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Posttraumatic stress disorder in DSM-5: Estimates of prevalence and symptom structure in a nonclinical sample of college students☆

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ABSTRACT

We empirically investigated recent proposed changes to the posttraumatic stress disorder (PTSD) diagnosis for *DSM-5* using a non-clinical sample. A web survey was administered to 585 college students using the Stressful Life Events Screening Questionnaire to assess for trauma exposure but with additions for the proposed traumatic stressor changes in *DSM-5* PTSD. For the 216 subjects endorsing previous trauma exposure and nominating a worst traumatic event, we administered the original PTSD Symptom Scale based on *DSM-IV* PTSD symptom criteria and an adapted version for *DSM-5* symptoms, and the Center for Epidemiological Studies-Depression Scale. While 67% of participants endorsed at least one traumatic event based on *DSM-IV* PTSD's trauma classification, 59% of participants would meet *DSM-5* PTSD's proposed trauma classification. Estimates of current PTSD prevalence were .4–1.8% points higher for the *DSM-5* (vs. the *DSM-IV)* diagnostic algorithm. The *DSM-5* symptom set fit the data very well based on confirmatory factor analysis, and neither symptom set's factors were more correlated with depression.

1. Introduction

In recent years, several modifications to the diagnostic criteria for posttraumatic stress disorder (PTSD) have been proposed. Some of these changes were recently proposed for PTSD in the *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition* (*DSM-5)* (detailed in Friedman, Resick, Bryant, & Brewin, in press). The proposed revisions primarily involve changes to *DSM-IV* PTSD's types of events satisfying the objective traumatic stressor criterion (Criterion A1 in *DSM-IV*), deletion of the requirement for initial subjective reactions of intense fear, helplessness, or horror to the stressor event (Criterion A2), and broadening the scope of symptoms beyond re-experiencing, avoidance, numbing and arousal symptoms in order to emphasize dysphoria (Criterion C). The present study examines the direct effects of proposed changes to the PTSD diagnosis on the prevalence rates of trauma exposure and PTSD, as well as on the symptom structure of PTSD.

1.1. Traumatic stressor criterion

PTSD's Criterion A1 in *DSM-IV* requires that a traumatic event for a PTSD diagnosis must involve direct or indirect trauma exposure to threatened or actual serious injury, bodily compromise, or death. Whether Criterion A1 should be limited in scope or expanded to include other types of events has been considerably debated in recent years (e.g., Brewin, Lanius, Novac, Schnyder, & Galea, 2009; Friedman et al., in press; Long & Elhai, 2009; Weathers & Keane, 2007). Whether Criterion A2 should be included at all also has been the subject of debate and research (Bovin & Marx, 2011; Friedman et al., in press).

The current proposal for *DSM-5* PTSD criteria (American Psychiatric Association. DSM-5 Development, 2010) suggests several changes to Criterion A1. First, the proposal requires that indirect exposure through witnessing a stressor event must occur in person. This restriction clarifies ambiguity from *DSM-IV* PTSD criteria by excluding events witnessed exclusively via electronic media (e.g., Ahern et al., 2002). Second, the proposal suggests that for indirect exposure to occur through learning about a loved one's traumatic experience, this must involve violent or accidental death, presumably to rule out death from natural causes or old age. Third, it is proposed that indirect exposure may also involve persistent or prolonged exposure to aversive details of a gruesome trauma, with the stipulation that such aversive exposure can be through

☆ Portions of this study were part of the second author's undergraduate honor's thesis. The survey measures used in this study are available upon request from the first author. Correspondence about this paper may be addressed to Jon Elhai through his website: www.jon-elhai.com.

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electronic media only if it happens as part of one's occupation (discussed in Friedman et al., in press).

The *DSM-5* PTSD proposal also suggests removing Criterion A2 entirely. McNally (2009) argued that Criterion A2's placement alongside Criterion A1 is problematic because it unnecessarily confuses the traumatic event's occurrence (the stimulus) with the person's emotional reaction (the response). Furthermore, research studies have generally not found that Criterion A2 is predictive of who will develop PTSD (reviewed in Bovin & Marx, 2011). However, more recent research has found that meeting vs. not meeting Criterion A2 has robust associations with PTSD at the latent variable level (Armour, Layne, et al., 2011).

1.2. Symptom criteria

Several changes are proposed for *DSM-5* to the symptom criteria for PTSD (American Psychiatric Association. DSM-5 Development, 2010). Criterion B's changes primarily involve rephrasing for clarity and precision, including specifying that nightmare content must be related to the traumatic event, and clarifying that flashback symptoms are dissociative reactions that can range on a continuum.

The most prominent proposed change in symptom criteria occurs with *DSM-IV* PTSD's Criterion C (American Psychiatric Association. DSM-5 Development, 2010). Criterion C's effortful avoidance and emotional numbing symptoms are proposed to be split into two separate criteria (C and D, respectively, in *DSM-5*), based on empirical research demonstrating that avoidance and numbing are distinct from one another in terms of psychopathology and treatment effects (reviewed in Asmundson, Stapleton, & Taylor, 2004). Furthermore, factor analytic evidence demonstrates that the *DSM-IV* symptom model for PTSD only fits well when avoidance and numbing are split into separate factors (reviewed in Elhai & Palmieri, 2011), resulting in the King, Leskin, King, and Weathers (1998) emotional numbing PTSD model which has substantial empirical support (reviewed in Yufik & Simms, 2010). A competing model, developed by Simms, Watson, and Doebbeling (2002), modifies the emotional numbing model by moving three hyperarousal symptoms into the numbing factor, and labeling the resulting eight-item factor of mixed numbing and hyperarousal as dysphoria; this model too has substantial empirical support (reviewed in Yufik & Simms, 2010). In *DSM-5*, Criterion C would include two avoidance symptoms and requires at least one symptom for diagnosis. Criterion D includes seven symptoms of "negative alterations in cognition and mood that are associated with the traumatic event(s)" and would require at least three symptoms for diagnosis (two for children). Recent studies have found that requiring both avoidance and numbing for a PTSD diagnosis would result in a decrease in PTSD's prevalence by about 1–2% points (Elhai, Ford, Ruggiero, & Frueh, 2009; Forbes et al., 2011).

The *DSM-5* proposed Criterion D clarifies that endorsement of the traumatic amnesia item should not be due to head injury or substance use. Additionally, Criterion D includes new symptoms involving perceived trauma-related blame, a pervasive negative emotional state, and replacement of the *DSM-IV* PTSD item of perceived foreshortened future with an item defined by persistent exaggerated negative perceptions of oneself, others or the world. Thus the proposed Criterion D greatly emphasizes symptoms consistent with depression. However, some investigators have criticized the original *DSM-IV* PTSD diagnosis for too heavily emphasizing depression content (Frueh, Elhai, & Acierno, 2010; McHugh & Treisman, 2007; McNally, 2009; Rosen & Lilienfield, 2008), especially in light of PTSD's item overlap and comorbidity with major depression (Elhai et al., 2011).

The newly proposed Criterion E is an elaboration of *DSM-IV* PTSD's Criterion D, with six items, of which at least three symptoms must be present for diagnosis (two for children). Criterion E adds reckless or self-destructive behavior as a symptom, given its proposed role as a coping mechanism for PTSD (reviewed in Rheingold, Acierno, & Resnick, 2004). Additionally, the irritability item replaces anger with aggressive behavior. The remaining symptoms for this criterion remain largely intact from the *DSM-IV* PTSD diagnosis.

1.3. Timing specifier

The final change in the proposed *DSM-5* criteria from the *DSM-IV* criteria for PTSD is a clarification of delayed onset as a specifier for PTSD. While *DSM-IV* PTSD's delayed onset specifier required that *no* symptoms emerge until at least six months post-trauma, the *DSM-5* proposed specifier for delayed onset allows for *some* (not all) of the symptoms to occur prior to six months post-trauma. In fact, research demonstrates that delayed onset for PTSD is extremely rare if it even exists at all (Andrews, Brewin, Philpott, & Stewart, 2007; Frueh, Grubaugh, Yeager, & Magruder, 2009).

1.4. Summary and aims

It is unclear how the proposed changes for *DSM-5* PTSD regarding qualifying traumatic events, the deletion of Criterion A2, the changes and additions of symptoms, and the greater emphasis on depression content will affect the prevalence estimates of trauma exposure and PTSD, and the symptom structure of PTSD. In this study, we recruited a convenience sample of non-clinical participants by querying them using traumatic event and PTSD symptom content from both the *DSM-IV* PTSD criteria and the proposed *DSM-5* PTSD criteria. This study was conducted using self-report surveys, so clinician interviews were not available to confirm diagnostic caseness.

We hypothesized that the proposed changes to Criterion A would result in negligible differences in the estimated prevalence of trauma exposure, because it broadens the definition of trauma in one sense (adding repeated exposure to aversive trauma-related details, and removing the requirement for an initial fear reaction) but restricts the definition in another sense (by excluding the witnessing of trauma through electronic media). Based on recent empirical findings (Elhai et al., 2009; Forbes et al., 2011), we anticipated a reduction in PTSD's estimated current prevalence rate by about 1–2% points, mainly from the proposed requirement for both avoidance and numbing criteria. Finally, we expected that the proposed symptom set as a whole would fit well, based on confirmatory factor analysis (CFA). However, we expected that the new negative mood and cognition items would stand on their own as a separate factor, because their content is more focused on depressed mood and pessimism than the other symptoms within that cluster are. We also tested whether the recklessness item would fit well with the arousal items by investigating a model placing it within the negative mood and cognition items instead.

2. Method

2.1. Participants and procedure

We recruited 627 undergraduates from a moderately large Ohio Public University's psychology research pool during the fall 2010 semester. Study participation was initiated through the university's password-protected website (designed only for student access with a valid e-mail address from the university) listing currently available studies. After sign-up, participants were administered an online consent form following a protocol approved by the university Institutional Review Board, and those agreeing to participate were administered a web survey containing the following measures.

2.2. Instruments

2.2.1. Demographic survey

We inquired about age, education, employment, gender, race, ethnicity and income.

2.2.2. Stressful Life Events Screening Questionnaire (SLESQ)

We used the SLESQ (Goodman, Corcoran, Turner, Yuan, & Green, 1998) to assess previous psychological trauma exposure. The SLESQ is a behaviorally specific self-report scale and includes 12 *DSM-IV* PTSD Criterion A1 traumatic stressors. We only inquired about the presence of traumas rather than additionally inquiring about characteristics of each traumatic event. We added a probing question to the witnessed exposure item to clarify whether it was witnessed exclusively through electronic media. Furthermore, we added a question based on the proposed criteria about repeated or extreme exposure to gruesome or horrific details of trauma, further querying whether such trauma was experienced exclusively through electronic media, and whether it occurred through one's occupation. After completing the SLESQ, respondents were asked to nominate their most distressing traumatic event (if endorsing more than one) for later PTSD inquiry, and were asked specific probing questions about this potentially traumatic event (including about *DSM-IV*'s Criterion A2)

For participants who endorsed at least one *DSM-IV*-qualifying Criterion A1 potentially traumatic event as their most distressing trauma, we used skip logic/branching in the web survey in order to automatically route them to administrations of the *DSM-IV*-based PTSD Symptom Scale (Foa, Riggs, Dancu, & Rothbaum, 1993) and an adapted version for the proposed *DSM-5* criteria (discussed below). The order of administration of PTSD measures was randomly varied. Participants endorsing the repeated aversive exposure item (which only appears in the proposed *DSM-5* criteria) as the most distressing event were only routed to the *DSM-5* PTSD query. Trauma-exposed participants were instructed to rate symptoms in relation to their traumatic event if they endorsed only one trauma, or to their most distressing event if they endorsed more than one trauma. Participants not endorsing any trauma were not administered PTSD items.

2.2.3. PTSD symptom scale-self report (PSS)

The PSS (Foa et al., 1993) assesses PTSD symptoms over the past two weeks using a four-point Likert scale with frequency/intensity behavioral anchor points (0 = "*Not at all*," to 3 = "5 *or more times per week/very much/almost always*"). Internal consistency estimates range from .65 to .71 (.92 in the present study's effective sample), with test–retest reliability between .66 and .80 (Foa et al., 1993). The PSS correlates .87 with the Clinician Administered PTSD Scale, with diagnostic sensitivity of .88 and specificity of .96 (Foa & Tolin, 2000; Foa et al., 1993).

For the *DSM-5* PTSD query, we adapted the PSS to the proposed *DSM-5* symptom modifications. We modified the phrasing of symptoms, and added the new symptoms, using similar phrasings found in the proposed criteria. We should note that existing PTSD instruments mapping onto *DSM-IV* symptom criteria use colloquialisms and/or easier readability to improve the respondent's understanding of sophisticated, clinically worded PTSD items (e.g., being "emotionally upset when reminded of the trauma" rather than "intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event). Similarly, we attempted to improve readability of the added *DSM-5* items (e.g., "cannot get over blaming yourself or others for the trauma or for the harm that the trauma has caused" instead of "persistent distorted blame of self or others about the cause or consequences of the traumatic event(s)"). We only modified the measure based on the proposed *DSM-5* changes, conducted in as minimal of a manner as possible; we did not implement any other changes that do not appear in the *DSM-5* proposal. Coefficient alpha for this adapted measure was .94 in this study. All but one of the authors of this report contributed to the adaptation of the measure.

For *DSM-IV* and *DSM-5* PTSD queries, we modified the rating time-frame of PTSD assessment to include the previous month of symptoms. We also inquired about functional impairment using a five-point Likert scale (1 = "*Not at all*," 2 = "*A little bit*," 3 = "*A moderate amount*," 4 = "*Quite a bit*," and 5 = "*Extremely*"), similar to how it is queried in other instruments (Spitzer, Kroenke, Williams, & the Patient Health Questionnaire Primary Care Study Group, 1999); we assessed cutoff scores of "2" and "3" on the impairment item. Functional impairment was queried in reference to relationships, school, work or other important areas of functioning, linked specifically to the relevant set of PTSD symptoms.

2.2.4. Center for Epidemiological Studies-Depression Scale (CES-D)

The CES-D (Radloff, 1977) is a 20-item self-report instrument of depression. It is a Likert-type instrument using four response options to indicate symptoms in the past week (0 = "*Rare or none of the time/less than* 1 *day*" to 3 = "*Most or all of the time*/5–7 *days*"). Excellent reliability (internal consistency was .84 to .90), and good test–retest reliability (.51 for 2-week and .67 for 4 week) have been demonstrated across various sample types (e.g., Radloff, 1977). Internal consistency of .88 was found by Knight, Williams, McGee, and Olaman (1997), and was .89 in the present study's effective sample. Good construct validity is reported, evidenced by moderate correlations with the Hamilton Clinician's Rating scale and Raskin Rating scale (.44–.54) at admission, and higher after four weeks of treatment (.69–.75) (Radloff, 1977).

2.3. Exclusions and missing data

Among the initial 627 participants, 31 subjects failed to at least answer the trauma exposure items and were excluded from analyses. Additionally, 11 subjects who denied endorsing any traumas, yet (incongruently) nominated a worst trauma for rating PTSD symptoms, were excluded as well.

Of the remaining 585 subjects, 389 subjects endorsed a trauma meeting either *DSM-IV* PTSD's Criterion A1 or the *DSM-5* proposed Criterion A. Among trauma-exposed subjects, only 235 nominated a most distressing (or only) traumatic event. In particular, 219 subjects nominated a *DSM-IV* PTSD Criterion A1 potential trauma as their most distressing event and were administered *DSM-IV* PTSD items. An additional subgroup of 16 subjects nominated a proposed *DSM-5* PTSD Criterion A traumatic event as their most distressing event. Thus, 235 participants (combining both subgroups) were administered *DSM-5* PTSD items. For the *DSM-IV* PTSD symptom query, 3 of 219 subjects failed to answer most PTSD items and were excluded. For the *DSM-5* symptom query, 2 of 235 subjects failed to answer most PTSD items and were excluded. We used maximum likelihood (ML) procedures (Graham, 2009) to estimate missing *DSM-IV* and *DSM-5* PTSD items (1–3 items per subject). Validation analyses included data on the CES-D; no subjects missed more than 3 items on the measure, so we used ML procedures to estimate missing values, subsequently summing responses (reverse scoring appropriate items) to obtain a summed CES-D score.

2.4. Analyses

CFA was conducted using Mplus 6.1 software (Muthén & Muthén, 2010, 1998–2010), using the 216 subjects with an adequate amount of data on *both* the *DSM-IV* and *DSM-5* PTSD queries. For the *DSM-IV* PTSD items, we did not test the three-factor *DSM-IV* PTSD model since extensive research demonstrates that it does not fit well (reviewed in Elhai & Palmieri, 2011); we instead tested

the more empirically supported four-factor emotional numbing and dysphoria models (reviewed in Yufik & Simms, 2010). For the *DSM-5* items, we first tested the proposed four-factor model. We also tested a four-factor *DSM-5* model with the recklessness item loading onto the negative alterations in mood and cognitions factor instead, to examine whether in fact the recklessness item belongs with its intended symptom cluster. Finally, we tested a five-factor *DSM-5* model, separating the new symptoms proposed as part of the negative alterations factor into its own factor.

We treated the PSS items as ordinal variables because they have fewer than five response options (e.g., Flora & Curran, 2004; Wirth & Edwards, 2007). Consequently, we generated a polychoric (rather than Pearson) covariance matrix, and probit regression coefficients in the CFAs. We therefore implemented robust weighted least squares estimation with a mean- and variance-adjusted chi-square (WLSMV) for the CFAs, the preferred estimation method for ordinal items (Flora & Curran, 2004; Wirth & Edwards, 2007). All residual error covariances were fixed to zero. In scaling the factors, we fixed all factor variances to a value of 1.

Goodness of fit indices are reported, including the comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). Models fitting very well are indicated by CFI and TLI $\geq$ .95, and RMSEA $\leq$ .06 (Hu & Bentler, 1999). Tests of parameter estimates were two-tailed. Because comparing nested models by examining differences in traditional goodness of fit indices is inappropriate and inaccurate (Fan & Sivo, 2009), we used a chi-square difference test for nested models. In difference testing, we implemented a correction factor, given the non-normally distributed WLSMV chi-square value (Muthén & Muthén, 2006). We also calculated Bayesian Information Criterion (BIC) values (using the ML estimator) to compare non-nested models within a given diagnostic system (e.g., *DSM-IV*). In comparing BIC values between models, a 10-point BIC difference represents a 150:1 likelihood and "very strong" ($p < .05$) support that the model with the smaller BIC value fits best; a difference in the 6 to 9 point range indicates "strong" support (Kass & Raftery, 1995; Raftery, 1995). There is no objective method available for comparing model fit between two distinct sets of items (i.e., *DSM-IV* vs. *DSM-5*). Finally, we tested for differential associations between *DSM-IV* and *DSM-5* factors with depression scores using t-tests for dependent correlations.

3. Results

Among the effective sample of 585 participants, the mean age was 19.36 years (SD = 3.00). The average number of school years completed was 12.69 (SD = 1.05). Most participants were women (71.2%, $n = 415$). Nearly 5% ($n = 28$) described themselves as Hispanic or Latino; most participants were of Caucasian (75.0%, $n = 439$), African American (18.3%, $n = 107$), or Asian descent (5.5%, $n = 32$). Most participants were single (90.2%, $n = 522$).

3.1. Prevalence estimates

The most prevalent traumatic events endorsed based on *DSM-IV* criteria included learning that a close friend or family member died from an accident, homicide or suicide (25.5%, $n = 148$), and being present when another person was killed, seriously injured or sexually or physically assaulted (25.0%, $n = 146$) (see Table 1 for more details). Only 43.2% of those individuals witnessing a trauma ($n = 63$) would meet the proposed *DSM-5* criterion of witnessing it in person (rather than exclusively through electronic media). Among the 83 remaining subjects who would not satisfy the witnessed trauma category for *DSM-5* PTSD, only 48 of them (57.8%) endorsed another trauma that would qualify for *DSM-5*'s traumatic stressor criterion. The newly proposed *DSM-5* A4 trauma criterion – repeated exposure to aversive details of trauma in person or by electronic media if in the course of one's occupation – was endorsed by 46 respondents (7.9%); all 46 respondents also endorsed at least one other *DSM-IV* traumatic event and thus would have otherwise satisfied the *DSM-IV* traumatic stressor criterion.

Table 1
DSM-IV Trauma exposure prevalence rates ($N = 585$).

DSM-IV trauma exposure item description	% (*n*)
Life-threatening illness	12.0 (70)
Life-threatening accident	16.1 (93)
Force/weapon used in robbery	4.5 (26)
Family/close friend died from accident, homicide, or suicide	25.5 (148)
Completed rape	6.3 (37)
Attempted rape	8.5 (50)
Other sexual assault	10.4 (61)
Child physical assault	8.8 (51)
Adult physical assault	17.5 (102)
Threat with a weapon	10.9 (146)
Witnessed trauma	25.0 (146)
Other trauma involving serious injury or threat to life	3.3 (19)

Overall, 389 subjects (66.5% of the effective sample) endorsed at least one traumatic event that would meet *DSM-IV* PTSD's A1 traumatic stressor criterion, based on endorsing at least one of the 12 SLESQ trauma exposure items. The estimated prevalence of traumatic event exposure dropped to 59.3% ($n = 347$) when implementing the proposed changes in trauma exposure classification for *DSM-5*, a significant difference of 7.2% from *DSM-IV* estimates of trauma exposure prevalence, binomial approximation $z = 3.69$ (SE = .02), $p < .001$.

Table 2 displays the estimated current prevalence rates for various *DSM-IV* and *DSM-5* PTSD diagnostic algorithms. First, we estimated the *DSM-IV* prevalence of current PTSD based on endorsing at least one of the first 12 SLESQ traumas, and having at least 1 Criterion B symptom, at least 3 C symptoms, and at least 2 D symptoms (but not including the functional impairment requirement). Next, we estimated PTSD's current estimated prevalence using the proposed diagnostic algorithm for *DSM-5* by modifying the trauma exposure criterion as indicated above, requiring at least 1 B, 1 C, 3 D and 3 E symptoms without the impairment requirement, but (in contrast to the *DSM-5* proposal) stipulating that intense fear, helplessness or horror is endorsed (*DSM-IV* PTSD's Criterion A2). Based on this diagnostic algorithm, the *DSM-5* estimated prevalence did not significantly differ from *DSM-IV*'s PTSD prevalence, binomial approximation $z = .55$ (SE = .01), $p = .34$. Modifying the *DSM-5* diagnostic algorithm to include removal of Criterion A2 increased the estimated prevalence of PTSD, but this also did not differ from *DSM-IV*'s PTSD prevalence with impairment not required, binomial approximation $z = 1.66$ (SE = .01), $p = .10$.

In implementing the functional impairment requirement for the PTSD diagnosis, the *DSM-IV* current prevalence estimate decreased by .6% if at least "a little impairment" was required and by a further 2.5% if at least "moderate impairment" was required. Adding the impairment criterion decreased the estimated prevalence for *DSM-5* PTSD by .8% if at least "a little impairment" was required, and by 3.6% if at least "moderate impairment" was required (see Table 2).

Table 2
Estimated PTSD prevalence rates ($N = 585$).

Diagnostic algorithm	% (*n*)
DSM-IV, without impairment required	7.4 (43)
DSM-IV, with mild impairment required	6.8 (40)
DSM-IV, with moderate impairment required	4.3 (25)
DSM-5, with Criterion A2, without impairment required	8.0 (47)
DSM-5, without Criterion A2, without impairment required	9.2 (54)
DSM-5, without Criterion A2, with mild impairment required	8.4 (49)
DSM-5, without Criterion A2, with moderate impairment required	4.8 (28)

Table 3
DSM-IV and DSM-5 standardized factor intercorrelations ($n = 216$).

Factor intercorrelations	*DSM-IV* numbing model	*DSM-IV* dysphoria model	*DSM-5* model
Factors 1–2	.90	.90	.89
Factors 1–3	.91	.89	.94
Factors 1–4	.82	.73	.88
Factors 2–3	.84	.80	.78
Factors 2–4	.70	.65	.74
Factors 3–4	.86	.71	.92

Note: Factor 1: reexperiencing; Factor 2: avoidance; Factor 3: numbing/dysphoria/negative alterations in mood and cognition; Factor 4: hyperarousal.

The differences between *DSM-IV* and *DSM-5* prevalence estimates were not statistically significant when either mild impairment (binomial approximation $z = 1.54$ (SE = .01), $p = 12$) or moderate impairment (binomial approximation $z = .60$ (SE = .01), $p = .33$) were required.

3.2. Symptom structure

The four-factor emotional numbing model fit the data well, robust χ^2 (113, $N = 216$) = 205.021, $p < .001$, CFI = .975, TLI = .970, RMSEA = .061 (90% CI: .048–.075), BIC = 5250. Additionally, the four-factor dysphoria model fit the data well, robust χ^2 (113, $N = 216$) = 177.530, $p < .001$, CFI = .983, TLI = .979, RMSEA = .051 (90% CI: .036–.066), BIC = 5224. BIC value comparison suggests better fit for the dysphoria model than for the numbing model. A CFA for the proposed *DSM-5* four-factor PTSD model fit the data adequately, robust χ^2 (164, $N = 216$) = 303.79, $p < .001$, CFI = .972, TLI = .967, RMSEA = .063 (90% CI: .052–.074), BIC = 6381.851. Table 3 displays factor intercorrelations for these three models.

A revised *DSM-5* model of five factors, splitting the three newly proposed negative alterations symptoms into a unique factor, also fit the data adequately, robust χ^2 (160, $N = 216$) = 300.726, $p < .001$, CFI = .971, TLI = .966, RMSEA = .064 (90% CI: .053–.075), BIC = 6393.738, but did not fit significantly better than the four-factor model, χ^2_{change} (4, $N = 216$) = 6.725, $p = .151$. Finally, we tested a variation on the proposed *DSM-5* four-factor model that moved the recklessness item to the negative alterations in cognitions and mood (D criterion) factor, which fit the data adequately, robust χ^2 (164, $N = 216$) = 305.45, $p < .001$, CFI = .971, TLI = .967, RMSEA = .063 (90% CI: .052–.074), BIC = 6384.782. Given the non-nested comparisons, BIC values were examined, and this revised model did not fit better than the original four-factor *DSM-5* model.

In comparing the *DSM-5* four-factor model with the *DSM-IV* four-factor emotional numbing and dysphoria models, we found that, despite the *DSM-5* reexperiencing symptom factor loadings being somewhat lower (averaging a difference value of .06), overall the *DSM-5*'s symptoms loaded well onto their respective factors, averaging .81 across loadings (ranging from .68 to .93). Table 4 displays the *DSM-5* model's factor loadings.

Lastly, we assessed whether each *DSM-IV* PTSD factor was more/less related to depression scores than its *DSM-5* PTSD factor counterpart. Given the stronger focus in the *DSM-5* model on depressive symptoms, we expected stronger correlations with depression for the *DSM-5*'s negative alterations in mood/cognition factor than for the comparable *DSM-IV*'s emotional numbing factor. Factor scores generated from the *DSM-IV* four-factor emotional numbing model and the *DSM-5* four-factor model were used in conjunction with total scores for the CES-D. No difference in correlation pairs was found. *DSM-IV*'s reexperiencing factor was no more related to depression symptom severity ($r = .450$) than *DSM-5*'s reexperiencing factor ($r = .468$), $t(213, n = 216) = .625$, $p = .530$. Similarly, *DSM-IV*'s avoidance factor was no more related to depression symptom severity ($r = .410$) than *DSM-5*'s avoidance factor ($r = .383$), $t(213, n = 216) = .810$, $p = .418$. *DSM-IV*'s numbing factor also was no more related to depression symptom severity ($r = .495$) than *DSM-5*'s similar negative alterations factor ($r = .504$), $t(213, n = 216) = .342$, $p = .733$. Finally, *DSM-IV*'s hyperarousal factor was no more related to depression symptom severity ($r = .513$) than *DSM-5*'s hyperarousal factor ($r = .530$), $t(213, n = 216) = .681$, $p = .497$.

Table 4
DSM-5 PTSD model standardized factor loadings ($n = 216$).

DSM-5 PTSD item description	Factor loading
Reexperiencing	
Intrusive Memories	.85
Nightmares	.74
Flashbacks	.82
Psychological reactivity	.77
Physiological reactivity	.76
Avoidance	
Avoidance of reminders (thoughts/feelings)	.91
Avoidance of reminders (situations/people/things)	.88
Negative alterations in mood and cognition	
Decreased recall of trauma	.68
Negative expectations about oneself/people/world	.77
Distorted blame	.85
Pervasive negative emotional state	.93
Loss of interest	.84
Social detachment	.82
Difficulty experiencing positive emotions	.83
Hyperarousal	
Irritability or anger	.81
Recklessness	.84
Hypervigilance	.70
Exaggerated startle response	.82
Difficulty concentrating	.82
Difficulty sleeping	.79

4. Discussion

In the present study, we examined the impact of several modifications to the PTSD diagnosis (proposed for *DSM-5*) on the estimated current prevalence of trauma exposure and PTSD, along with symptom structure differences, among a non-clinical sample of college students. Estimated trauma exposure prevalence decreased in a statistically significant manner as a result of implementing the proposed *DSM-5* changes, while the prevalence of PTSD increased (but not significantly). Several models were tested by CFA and found to have an adequate fit to the data, including four-factor models using the *DSM-IV* PTSD items, an adapted four-factor model for the proposed *DSM-5* PTSD items, and two modifications of the *DSM-5* criteria (a five-factor model, and a four-factor model with the reckless behavior symptom moved to the negative alterations factor). However, the four-factor *DSM-5* PTSD model best fit the data based on CFA, as did a four-factor dysphoria PTSD model based on the *DSM-IV* definitions for trauma exposure and PTSD symptoms. Notably, relationships with depression were not different between the *DSM-IV* and *DSM-5* factor models, despite stronger depression-related content in the *DSM-5* model.

The resultant prevalence estimates of trauma exposure of 67% and 59% when using *DSM-IV* and *DSM-5* criteria, respectively, were consistent with prevalence rates based on *DSM-IV* from the general population based on structured interviews (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Norris, 1992), and from college student samples based on self-report measures (Bernat, Ronfeldt, Calhoun, & Arias, 1998; Elhai & Simons, 2007). Most surprisingly, we found that among students who reported being witness to a traumatic event meeting *DSM-IV* PTSD's traumatic stressor criterion, only 43% of those individuals indicated witnessing the trauma in person and would thus count as a qualifying trauma according to the proposed *DSM-5* stressor criterion. The remaining 57% of subjects who reported witnessing a trauma would not qualify for the

DSM-5 stressor criterion because they did so without being exposed to the events in person. More than half of this sub-group could be diagnosed with PTSD by *DSM-IV* criteria but not by *DSM-5* criteria because they did not otherwise endorse any other traumatic events. Thus based on our results, the *DSM-5*'s restriction of witnessed trauma to only include in-person experiencing should contribute to a slightly decreased trauma exposure prevalence rate and could thereby reduce PTSD's prevalence in *DSM-5*. The decreased trauma exposure prevalence from this restriction was not offset by a broadening of trauma exposure's definition in the *DSM-5* to include repeated exposure to aversive details of trauma, because all participants endorsing such aversive exposure also endorsed at least one other *DSM-IV* traumatic event.

The proposed *DSM-5* PTSD criteria include the deletion of PTSD's Criterion A2. Challenges have been lodged against Criterion A2 for its conflation of trauma exposure and posttraumatic reactions (McNally, 2009), as well as for its poor diagnostic power in discriminating between those with and without PTSD (reviewed in Bovin & Marx, 2011). However, this study is one of the few that has directly investigated whether Criterion A2's deletion substantially impacts PTSD diagnostic prevalence using the *DSM-5* PTSD criteria. The difference proved to be small in absolute terms, with an increase of approximately one-half of a percentage point in estimated prevalence from *DSM-IV* criteria with A2 included (4.3%) to *DSM-5* criteria with A2 not included (4.8%). When functional impairment was not required for a diagnosis, PTSD's estimated current prevalence increased more substantially, from 7.4% using the *DSM-IV* criteria to 8.0% using the *DSM-5* criteria and including A2, and to 9.2% when using the exact *DSM-5* criteria and removing the Criterion A2 requirement. However, these differences were not statistically significant. This pattern of findings for A2 and functional impairment on PTSD rates is consistent with those of another study of college undergraduates (Archambeau, Elhai, & Frueh, 2011).

Removing PTSD's Criterion A2 was associated with only small absolute increases in PTSD's prevalence in *DSM-5*. The increase in prevalence might have been larger had the *DSM-5* criteria not included the requirement that both effortful avoidance *and* emotional numbing symptom criteria must be satisfied. Two previous studies found reductions in PTSD's prevalence by 1–2% points based on requiring both avoidance and numbing – namely, Forbes et al. (2011) in their sample of injury victims, and Elhai et al. (2009) in their national samples of adolescents and adults. Based on the present study's results, the estimated current prevalence for PTSD would increase by a margin of .4 to 1.8 percentage points (depending on the specific diagnostic algorithm indicated in Table 2) in transitioning from *DSM-IV* to the proposed *DSM-5* criteria. Our current prevalence rates based on *DSM-IV* PTSD criteria ranged from 4.3% to 7.4%. With the requirement for moderate impairment (4.3%), this estimate maps well onto previously published rates of current PTSD in general population samples of men and women (Kessler, Chiu, Demler, & Walters, 2005; Norris, 1992). Of course no previous estimates have yet been published using the proposed *DSM-5* PTSD criteria.

Finally, we examined the impact of the proposed *DSM-5* PTSD symptom set on PTSD's factor structure. We found that the *DSM-5* PTSD symptom set fit the data well, as did the *DSM-IV* symptom set. Furthermore, a modification to the proposed *DSM-5* model, which moved the reckless behavior item from the arousal factor to the negative alterations factor, did not enhance model fit. The new symptoms of negative mood and cognition did not appear to represent a unique construct, but instead appeared to comprise an expanded version of the *DSM-IV* PTSD factors comprising dysphoria and emotional numbing symptoms – as proposed by the *DSM-5* developers (Friedman et al., in press). And risky behavior, while possibly reflecting the influence of negative affect and cognitions, was found to not fit into that criterion as well as in its intended hyperarousal factor, consistent with the *DSM-5* proposal (Friedman et al., in press).

Importantly, since several investigators have challenged PTSD's construct validity given the large representation of symptoms overlapping with those of depression (Frueh et al., 2010; McNally, 2009; Rosen & Lilienfield, 2008), and because the proposed *DSM-5* symptom set adds additional depression content, we explored if the added depression content left the *DSM-5* PTSD factors more vulnerable to substantial relationships with depression. However, we discovered no significant increase in correlations with depression symptom severity when the *DSM-IV* factors' correlations were compared with those of the *DSM-5* PTSD factors. Although further research is needed to determine if the *DSM-5* modifications alter the extent or nature of comorbidity of PTSD with the categorical diagnosis of major depressive disorder (Elhai et al., 2009), these initial results are encouraging in suggesting that additional depression-relevant symptoms in the *DSM-5* PTSD criteria do not appear to artifactually increase the relationship of PTSD with depression.

This paper is one of the first to examine the performance of the proposed *DSM-5* PTSD modifications. However, results must be interpreted with caution because we used self-report PTSD measures (via a web survey) rather than the structured diagnostic interviews that would be required to firmly draw valid conclusions about PTSD's prevalence. Other limitations include the use of non-clinical college students. Additionally, most participants were women, and gender has been found to impact PTSD's prevalence (Tolin & Foa, 2006) and factor structure (Armour, Elhai, et al., 2011). Furthermore, as *DSM-5* field trials are currently underway, it is possible that the final PTSD diagnostic criteria to appear in *DSM-5* will be slightly modified from the current proposal. Despite these limitations, this study offers a unique and early glimpse at the empirical performance of the *DSM-5* PTSD criteria.

Overall findings suggest that while the proposed criteria may significantly decrease the prevalence of trauma exposure classification and mildly increase the prevalence of PTSD, the proposed symptom set's structure fits well with the conceptual model proposed for *DSM-5* and is consistent with findings from factor analyses of the *DSM-IV* PTSD symptom set, with no significant increase in the relationship of PTSD symptoms with depression symptoms. Thus, as we have stated elsewhere (Frueh et al., 2010) the current proposed changes for PTSD in *DSM-5* represent a modest improvement over *DSM-IV* criteria, though they are incremental and relatively minor in nature. As such, they are unlikely to have a meaningful impact on prevalence rates, treatment approaches, or forensic applications of the disorder.

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