Refining Posttraumatic Stress Disorder Diagnosis: Evaluation of Symptom Criteria With the National Survey of Adolescents

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Objective: To compare the prevalence estimates, comorbidity rates, and structural validity of a revised symptom criteria set for the diagnosis of posttraumatic stress disorder (PTSD) with those of the *DSM-IV* criteria in a representative community sample of adolescents.

Method: Cross-sectional data from the National Survey of Adolescents, a 1995 household probability sample of 4,023 adolescents aged 12–17 years, were examined. *DSM-IV* PTSD symptoms were assessed with a modification of the National Women's Study PTSD module. Three- and 4-factor *DSM-IV* models were compared to a 2-factor PTSD model that deleted symptoms potentially overlapping with depression or other anxiety disorders. Comorbidity was assessed using *DSM-IV* criteria for major depressive episodes and substance use disorders.

Results: PTSD prevalence varied across models (ie, 5.2%–8.8%, lifetime; 3.2%–5.7%, past 6 months). When the 2-factor model was used with a proportionate symptom threshold, lifetime PTSD prevalence was comparable to that with the 3-factor *DSM-IV* model, and major depressive episode comorbidity was reduced by 9%–14%. Comorbidity with substance use disorders was comparable across models. Structural validity, tested with confirmatory factor analyses, showed that the 2-factor model and a 4-factor *DSM-IV* model were superior to the *DSM-IV* 3-factor model.

Conclusions: Compared to the *DSM-IV* 3-factor PTSD model, a 2-factor model that removed depression and anxiety symptoms and used a proportionate symptom threshold may produce comparable lifetime PTSD prevalence estimates, reduced PTSD-depression comorbidity, and superior structural validity (comparable to a 4-factor PTSD model) when applied to community samples of adolescents. Further research on PTSD structure and diagnosis with adolescents is warranted.

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The diagnosis of posttraumatic stress disorder (PTSD) has been revised in successive versions of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) since first appearing in the third edition in 1980 through the most recent *DSM (DSM-IV-TR)*.[1] While the trauma (A) criterion and specific symptoms have been substantially revised over time, a 3-factor structure has consistently been used to organize the symptoms in the (B) intrusive re-experiencing, (C) avoidance and emotional numbing, and (D) hyperarousal criteria for PTSD. However, PTSD nosology has been controversial, including calls for major revisions, or even its elimination.[2,3] This study tests a revision[4] of the PTSD symptom criteria proposed to increase the parsimony and efficiency of the PTSD diagnosis with a briefer symptom set designed to reduce overlap with other anxiety disorders or depression. The revised symptom set has been tested with adults,[5] and in the present study, its use is extended to adolescents.

In an attempt to incorporate the results of factor analytic and clinical studies in a refined PTSD diagnosis, Spitzer et al[4] proposed removing 5 symptoms that either overlap with those of major depressive episode and generalized anxiety disorder (ie, anhedonia, C4; sleep problems, D1; irritability/anger, D2; concentration problems, D3) or have questionable clinical validity (ie, possibly more related to dissociative disorders or normal age-related cognitive changes than to PTSD; psychogenic amnesia, C3). Spitzer et al[4] suggested also consolidating

the remaining avoidance, numbing, and arousal items in a combined C/D criterion—creating a 2-factor PTSD model, with 4 C/D symptoms required for a PTSD diagnosis.

The resulting 2-factor PTSD model[4] includes the same 5-symptom (B1–B5) intrusive reexperiencing factor as the *DSM-IV* PTSD diagnosis, and a second avoidance/hyperarousal factor that combines 5 *DSM-IV* avoidance/numbing symptoms (C1, avoidance of thoughts; C2, avoidance of reminders; C5, social detachment; C6, emotional numbing; and C7, sense of foreshortened future) with 2 *DSM-IV* hyperarousal symptoms (D4, hypervigilance, and D5, exaggerated startle response). Spitzer et al[4] proposed a diagnostic criterion of at least 4 of the avoidance/hyperarousal symptoms present for the diagnosis of PTSD. Because this imposed a more stringent criterion than in the *DSM-IV* (which requires 3 of the 7 avoidance symptoms and 2 of the 5 hyperarousal symptoms for a PTSD diagnosis), a modified version of the 2-factor model—with a criterion of 3 avoidance/hyperarousal symptoms present—also was tested in the present study (see Method section below).

Elhai et al[5] contrasted the original *DSM-IV* PTSD diagnosis with the Spitzer et al[4] version using National Comorbidity Survey Replication (NCS-R) epidemiologic data with adults.[6] Although the 2 PTSD models did not differ appreciably in internal consistency, structural validity, functional impairment, or psychiatric comorbidity, the Spitzer et al[4] PTSD classification led to a reduction in the estimated prevalence of lifetime PTSD (from 6.8% to 6.4%) such that 13% of respondents meeting *DSM* criteria for PTSD no longer were classified as PTSD cases.[5]

The current study is a replication and extension involving adolescents and examining recent as well as lifetime PTSD. Adolescence, the age period from 12 to 17 years, is a time of rapid change and growth biologically, psychologically, and socially.[7] Adolescents who are exposed to violence are at risk for PTSD, major depressive disorder, and substance abuse, and those who develop PTSD are at risk for drug abuse or dependence.[8] Adolescents exposed to life threatening disasters[9] or accidents[8] also are at risk for PTSD. Not only having experienced recent traumatic events, but also having experienced traumatic stressors such as abuse or domestic violence during childhood, places adolescents at risk for persistent posttraumatic stress impairment and related behavioral and psychosocial risks (eg, suicidal ideation and drug and alcohol use problems).[10]

Studies of the symptom structure of PTSD in adolescence have yielded mixed results. Anthony et al[9,11] identified 3 latent dimensions of PTSD symptoms among more than 5,000 youths exposed to Hurricane Hugo and then replicated the structure with a sample of fifth graders exposed to Hurricanes Hugo or Andrew. However, the symptom factors did not match those of the *DSM-IV*, instead grouping the intrusive reexperiencing and avoidance symptoms in one set, emotional numbing items in a second factor, and hyperarousal symptoms in a third factor. Sack and colleagues[12] found a 4-factor solution to better fit data from Cambodian youths who had experienced war trauma than the 3 criteria of the *DSM-IV*. Avoidance items constituted a separate factor in that solution, rather than being included in a single criterion with either intrusive reexperiencing[9,11] or emotional numbing (*DSM-IV*) symptoms, a factor solution with substantial empirical support in the adult PTSD literature (reviewed in Asmundson et al[13]). Saul et al[14] found that, when a broader array of types of exposure to traumatic stressors was assessed with the National Survey of Adolescents (NSA), the Sack et al[12] 4-factor model was a better fit to the data than either the *DSM-IV* 3-factor model or the Anthony et al[9,11] 4-factor model.

While these studies provide modest structural validity support for a 4-factor PTSD model with adolescents, they have not tested a more parsimonious model such as the Spitzer et al[4] 2-factor model, nor do they address the clinical utility of alternative PTSD diagnosis models with adolescents. It is possible that the emotional numbing symptoms, which appear to constitute a separate factor in both 4-factor models of adolescent PTSD, should be pared down and subsumed with comorbid mood and anxiety disorders.[4] Also, arousal symptoms involving sleep, anger, and concentration problems may be better accounted for by comorbid anxiety or mood disorders rather than by PTSD.[4] Therefore, the present study was designed to use data from the same epidemiologic database used by Saul and colleagues,[14] the NSA, to test the nosologic modifications proposed by Spitzer et al[4] with adolescents. In addition to lifetime PTSD symptoms, the NSA also assessed recent PTSD symptoms. Recent PTSD involves immediate psychosocial impairment, whereas lifetime PTSD confers elevated risk of impairment. Recent PTSD among adolescents also confers significant psychiatric comorbidity.[8,15] Therefore, an examination of the effect of altered criteria for recent as well as lifetime PTSD may provide useful insights into the structure and criterion set for PTSD among adolescents.

The specific hypotheses tested in the present study were that a 2-factor PTSD model that deleted symptoms potentially overlapping with depression or other anxiety disorders would have comparable PTSD prevalence, greater structural validity, and reduced comorbidity compared to 3- and 4-factor *DSM-IV* models that retain depression and anxiety disorder symptoms.

METHOD

Procedure

Data were acquired from the NSA[16] by the third author (K.J.R.). The survey was conducted by computer assisted

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telephone interviews that included a 10-minute assessment with a parent or guardian followed by a private interview with the participating adolescent with parent/guardian consent. Provisions to ensure adolescent confidentiality were included by the Department of Justice, and adolescent safety was addressed with clinical follow-up in the event of disclosure of previously undisclosed sexual or physical assault.[8,17]

Sample

The NSA[16,17] is a cross-sectional household probability sample of 4,023 adolescents (aged 12–17 years) surveyed between January and June 1995 and designed to be representative of the 1995 United States population drawing from the 9 Census Bureau regional census tracts. Of the 5,367 households identified, more than 90% (N = 4,836) of selected parents participated, and an adolescent from 75% of the eligible households (95% of those providing parental consent) completed the independent adolescent phone interview. The survey oversampled households in urban locations in order to avoid underrepresenting youths from minority ethnic groups. Participating adolescents were 51.5% male, 70% non-Hispanic white, 15% African American, 8% Hispanic/Latino, 4% Native American, 1% Asian American, and 2% other ethnicities.

Instruments

Demographics. Family and youth demographic characteristics were obtained in the parent interview using questions from the United States Census Bureau for age, gender, and race.

Posttraumatic stress disorder. Exposure to potentially traumatic events was assessed in the adolescent interview, which was conducted only if the respondent could complete the interview in a private place, in order to enhance both willingness to answer sensitive questions and willingness to provide honest answers. Events were described in brief behaviorally specific terms requiring only a "Yes" or "No" answer, followed by a similarly closed-ended question about feeling afraid of dying or severe injury.[16] This method of identifying trauma exposure differs from *DSM-IV* criteria in 2 respects that may lead to under-identification of PTSD. Although *traumatic* events were limited to "high magnitude" stressors (ie, witnessing violent trauma; sexual assault or abuse; physical assault or abuse; or direct exposure to disaster, accident, or actual or threatened serious injury; see Appendix of Kilpatrick et al[8]), some potentially traumatic events (ie, serious injury, illness, or death of a family member or close friend) were excluded. Second, assessing respondents' subjective fear of death or severe injury does not establish *DSM-IV* criterion A1 (ie, whether the event objectively involved death, severe injury, or violation of bodily integrity), but more importantly, it is not a proxy for the A2 criterion because these are only a subset of the possible subjective reactions of extreme fear, helplessness, or horror. In the present study, the A1 criterion was assumed to have been met by the restriction of events to high magnitude stressors, and the A2 criterion was not assessed—specifically, endorsement of fear of death or serious injury was not required. Although these represent limitations that should be addressed in future studies, they were chosen in order to attempt to counterbalance the potential under-identification of PTSD due to limiting traumatic event types with potential over-identification of PTSD by not using a restrictive A2 probe. Consistent with the *DSM-IV*, functional impairment (ie, endorsement of at least 1 of 3 items regarding problems with school, job, or family/friends as very distressing) was required.

Posttraumatic stress disorder symptoms (binary "yes"/"no" items) experienced for at least 2 weeks were assessed using Kilpatrick and colleagues'[8] adaptation of the National Women's Study PTSD module but were not linked to any specific index traumatic event. The interview was adapted for *DSM-IV* criteria from the Diagnostic Interview Schedule, an epidemiologic survey designed for trained layperson interviewers. *Recent* PTSD symptoms were coded present if reported to occur in the past 6 months. *Lifetime* symptoms were based on any time in the adolescent's life (including the past 6 months). In the *DSM-IV* Field Trial study with adults, this PTSD interview showed good correspondence for recent PTSD (κ = .71) and lifetime PTSD (κ = .77) with the Structured Clinical Interview for *DSM-IV*.[18]

The Spitzer model PTSD diagnosis was identical to that of the *DSM-IV* PTSD diagnosis except that (1) a combined C/D symptom cluster was constructed, removing the traumatic amnesia, anhedonia, concentration, sleep, and irritability symptom items, and (2) at least 4 symptoms were required from the remaining combined C/D criterion for a PTSD diagnosis (see Table 1). A revision of this model also was tested using 3 C/D symptoms as the diagnostic cutoff. Five of 12 criterion C and D symptoms are required in the *DSM-IV*, or 42% of the possible symptoms. Reducing the requirement to 3 symptoms thus is more proportionate (ie, 3/7 = 43%) to *DSM-IV* criteria.

Comorbid psychiatric disorders. The NSA assessed *DSM-IV* criterion items for major depressive episode and substance use disorders to code each diagnosis as present or absent.[16,17]

Analyses

Statistical Package for the Social Sciences (SPSS) version 15 software[19] was used to provide PTSD prevalence and diagnostic comorbidity estimates. Mplus version 5.1 software[20] was used to test structural validity. All analyses were 2-tailed. For structural validity and reliability analyses, only data from the 3,351 trauma-exposed participants were used, and missing item-level data were estimated to

Table 1. Confirmatory Factor Analytic Models Tested

PTSD Items	Spitzer et al 2 Factors	*DSM-IV* 3 Factors	*DSM-IV* 4 Factors
B1. Intrusive thoughts	Reexperiencing	Reexperiencing	Reexperiencing
B2. Nightmares	Reexperiencing	Reexperiencing	Reexperiencing
B3. Flashbacks	Reexperiencing	Reexperiencing	Reexperiencing
B4. Cued emotional reactivity	Reexperiencing	Reexperiencing	Reexperiencing
B5. Cued physical reactivity	Reexperiencing	Reexperiencing	Reexperiencing
C1. Avoiding thoughts	Avoidance/hyperarousal	Avoidance/numbing	Avoidance
C2. Avoiding reminders	Avoidance/hyperarousal	Avoidance/numbing	Avoidance
C3. Specific amnesia	—	Avoidance/numbing	Numbing
C4. Loss of interest	—	Avoidance/numbing	Numbing
C5. Feeling distant	Avoidance/hyperarousal	Avoidance/numbing	Numbing
C6. Feeling numb	Avoidance/hyperarousal	Avoidance/numbing	Numbing
C7. Lack of future plan	Avoidance/hyperarousal	Avoidance/numbing	Numbing
D1. Difficulty sleeping	—	Hyperarousal	Hyperarousal
D2. Irritability	—	Hyperarousal	Hyperarousal
D3. Difficulty concentrating	—	Hyperarousal	Hyperarousal
D4. Overly alert	Avoidance/hyperarousal	Hyperarousal	Hyperarousal
D5. Exaggerated startle response	Avoidance/hyperarousal	Hyperarousal	Hyperarousal

Abbreviations: *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; PTSD = posttraumatic stress disorder.

preserve the sample size, using maximum likelihood procedures[21] for categorical outcomes.[20] Three percent to 5% of participants missed such data (typically on 1–2 items each). The sample size (n = 3,351) of trauma-exposed subjects is larger than the trauma-exposed sample of Saul et al[14] (n = 1,581) because the present study did not require that fear of death or serious injury during the trauma be endorsed. Dropping that requirement provided an opportunity to replicate the Saul et al[14] confirmatory factor analyses with 3-factor and 4-factor solutions in order to determine if a 4-factor solution based on the Sack et al[12] subdivision of Criterion C into separate avoidance and numbing factors was superior to the *DSM-IV* 3-factor model with the broader subsample of adolescents who endorsed potentially traumatic events with or without fear of death or injury.

RESULTS

PTSD Prevalence: Lifetime Diagnosis

Lifetime PTSD was identified as present for 329 participants (8.2%) according to *DSM-IV* criteria, compared to 209 participants (5.2%) using the Spitzer et al[4] model, representing a statistically significant difference using a binomial approximation *z* test for proportions,[22] $z = 6.93$, SE = 0.00, $P < .001$. More participants (n = 137, 42%) who met *DSM-IV* lifetime PTSD criteria no longer met criteria using the Spitzer et al model than vice versa (n = 17, 8% of those meeting the Spitzer et al lifetime criteria). When the Spitzer et al model was used with a 3–C/D symptom threshold, lifetime PTSD prevalence was comparable to that with the *DSM-IV* (354 participants; 8.8%), binomial approximation $z = 1.39$, SE = 0.00, $P > .05$. With the modified symptom threshold, 54 participants (16% of those meeting lifetime PTSD criteria according to *DSM-IV*) no longer met PTSD criteria, and a slightly larger proportion of participants who met the Spitzer et al criteria (n = 79, 22%) did not meet *DSM-IV* PTSD criteria.

PTSD Prevalence: Recent Diagnosis

Recent PTSD was diagnosed in 203 participants (5.0%) according to *DSM-IV* criteria, compared to 128 participants (3.2%) using the Spitzer et al[4] model, a result that was significantly different, binomial approximation $z = 5.24$, SE = 0.00, $P < .001$. Almost half (45%, n = 91) of the participants who met recent PTSD criteria according to *DSM-IV* did not meet recent criteria using the Spitzer et al symptom criteria. Fewer participants (13%, n = 16) of those meeting the Spitzer et al recent PTSD criteria did not meet *DSM-IV* criteria for recent PTSD. A 3-symptom threshold for the C/D criterion for the Spitzer et al model reversed the finding, with the 2-factor model's recent PTSD prevalence estimate (5.7%, n = 231) significantly higher than that of the *DSM-IV*, binomial approximation $z = 2.33$, SE = 0.00, $P = .03$. Fewer participants (19%, n = 39) who met *DSM-IV* recent PTSD criteria failed to meet recent PTSD criteria with this version of the Spitzer et al criteria, but a larger proportion (29%, n = 67) would not meet *DSM-IV* criteria.

Structural Validity

Confirmatory factor analyses next compared the structural validity of the 2-, 3-, and 4-factor (ie, separating effortful avoidance and emotional numbing into 2 separate factors[12]) PTSD models using robust (mean- and variance-adjusted) weighted least squares estimation to compare covariance matrices and to produce factors from a tetrachoric correlation matrix with factor loadings estimated by probit regression coefficients.[23,24] Chi-square tests of model fit were examined in conjunction with relative and absolute goodness-of-fit indices, including the Tucker-Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation

Table 2. PTSD Diagnostic Comorbidity Differences Between Diagnostic Models With National Survey of Adolescents Data

	DSM-IV PTSD 3-Factor Diagnosis		Spitzer et al 2-Factor PTSD Diagnosis (4-symptom cutoff)			Spitzer et al 2-Factor PTSD Diagnosis (3-symptom cutoff)		
Comorbid Disorder Diagnosed	%	*n*	%	*n*	*z*[a]	%	*n*	*z*[b]
Lifetime PTSD								
MDE	75.7	249	76.6	160	.34	69.2	245	2.88*
Alcohol abuse	13.7	45	16.3	34	1.24	15.3	54	1.29
Substance abuse	5.8	19	7.2	15	.98	5.9	21	.08
Recent PTSD								
MDE	36.9	75	40.6	52	.99	31.6	73	1.62
Alcohol abuse	13.3	27	14.1	18	.98	13.4	31	.08
Substance abuse	6.9	14	7.8	10	.46	6.5	15	.23

[a] *z* = Binomial approximation *z* test statistic for proportions, comparing the *DSM-IV* and Spitzer et al (4 C/D symptoms required) PTSD diagnostic systems, using a mean sample size of 269 and 166 across diagnostic systems for lifetime and current PTSD, respectively.
[b] *z* = Binomial approximation *z* test statistic for proportions, comparing the *DSM-IV* and Spitzer et al (3 C/D symptoms required) PTSD diagnostic systems, using a mean sample size of 342 and 217 across diagnostic systems for lifetime and current PTSD, respectively.
*$P < .01$.
Abbreviations: *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; MDE = major depressive episode; PTSD = posttraumatic stress disorder.

(RMSEA) (interpreted as well-fitting when CFI/TLI > 0.95, RMSEA ≤ 0.06).[25,26] Because the 2-factor[4] model is not nested within the *DSM-IV* 3- or 4-factor models, they cannot be compared with a χ^2 difference test. However, Bayesian information criterion (BIC) values are provided for the models (using maximum likelihood estimation, with a logit rather than probit link), whereby the model with a 10-point lower BIC value indicates an odds of 150:1 that the smaller value's model is better fitting.[27]

Analyses were conducted separately for recent and lifetime PTSD symptoms, with very comparable results, so only the lifetime PTSD model tests will be reported (recent PTSD results may be obtained from J.D.E.). The 2-factor model fit the data well: robust $\chi^2 = 1624.52$, df = 48,3351; $P < .001$, TLI = 0.99, CFI = 0.98, RMSEA = 0.03, BIC = 26596.64. A similar fit was obtained for the *DSM-IV* 3-factor model, robust $\chi^2 = 343.37$, df = 99,3351; $P < .001$, TLI = 0.99, CFI = 0.98, RMSEA = 0.03, BIC = 40647.69, and the *DSM-IV* PTSD 4-factor model (separating avoidance and numbing symptoms) of lifetime symptoms, robust $\chi^2 = 268.55$, df = 97,3351; $P < .001$, TLI = 0.99, CFI = 0.98, RMSEA = 0.02, BIC = 40590.65. The BIC values, comparing nonnested models, indicated a superior fit for the Spitzer et al 2-factor model.

Comorbidity

Depression. Among participants with *DSM-IV*–diagnosed lifetime PTSD, 249 (75.7%) also met criteria for a lifetime major depressive episode (Table 2). Among participants with lifetime PTSD based on the Spitzer et al[4] model with 4– and 3–C/D symptom cutoffs, 160 (76.6%), and 245 (69.2%), respectively, met criteria for a lifetime major depressive episode. Compared to the *DSM-IV* PTSD criteria, the difference in the proportions was not statistically significant for the Spitzer et al model with a 4–C/D symptom threshold, binomial approximation $z = 0.34$, SE = 0.03, $P > .05$, but was lower for a 3–C/D symptom threshold, $z = 2.88$, SE = 0.02, $P = .006$. Of the participants with *DSM-IV*-diagnosed recent PTSD, 75 (36.9%) also met criteria for a recent major depressive episode. Among participants with recent PTSD based on the Spitzer et al[4] model with 4– or 3–C/D symptom thresholds, 52 (40.6%), and 73 (31.6%), respectively, also met criteria for a recent major depressive episode. Compared with the *DSM-IV* PTSD model, the difference between the proportions was not statistically significant for either version of the Spitzer et al model, binomial approximation $z = 0.99$, SE = 0.04, $P > .05$, and $z = 1.62$, SE = 0.03, $P > .05$, respectively. Although the differences were not statistically significant, the Spitzer criteria set with a 3-C/D requirement was associated with a 9%–14% reduction in comorbid lifetime and recent major depressive episodes, compared to the DSM-IV criteria.

Substance use disorders. Of the participants with diagnosed lifetime PTSD based on the *DSM-IV* or Spitzer et al models with 4– or 3–C/D symptom cutoffs, 45 (13.7%), 34 (16.3%), and 54 (15.3%), respectively, met criteria for lifetime alcohol abuse. Compared with the *DSM-IV* PTSD model, the difference between the proportions was not statistically significant for the Spitzer et al models, binomial approximation $z = 1.24$, SE = 0.02, $P > .05$, and $z = 1.29$, SE = 0.02, $P > .05$ (Table 2). Of the participants with diagnosed recent PTSD based on the *DSM-IV* or Spitzer et al models with 4– or 3–C/D symptom cutoffs, 27 (13.3%), 18 (14.1%), and 31 (13.4%), respectively, met criteria for a recent alcohol abuse. Compared with the *DSM-IV* PTSD model, the difference between proportions was not statistically significant for the Spitzer et al

models, binomial approximation $z = 0.30$, SE = 0.03, $P > .05$, and $z = 0.04$, SE = 0.02, $P > .05$.

Of the participants with diagnosed lifetime PTSD based on the *DSM-IV* or Spitzer et al model with 4– or 3–C/D symptom cutoffs, 19 (5.8%), 15 (7.2%), and 21 (5.9%), respectively, met criteria for lifetime drug abuse. Contrasting with the *DSM-IV* PTSD model, the difference between the proportions was not statistically significant for the Spitzer et al models, binomial approximation $z = 0.98$, SE = 0.01, $P > .05$, and $z = 0.08$, SE = 0.01, $P > .05$ (Table 2). Of the participants with diagnosed recent PTSD based on *DSM-IV* or Spitzer et al models with 4– or 3–C/D symptom cutoffs, 14 (6.9%), 10 (7.8%), and 15 (6.5%), respectively, met criteria for recent drug abuse. Compared with the *DSM-IV* PTSD model, the difference between proportions was not statistically significant for either Spitzer et al model, binomial approximation $z = 0.46$, SE = 0.02, $P > .05$, and $z = 0.23$, SE = 0.02, $P > .05$.

DISCUSSION

Using data from a national survey of adolescents, a 2-factor PTSD model proposed by Spitzer et al[4] resulted in a superior structural fit compared to the *DSM-IV* 3-factor PTSD model and to a 4-factor revision of the *DSM-IV* PTSD model.[12] With a 3-symptom criterion for the avoidance/hyperarousal criterion, the 2-factor model also yielded lower levels of comorbidity with lifetime major depressive episode and slightly *higher* lifetime and recent PTSD prevalence estimates than the 3-factor *DSM-IV* model. The 2-factor model's reduced comorbidity of lifetime PTSD with major depressive episode was a decrease from more than 3 quarters to just over two thirds of the adolescents diagnosed with PTSD (an absolute difference of 6.5%). A similar reduction, although not statistically significant (likely because of reduced statistical power due to a lower base-rate for recent versus lifetime PTSD), was observed in recent PTSD-depression comorbidity—an absolute difference of 5.3% (36.6% vs 31.3%).

The 4-symptom criterion for avoidance/hyperarousal symptoms proposed by Spitzer et al led to substantially lower PTSD prevalence estimates than the 3-factor *DSM-IV* PTSD model, and thus potentially to underdetection of as many as 40%–45% of clinically impaired adolescents with recent or past PTSD. The lower prevalence estimates for the 2-factor model with the more stringent 4-symptom criterion for avoidance/hyperarousal do not necessarily mean that "PTSD" per se would be underdetected, because there is no absolute criterion for what constitutes PTSD—and, indeed, examining different criteria is the focus of this study. More liberal criteria might lead to overdetection of "PTSD." However, this risk must be weighed against the risk of underdetection and undertreatment of clinically impaired adolescents, which has been found to be a serious problem with regard to traumatized adolescents[28,29] and adolescents with a broad range of psychiatric conditions including PTSD.[30]

The 2-factor PTSD model specified by the Spitzer et al[4] criteria and the 3- and 4-factor models derived from the *DSM-IV* PTSD symptom set all fit the adolescent data well, but the 2- and 4-factor models appeared to represent *better* fitting factor solutions than the 3-factor model. This result may be due to the fact that the Spitzer et al model eliminated mood and anxiety symptoms, which could be conceptualized as important aspects of the PTSD diagnosis, but distinct from traditional posttraumatic reactions. Additionally, the replication of the finding of Saul and colleagues[14] that the 4-factor model was superior in fit to the 3-factor model suggests that further empirical and conceptual examination is needed to determine the best structural model to describe PTSD in adolescents (as with adults[13]).

The findings both converge with and diverge from those of Elhai and colleagues[5] in their evaluation of the Spitzer et al[4] 2-factor PTSD model with adults. Elhai et al found no difference between the *DSM-IV* and Spitzer et al criteria in comorbidity with MDE and alcohol use disorders, which is similar to this study's findings using the original Spitzer et al 4–C/D symptom cutoff, but differs from this study's finding of reduced PTSD-depression comorbidity when a 3–C/D symptom cutoff was used with the Spitzer et al PTSD model. This difference may be due to the altered cut point rather than to age or developmental factors. However, with adolescents, PTSD prevalence estimates were substantially lower using the original Spitzer et al criteria, compared to *DSM-IV* criteria, and a relaxed C/D symptom threshold was necessary to achieve comparable prevalence estimates for the 2 systems. With adolescents, therefore, unless subsequent research can show evidence that the higher PTSD prevalence levels with the relaxed diagnostic threshold lead to an unwarranted overdetection of PTSD, it appears that a 3–C/D symptom threshold best enables the Spitzer et al 2-factor PTSD model to have sensitivity in detecting PTSD cases comparable to that of the *DSM-IV*. The finding that 2.5%–3.8% of the adolescent sample would be differently diagnosed by the 2 models suggests that further research is needed to clarify differences between "caseness" for the models.

Several clinical implications warrant consideration. On the basis of parsimony and efficiency, the reduced PTSD symptom set proposed by Spitzer et al[4] may have clinical utility as a result of both brevity and reduced comorbidity with major depressive episodes. Screening for PTSD with adolescents in primary care,[28] child welfare,[29] and mental health[30] is needed in order to reduce underdetection and undertreatment of clinically impaired youths. Screening for PTSD has been accomplished

successfully with adults in primary care,[31] substance use disorder treatment,[32] emergency medical care and victims assistance,[33] and corrections[34] settings, consistently showing that identifying 2 of the 3 *DSM-IV* PTSD symptom criteria as likely to be present provides the most accurate identification of PTSD cases. The 2-factor model thus may provide a basis not only for efficient diagnostic assessment but also for the development of efficient PTSD screening instruments for adolescents who have been exposed to trauma.

The reduced comorbidity levels with major depressive episodes achieved by the modified 2-factor model also may provide a basis for enhancing treatment specificity. The 5%–7% of youths who would be diagnosed with comorbid PTSD and major depressive episode using the *DSM-IV* or the original Spitzer et al[4] PTSD criteria but are diagnosed only with PTSD using the Spitzer et al model and the 3–C/D symptom cutoff might be candidates for PTSD-specific therapy rather than more complex treatments also targeting depression (eg, antidepressant medication). This finding may help to explain why such treatment adaptations are not always effective.[35]

Research testing the adapted Spitzer et al[4] PTSD criteria with clinical samples is therefore needed in order to determine if the current community sample findings regarding structural validity and comorbidity can be replicated in clinical contexts. Studies also should examine the revised PTSD model's clinical utility[36] using the precise *DSM-IV* definitions of criteria A1 and A2, including testing for predictive validity (eg, ability to distinguish patients with different health care outcomes in various treatments) and usefulness/acceptability according to clinicians. Such research can clarify whether reducing the frequency of potential artifactual cases of PTSD-depression comorbidity that occur largely due to overlapping symptoms in the 2 diagnoses does in fact alter or improve clinical practice and outcomes with traumatized adolescents.

With regard to the structure of PTSD in adolescence, the 2-factor Spitzer et al[4] model may warrant further structural study given its strong fit with the data in this study with youth and in the NCS-R adult dataset[5] and its conceptual fit with the original 2-factor (intrusion/avoidance) theory of traumatic stress.[37] However, it should be noted that a premise of PTSD diagnosis is that PTSD represents a categorical taxon rather than a continuum. Adolescent studies indicate that a dimensional model may be needed to represent posttraumatic stress,[38] suggesting that dimensional models also should be compared to categorical PTSD models with adolescents.

In conclusion, this epidemiologically based study's findings suggest that the prevalence of PTSD in adolescents is not primarily an artifact of comorbidity with depression or substance use disorders, and that a briefer symptom set that deletes *DSM-IV* PTSD symptoms that overlap with depression and anxiety disorders warrants testing with adolescent clinical samples regarding the set's clinical utility in comparison to the existing *DSM-IV* PTSD symptom set.

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