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Diagnosing PTSD in Early Childhood: An Empirical Assessment of Four Approaches

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Abstract

Prior studies have argued that the *Diagnostic and Statistical Manual, Fourth Edition (DSM-IV)* criteria were insensitive for diagnosing posttraumatic stress disorder (PTSD) in young children. Four diagnostic criteria sets were examined in 284 3–6 year-old trauma-exposed children. *DSM-IV* criteria resulted in significantly fewer cases (13%) compared to an alternative algorithm for young children (PTSD-AA, 45%), the proposed DSM-5 posttraumatic stress in preschool children (44%), and the DSM-5 criteria with 2 symptoms that are under consideration by the committee (DSM-5-UC, 49%). Using DSM-IV as the standard, the misclassification rate was 32% for PTSD-AA, 32% for DSM-5, and 37% for DSM-5-UC. The proposed criteria sets showed high agreement on the presence (100%) but low agreement on the absence (58–64%) of diagnoses. The misclassified cases were highly symptomatic, $M = 7$ or more symptoms, and functionally impaired, median = 2 domains impaired. The additional symptoms had little impact. Evidence for convergent validation for the proposed diagnoses was shown with elevations on comorbid disorders and Child Behavior Checklist Total scores compared to a control group ($n = 46$). When stratified by age (3–4 years and 5–6 years), diagnoses were still significantly elevated compared to controls. These findings lend support to a developmental subtype for PTSD.

Alternative posttraumatic stress disorder (PTSD) diagnostic criteria for young children have been proposed due to perceived shortcomings of the Diagnostic and Statistical Manual, Fourth Edition DSM-IV (American Psychiatric Association, 1994; Iselin, LeBrocq, Kenardy, Anderson, & McKinlay, 2010; Scheeringa, Zeanah, Myers, & Putnam, 2003). The central issue has been the claim that the *DSM-IV* PTSD algorithm is developmentally inappropriate (in particular, needing three avoidance/numbing symptoms), thereby underestimating the prevalence of those with ample symptoms and impairment who could be diagnosed. In addition, developmental differences affect how these symptoms manifest (Salmon & Bryant, 2002; Scheeringa, Zeanah, Drell, & Larrieu, 1995). Capacities to

verbally express symptoms are just emerging, and behavioral symptoms may be manifest differently, such as loss of interests in play activities rather than in school and work activities (Scheeringa et al., 1995).

Because all previous iterations of the DSM were conceived in the absence of data from children under 15 years of age, several proposals have aimed at revising the criteria (Scheeringa, Zeanah, & Cohen, 2011). This has led to some controversy over the classification of PTSD for young children (Iselin et al., 2010), which has implications for the current process of revising the criteria in the *DSM-5*. A different set of diagnostic criteria for PTSD in young children has been proposed and refined by Scheeringa and colleagues in a series of studies (Scheeringa, Zeanah, Myers, & Putnam, 2005; Scheeringa, Peebles, Cook, & Zeanah, 2001; Scheeringa et al., 1995; Scheeringa et al., 2003). Termed an alternative algorithm (PTSD-AA), this algorithm eliminates Criterion A2 (initial response of fear, helplessness, or horror) because young children cannot reliably self-report this reaction, and an adult is not always present to observe the reactions (Scheeringa et al., 1995). The wording of several symptom criteria were modified to make them more developmentally appropriate. Only one avoidance/numbing symptom is required to meet this criterion instead of three. In prior research by different investigative teams, when PTSD-AA was compared to *DSM-IV*, the diagnosis rate was substantially higher for PTSD-AA: 26% versus 0% after a variety of traumatic events (Scheeringa et al., 2003), 10% versus 1.7% after acute injury (Meiser-Stedman, Smith, Glucksman, Yule, & Dalgleish, 2008), and 25% versus 5% after burn injury (De Young, Kenardy, & Cobham, 2011). The cases diagnosed using the PTSD-AA had a mean of 6.1 (Scheeringa et al., 2003) and 10.0 (Meiser-Stedman et al., 2008) PTSD symptoms, indicating rather severe symptom levels.

In response to these concerns about the *DSM-IV* criteria for young children, *DSM-5* planners proposed a developmental subtype of PTSD in preschool children, which adopted many aspects of the PTSD-AA (see Table 1). The dissimilarities from PTSD-AA are in different symptoms available in the numbing/avoidance criterion. In addition, *DSM-5* proposed a change in the wording of restricted range of affect to limit it to only positive emotions (as opposed to positive or negative emotions). Also, two symptoms were dropped – inability to recall an important aspect of the trauma and sense of a foreshortened future – because they rarely occurred in young children.

As well, the *DSM-5* committee has two new symptoms under consideration. One symptom, “Substantially increased frequency of negative emotional states – for example, fear, guilt, sadness, shame, or confusion,” is in the numbing/avoidance criterion. The other, “Reckless or self-endangering behavior,” is in the increased arousal criterion. There are no empirical data supporting these symptoms of which we are aware. Nevertheless, including these two symptoms creates another set of possible criteria, which we refer to as *DSM-5-under consideration* (*DSM-5-UC*).

In the first test of the *DSM-5* approach, 25% of burned young children met these criteria, compared to 5% using *DSM-IV*. It did not appear, however, that the new wording of the restricted range of affect symptom or the two new symptoms were tested (De Young et al., 2011). The purpose of our study was to compare the full versions of the two different

DSM-5 approaches and compare them to PTSD-AA and *DSM-IV*. Also, to address limitations of previous studies of small size and homogenous types of traumas, another purpose of this paper was to examine criteria sets in a larger sample with diverse types of traumas.

Lastly, previous research has shown increased likelihood of other disorders among people with PTSD (Davidson, Hughes, Blazer, & George, 1991; Kulka et al., 1990). Demonstrating this in children diagnosed by an alternative criteria set would be evidence for convergent validation, and provide additional support for modifying the *DSM-IV* approach.

We had two hypotheses. Hypothesis 1: The percentage of children diagnosed using *DSM-IV* criteria will be significantly lower than using PTSD-AA, the proposed *DSM-5*, and the *DSM-5-UC* criteria, respectively. With the *DSM-IV* as the criterion, all alternative criterion sets will demonstrate high misclassification rates. Hypothesis 2: Those diagnosed by an alternative algorithm will have higher proportions of comorbid disorders and elevated scores on CBCL Total scores compared to those who are trauma-exposed but do not have a diagnosis and compared to non-trauma-exposed controls.

Method

Participants and Procedure

For the trauma-exposed group, there were two inclusion criteria: The participant had to have experienced at least one life-threatening trauma when the child was old enough to remember it with a narrative recall (at least 3 years old). Medical events counted if they involved major surgery or were invasive beyond blood draws (e.g., lumbar puncture). The second criterion was that the participant had to be between the ages of 36 months and 83 months at the time of most recent trauma and time of enrollment. Exclusion criteria: include head trauma with Glasgow Coma Scale score 7 or less in the emergency room, mental retardation, autistic disorder, blindness, deafness, and foreign language-speaking families. Recruitment was open to families from any geographical area who were willing to travel to the laboratory.

Data were collected on 284 trauma-exposed children. Children were recruited for three types of trauma experiences by design to explore differences between trauma exposure -single event, repeated events, or Hurricane Katrina. The single event group comprised 62 children. This included 54 participants identified from a Level I Trauma Center registry; the events included 43 motor vehicle accidents and 11 accidental injuries of other origins. Eight children were recruited from newspaper advertisements: all involved witnessing single incidents of relatives murdered, assaulted, or severely injured.

The repeated events group was 85 participants who were identified through the three main battered women's programs in the New Orleans area. The staff at these programs gave mothers a phone number to contact regarding the study. All of the children had witnessed domestic violence, and 92% of caregivers endorsed this as their children's worst experience. These children had experienced a mean of 1.7 types of traumatic events and a mean of 68.8 events (median 9), mostly accounted for by domestic violence.

The Hurricane Katrina group consisted of 138 children. Nearly the entire population of the New Orleans metropolitan area was eligible when the hurricane struck during this study. Recruitment was primarily through newspaper advertisements. One child was excluded because he witnessed domestic violence and could not be exclusively in either the repeated or Katrina group. The final subsample was 137. They experienced a mean of 1.4 types of traumatic events, and 93% of caregivers endorsed Katrina as their children's worst lifetime experience. Unlike the repeated events group, they had experienced a mean of only 1.5 events and a median of 1. If single and repeated participants were recruited post-Katrina, they did not have a life-threatening Katrina disaster experience.

A control group of 46 participants was recruited. In order to match to the trauma-exposed subjects on sociodemographic factors, the trauma-exposed participants were asked for neighbors and acquaintances with children in the 3–6 years age range. These families were contacted by telephone and asked to participate. Control children were significantly younger, maternal caregivers were younger and less educated, and more fathers lived in the home compared to the trauma-exposed (Table 2). The groups did not differ on sex, ethnicity, fathers' ages, fathers' education, or mothers' employment

The majority were from the New Orleans metropolitan area. There were several differences between the three trauma-exposed groups on durations from traumas to time of assessment, fathers living in the home and female caregiver age, employment, and years of education (see Table 2). Race was significantly more often African-American, fathers were younger, and the duration from the last trauma to the assessment was shorter in the single event group compared to both the repeated events and Hurricane Katrina groups. Race was significantly more often mixed, fathers lived in the homes less often, fewer maternal caregivers were employed, and the duration from the first trauma to the assessment was longer in the repeated events group compared to both the single event and hurricane groups. Race was significantly more often Caucasian, maternal caregivers were older and had more years of education, and fathers had more years of education in the hurricane group compared to both the single and repeated events groups. The duration from the first trauma to the assessment was longer in the hurricane group compared to the single event group. In contrast to the single and repeated events groups, the Hurricane Katrina disaster impacted both affluent and poorer neighborhoods.

This study was approved by the Tulane University Committee on Use of Human Subjects. Interviewers received extensive training and ongoing supervision. The initial interviewers and the principal investigator were trained on the PAPA by a trainer from Duke University where the PAPA was created. Subsequent interviewers were trained by the PI. Written informed consent was obtained from primary caregivers. Signed assent was not obtained from children. Interviews were conducted at a lab. Participants were monetarily compensated for their participation.

Measures

The Preschool Age Psychiatric Assessment (PAPA; (Egger et al., 2006) is a structured psychiatric interview with the caregiver. Test-retest reliability kappas in a community sample of 307 2–5 year old children were .73 for PTSD, .72 for major depression disorder, .74 for

attention-deficit/hyperactivity disorder (ADHD), .57 for oppositional defiant disorder, .60 for separation anxiety disorder, .54 for social phobia, .36 for specific phobia, and .39 for generalized anxiety disorder.

Data were collected on traumatic exposure using 12 events from the Life Events section. A modified measure of traumatic life events was used that asked for the date of the first event, the date of the last event, and a frequency count of the number of each type of traumatic event. The PTSD module included developmental modifications to wording of *DSM-IV* symptoms A2 (acute reaction), B1 (intrusive recollections), C4 (diminished interests), C5 (detachment or estrangement), and D2 (irritability) based on prior empirical work (Scheeringa et al., 2003).

The PAPA collected data on restrictions of positive and negative emotions separately, so the *DSM-5* version of restricted range of affect was coded for only the positive emotion restricted. The new DSM5-UC symptom “Substantially increased frequency of negative emotional states – for example, fear, guilt, sadness, shame, or confusion” was measured as either the symptom of sadness or guilt from the major depression disorder module; negative emotional states of fear, shame, or confusion symptoms were not available. The second new DSM-5-UC symptom, “Reckless or self-destructive behavior,” was measured as any 1 of 6 items that queried about preoccupation with death or suicide from the depression module: death themes in play, suicide themes in play, thinking or talking about death, suicidal thoughts, suicidal plans, and suicidal attempts.

Functional impairment was measured with questions about five domains of functioning – parental relationships, sibling relationships, daycare provider/teacher relationships, peer relationships, and ability to act appropriately outside of the home – plus a sixth domain for emotional distress.

Child Behavior Checklist (CBCL; (Achenbach & Edelbrock, 1983). Caregivers completed the ages 1.5–5 years version (100 items) for 3–5 year-old children and the ages 6–18 years version (112 items) for 6 year-old children. Only the Total score was used as a convergent measure of total comorbid psychopathology. An enormous amount of validity data exists on large nationally-representative samples. Test-retest reliability coefficients over one month averaged 0.90 for the broad bands. Children referred to mental health services had significantly higher scores on broad bands compared to nonreferred children (Achenbach & Edelbrock, 1983).

Data Analyses

For comparisons of most continuous variables between the three groups, one-way ANOVA was used. Tests between trauma groups were not corrected for durations from traumas to time of assessment, fathers living in the home and female caregiver age, employment, and years of education because that would inappropriately remove variance due to the planned group recruitment. The four different PTSD diagnoses were calculated with syntax in SAS 9.2 (SAS, Cary, NC). Data on 9 CBCL's were missing. Data were missing for biological father's age for 24 subjects and for father's years of education for 26 subjects. For domains of functional impairment, the Kruskal-Wallis test was used because of moderate right skew

in the distribution. Chi-square tests were used for categorical variables. To correct for multiple comparisons in post hoc pairwise tests, Neuman-Keuls' method was used following a significant ANOVA and Holm's method was used following a significant chi-square test. For comparing two percentages from different algorithms, binomial distribution tests were used. Missing data were treated as missing and were not imputed.

Results

The distribution of number of PTSD symptoms in those exposed to trauma centered around a mean of 5.5 symptoms ($SD = 3.1$) with minimal right skew (0.27) and a range of 0–13 symptoms. There were no significant differences between single, repeated, and Katrina groups on mean number of PTSD symptoms or rate of diagnosis for any algorithm, including DSM-IV (one-way ANOVA). These groups also did not differ on mean number of DSM-IV re-experiencing (criterion B), avoidance/numbing (criterion C) symptoms, or increased arousal (criterion D) symptoms. Because of this lack of differences, subsequent tests were not stratified by trauma groups.

The distribution of the number of functional impairment domains showed substantial right skew (0.59) with a median of 2 domains impaired. Seventy-three percent were impaired in at least 1 domain or more. There was a fairly even distribution between one (20%), two (18%), three (15%), and four (13%) domains of impairment, whereas it appeared less common to have five (4%) or six (4%) domains impaired. The three subgroups did not differ on impairment severity.

Hypothesis 1: Sensitivity and Misclassification rates

Treating the *DSM-IV* diagnosis as the standard, the rates of agreement about the presence and absence of diagnoses, and misclassification rate for each proposed algorithm are shown in Table 3. For each proposed algorithm, there was 100% agreement that a subject with a DSM-IV diagnosis also met criteria for the alternative criteria set. In contrast, there was poor agreement about the absence of diagnoses. More than one-third of those without a DSM-IV PTSD diagnosis were diagnosed with PTSD by each alternative criteria set. The misclassification rates were 32% by the PTSD-AA, 32% by the *DSM-5*, and 37% by the DSM-5-UC.

The percentage who qualified for a diagnosis according to the *DSM-IV* criteria (13%) was significantly lower compared to the PTSD-AA criteria (45%), *DSM-5* criteria (44%), and DSM-5-UC criteria (49%) Binomial tests significant below a Bonferroni-corrected alpha level $p < .0083$. PTSD-AA and *DSM-5* did not differ from each other ($p = .57$). The differences between PTSD-AA and DSM-5-UC ($p = .067$) and between *DSM-5* and DSM-5-UC ($p = .055$) were not significant.

Those who qualified for a diagnosis according to the PTSD-AA criteria but not the *DSM-IV* criteria (the "misclassified") were highly symptomatic with a mean of 7.0 PTSD symptoms ($n = 91$; Table 4). Those who were misclassified according to the PTSD-AA criteria were impaired in a median of two domains. The results were similar for those misclassified according to the *DSM-5* and DSM-5-UC criteria sets.

The proposed change in *DSM-5* to limit the restricted range of affect symptom to only positive affects had limited impact. The *DSM-IV*-defined symptom was present in 16% of the sample while the proposed *DSM-5*-defined symptom was slightly less common at 15% (Table 5). All of the changes in avoidance/numbing criterion in the *DSM-5* proposal barely altered the prevalence of the criterion from 70% for the PTSD-AA to 69% for *DSM-5* (Table 5).

The proposed symptom about negative emotional states was present in 29% of the sample. It is noteworthy that 95% of those with this symptom also had at least one of the symptoms of expression of negative emotion in response to trauma triggers (psychological distress at reminders, intrusive recollections, avoidance of internal cues, or avoidance of external cues). This change altered the prevalence of the avoidance/numbing criterion from 69% in *DSM-5* to 75% in *DSM-5-UC*.

The proposed symptom of reckless or self-endangering behavior was present in 18% of the sample. This change altered the prevalence of the increased arousal criterion from 65% in *DSM-5* to 68% in *DSM-5-UC*.

Hypothesis 2: Convergent Validation of Proposed Criteria Sets

Using the *DSM-IV* criteria, the 3-group test (diagnosed, not diagnosed, and control groups) for the presence of any comorbid disorder was significant, $\chi^2(2, N = 330) = 38.84, p < .0001$. All pairwise tests (diagnosed versus not diagnosed, diagnosed versus controls, and not diagnosed versus controls) were significant (Table 4). The 3-group test for CBCL Total scores was also significant, $F(2, 318) = 30.50, p < .001$, and all pairwise tests were significant.

For the alternative criterion sets, these tests were conducted with only the misclassified cases (i.e., meeting criteria using the alternatives but not using *DSM-IV*). The 3-group tests (diagnosed, not diagnosed, and control groups) for any comorbid disorder were significant using PTSD-AA, $\chi^2(2, N = 294) = 34.90, p < .001$, *DSM-5*, $\chi^2(2, N = 294) = 33.85, p < .001$, and *DSM-5-UC*, $\chi^2(2, N = 294) = 34.89, p < .001$, and all pairwise tests were significant. The results were similar for CBCL Total.

When stratified by age into 3–4 years ($n = 169$) and 5–6 years ($n = 161$) groups, those meeting each diagnostic criteria were still significantly elevated compared to controls (for comorbid disorders and CBCL Total). Those meeting criteria were significantly elevated on comorbid disorders compared to those not meeting criteria in the 3–4 years group for *DSM-IV* and *DSM-5-UC*, and in the 5–6 years group for *DSM-IV*, PTSD-AA, *DSM-5*, and *DSM-5-UC* (Table 4). The sample was also stratified on maternal age (median split at 26/27 years), maternal education (median split at 12/13 years), or fathers in the home (yes or no); these did not substantially influence the pattern of significance of tests with the diagnosed groups and so were not reported.

Discussion

The need for accurately detecting young children with severe PTSD-related symptoms and impairment is increasingly pertinent as new evidence-based treatments and diagnostic interviews (Egger et al., 2006; Scheeringa & Haslett, 2010) are developed for this population. The upcoming revision of *DSM-5* will be the first opportunity to revise the diagnostic criteria for PTSD with empirical data from actual studies of young children. This study provided a number of important findings to support a developmental subtype for PTSD in young children for the *DSM-5* to consider. If *DSM-IV* criteria were used to diagnose young children with PTSD in this sample instead of the *DSM-5* criteria, 32% of this trauma-exposed sample ($n = 90$) who were highly symptomatic and functionally impaired would not have met criteria. Extrapolating to everyday clinical situations, that represents an enormous number of young children who because they do not meet formal diagnostic criteria may well not qualify for and therefore not receive treatment.

In order to show the severity of symptoms in those meeting criteria for a proposed algorithm, most prior studies calculated the number of PTSD symptoms for all the cases that met criteria using the proposed algorithm, including those that overlapped with the *DSM-IV*. Because the *DSM-IV*, by definition, captures cases with more symptoms, these were not true estimates of the severity of cases that were diagnosed by the proposed algorithm and not by *DSM-IV*. In contrast, this study estimated the severity of only the misclassified cases. When examining only the misclassified, they were still highly symptomatic (PTSD-AA 7.0 symptoms, *DSM-5* 7.0 symptoms, and *DSM-5*-UC 7.4 symptoms), indicating that the lower thresholds were not diagnosing mildly symptomatic individuals. This is consistent with De Young et al., who found a mean of 6.4 symptoms in misclassified *DSM-5* cases (De Young et al., 2011). This suggests again that the problem of underestimating the prevalence of those with ample symptoms and impairment who could be diagnosed when using the *DSM-IV* criteria is largely a function of the algorithm. Requiring three symptoms from the avoidance/numbing criterion, which is composed of highly internalized phenomena and some developmentally inappropriate phenomena, is mainly what causes the phenomenon.

The results concerning comorbidity are consistent with prior research in showing significantly increased rates of other disorders among those diagnosed with one of the alternative criteria sets. The rates of 67–69% comorbidity for any comorbid disorder are somewhat lower than the 89% for *DSM-IV*, as would be expected, but are in line with rates of 62% (Davidson et al., 1991) to 98.8% (Kulka et al., 1990) found in adults. This is particularly notable because of the substantially shorter lifespans of these young children in which to develop lifetime comorbidity.

The *DSM-5* proposal appears to be the optimal way forward. Comparisons among the proposed algorithms suggested few significant differences and the *DSM-5* has trimmed some uncommon symptoms to be the most parsimonious. The impact of adding the two new symptoms in the *DSM-5*-UC was minimal but this conclusion is limited by methodology: this study assessed these two symptoms with limited probes. Future studies on these symptoms ought to involve expanded probes.

The limited impact of the new symptoms in the DSM-5-UC may be instructive about how to word PTSD-specific symptoms and perhaps also for how to word symptoms in general in a developmentally-appropriate manner for young children. The “negative emotional states” symptom is worded so that it is not clear that the negative emotional states are non-triggered emotional states that have to be distinct from the triggered emotional distress of the existing PTSD re-experiencing and avoidance symptoms. Emotional distress from triggered reminders or avoidance could well be inaccurately coded as “negative emotional states” when respondents are unaware of the triggers (i.e., caregivers as respondents), or interviewers do not adequately probe for the existence of triggers – both common problems that have been previously noted (Cohen & Scheeringa, 2009). Indeed, in this study, 95% of those with this new symptom also had at least one of the symptoms in which negative emotion is expressed in response to a trauma trigger. It seems possible that negative emotions from triggered trauma reactions were being double coded as “negative emotional states.”

This study did not assess the negative emotional states of guilt, shame, and confusion, however, it is not clear that these would have changed the results substantially. These emotions are highly internalized phenomenon that are difficult for young children to verbalize, if at all, and difficult for caregivers to infer from behavioral observations. Empirical studies have demonstrated that internalized symptoms are unreliable in young children, and when the symptoms are re-worded to depend more on behavioral observations so that internal phenomena do not have to be inferred from children with emerging verbal capacities, the symptoms become more reliable. For example, in a previous study, interrater reliability among four raters was good ($\kappa = .75$) for PTSD-AA that included behavioral wording for several symptoms but was only fair ($\kappa = 0.50$) for the *DSM-IV* (Scheeringa et al., 1995). Because of the difficulties in detecting these internalized symptoms, and also perhaps because they simply occur less frequently at this age, these symptoms also tend to be the least prevalent (Scheeringa et al., 2003). This was reconfirmed in this study, as five out of the seven numbing/avoidance symptoms were ranked last in prevalence among the *DSM-IV* symptoms (Table 5).

These developmental challenges are also evident in the other new symptom, “reckless or self-destructive behavior,” which was endorsed for 18% of this sample. The key aspect that would seem to distinguish it from other impulsive behavior in which children might be inadvertently harmed (i.e., ADHD) is the deliberate intention for self-destructive harm. This intention is difficult to assess in young children because it requires sophisticated verbal skills and a capacity to express complex internal feeling states. As noted earlier, these types of internal experiences in young children pose substantial reliability challenges. While relationships between suicidal impulses and post-traumatic psychopathology are documented in older children (Mazza, 2000), it remains an open question of how common this may manifest in this developmentally different period. This also raises the question of whether reckless or self-destructive behavior is misplaced in the increased arousal criterion and fits more appropriately in the numbing/avoidance criterion.

An additional concern about the new symptoms under consideration is that they appear to overlap with depression, and perhaps anxiety. PTSD has been criticized in the past for

containing symptoms that overlap with these disorders and appear intuitively confusing, however empirical studies have found such concerns to have little merit (Elhai, Grubaugh, Kashdan, & Frueh, 2008). It is likely that a healthy debate will continue on what types of symptoms to include.

Other limitations of this study include that this was not a community-representative sample. Results cannot be generalized to those who are not prone to respond to research recruitment efforts, and this sample might represent the more severe end of the continuum of exposure and symptoms. As with all investigations with young children, this study relied on caregiver report rather than children's perspectives. Though unavoidable, caregiver report is clearly an underestimate of total symptoms in traumatized children (Meiser-Stedman et al., 2008).

The examination of different algorithms and concerns about diagnostic criteria have important implications as attempts are made to justify age-related modifications in criteria or age-related subtypes of PTSD (Iselin et al., 2010; Scheeringa et al., 2011). These data support the adoption in *DSM-5* of a developmental subtype of PTSD in young children, as all three of the proposed criteria sets resulted in significantly more cases than the *DSM-IV* criteria, and these extra cases were highly symptomatic and impaired. The proposed developmental subtype of PTSD in the *DSM-5* would in turn stimulate additional research in general, including research on dimensional aspects that can complement and enrich the understanding of PTSD beyond this categorical classification. The clinical implications can be immediate and profound in terms of making age-appropriate diagnoses and providing treatment where none may have been provided before when the diagnostic algorithm was inappropriate.

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Table 1**Summary of Proposed PTSD Diagnostic Criteria Sets Compared to DSM-IV Criteria**

Criterion	DSM-IV	PTSD-AA	DSM-5	DSM-5-UC
A.2. extreme reaction at the time of the event	Required	Not required	Not required	Not required
Re-experiencing symptoms. Requires 1 of 5:	Intrusive and distressing recollection Nightmares Dissociation Psychological distress at reminders Physiological distress at reminders	Intrusive recollections not required to be distressing Nightmares Dissociation Psychological distress at reminders Physiological distress at reminders	Same as PTSD-AA	Same as PTSD-AA
Avoidance and numbing symptoms	Requires 3 of 7: Avoid thoughts, feelings, conversations Avoid activities, places, people Inability to recall trauma Diminished interests Detachment from others Restricted affect Sense of foreshortened future	Requires 1 of 7: Avoid thoughts, feelings, conversations Avoid activities, places, people Inability to recall trauma Diminished interests emphasize play constriction Socially withdrawn behavior Restricted affect Sense of foreshortened future	Requires 1 of 5: Avoid thoughts, feelings, conversations Avoid activities, places, people Diminished interests emphasize play constriction Socially withdrawn behavior Restricted affect limited to positive emotions	Requires 1 of 6: Avoid thoughts, feelings, conversations Avoid activities, places, people Diminished interests emphasize play constriction Socially withdrawn behavior Restricted affect limited to positive emotions
Increased arousal symptoms	Requires 2 of 5: Sleep difficulty Irritability, outbursts of anger Concentration difficulty Hypervigilance	Requires 2 of 5: Sleep difficulty Irritability includes excessive temper Concentration difficulty Hypervigilance	Requires 2 of 5: Same as PTSD-AA	Requires 2 of 6: Sleep difficulty Irritability includes excessive temper Concentration difficulty Hypervigilance

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Criterion	DSM-IV	PTSD-AA	DSM-5	DSM-5-UC
	Exaggerated startle response	Exaggerated startle response		Exaggerated startle response
				Reckless/self-endangering behavior

DSM-IV= Diagnostic and Statistical Manual, Fourth Edition. *PTSD-AA* = proposed alternative algorithm for young children. *DSM-5* = proposed DSM-5 posttraumatic stress in preschool children. *DSM-5-UC* = DSM-5 with two symptoms under consideration.

Table 2

Demographics of the Trauma-Exposed and Control Groups

Variable	Trauma-exposed								Control
	Single event		Multiple events		Hurricane				
	<i>n</i> = 62		<i>n</i> = 85		<i>n</i> = 137		<i>n</i> = 46		
	<i>M</i> or <i>n</i>	<i>SD</i> or %	<i>M</i> or <i>n</i>	<i>SD</i> or %	<i>M</i> or <i>n</i>	<i>SD</i> or %	<i>M</i> or <i>n</i>	<i>SD</i> or %	
Age	5.2	1.1	5.1	1.1	5.1	1.0	4.7	1.0	
Sex: males	42	68	55	65	78	57	29	63	
Ethnicity									
African-American	51	82	53	62	85	62	38	83	
Caucasian	7	11	15	18	39	28	3	7	
Mixed Race	3	5	13	15	8	6	3	7	
Other Race	1	2	4	5	5	4	2	4	
Age of mother	28.9	6.5	31.2	8.2	34.5	10.9	28.6	6.5	
Age of father	30.4	5.4	33.6	7.2	34.1	8.8	31.0	9.1	
Years education of mother	12.4	2.3	12.0	2.3	13.7	2.5	12.2	1.9	
Years education of father	11.9	2.3	11.7	1.9	13.0	2.7	12.0	1.9	
Father lives in home	14	23	6	7	46	34	17	37	
Mother employed	37	60	24	28	69	50	24	52	
Duration first trauma to assessment*	14.1		36.5		21.6				
Duration last trauma to assessment*	3.6		18.9		16.8				

* Medians

Table 3

Diagnostic Indices and Misclassification Rates Against DSM-IV for Proposed Criteria Sets

Criteria set	Agreement that diagnosis was present for both criteria sets %	Agreement that diagnosis was absent for both criteria sets %	Misclassification rate %
PTSD-AA	100	63	32
DSM-5	100	64	32
DSM-5-UC	100	58	37

Note: *DSM-IV*= Diagnostic and Statistical Manual, Fourth Edition. *PTSD-AA* = proposed alternative algorithm for young children. *DSM-5* = proposed DSM-5 posttraumatic stress in preschool children. *DSM-5-UC*= DSM-5 with two symptoms under consideration.

Table 4

Percentages of Comorbid Disorders and Mean CBCL Total Scores in Those Diagnosed With PTSD, Trauma-Exposed Without the Diagnosis, and Non-Trauma-Exposed Controls.

Criteria set	<i>n</i>	PTSD symptoms		PTSD-impaired domains			Frequency any comorbid disorder			Mean CBCL total			
		<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>M</i>	<i>SD</i>	All ages %	3-4 years %	5-6 years %	All ages <i>M</i>	3-4 years <i>M</i>	5-6 years <i>M</i>	
DSM-IV	D	36	9.7	2.1	3	2.6	1.3	89	88	90	70.6	72.3	69.2
	ND	248	4.9	2.7	1	1.4	1.5	51	57	45	57.0	58.7	55.4
PTSD-AA	D	91	7.0	1.7	2	2.2	1.4	69	66	73	61.1	61.2	60.9
	ND	157	3.6	2.3	0	0.9	1.3	40	51	30	54.8	57.1	52.5
DSM-5	D	90	7.0	1.7	2	2.2	1.4	69	66	72	61.1	61.2	61.0
	ND	158	3.6	2.3	0	0.9	1.3	41	51	31	54.8	57.1	52.6
DSM-5-UC	D	104	7.4	2.1	2	2.1	1.4	67	69	66	60.5	61.4	59.4
	ND	144	3.7	2.5	0	0.9	1.3	39	48	30	54.7	56.8	52.6
Control	46							20	26	7	47.8	48.9	45.6

Note: Those diagnosed with PTSD for PTSD-AA, DSM-5, and DSM-5-UC in this table are only the misclassified cases, i.e., those with the alternative criteria diagnosis but not a DSM-IV diagnosis of PTSD. D = diagnosed with PTSD. ND = not diagnosed with PTSD.

Table 5**Rates of Criteria and Symptoms**

	%	<i>n</i>
Diagnostic criteria		
Re-experiencing (all algorithms)	88.7	252
DSM-5-UC avoidance/numbing	75.0	213
PTSD-AA avoidance/numbing	70.1	199
DSM-5 avoidance/numbing	69.0	196
DSM-IV avoidance/numbing	15.5	44
DSM-IV, PTSD-AA, and DSM-5 increased arousal	65.1	185
DSM-5-UC increased arousal	68.3	194
<i>PTSD symptoms</i>		
Constituent of DSM-IV re-experiencing criterion		
Psychological distress at reminders	75.4	214
Intrusive recollections	44.7	127
Nightmares	42.3	120
Flashbacks	18.3	52
Physiological distress at reminders	17.3	49
Constituent of the DSM-IV avoidance/numbing criterion		
Avoid activities, places, persons	53.9	153
Avoid thoughts, feelings, conversations	28.5	81
Restricted range of affect	16.2	46
Social withdrawal/detachment	13.7	39
Loss of interest in activities	13.4	38
Inability to recall an important aspect	4.6	13
Sense of a foreshortened future	0.4	1
Constituent of the DSM-IV increased arousal criterion		
Irritability, outbursts, temper	62.3	177
Sleep difficulty	57.4	163
Exaggerated startle response	37.0	105
Difficulty concentrating	35.2	100
Hypervigilance	26.1	74
New symptoms proposed in DSM-5		
Negative emotional state	28.9	82
Suicidal (self-endangering)	18.1	51
Restricted positive affect	14.8	42

Note: *DSM-IV*= Diagnostic and Statistical Manual, Fourth Edition. *PTSD-AA* = proposed alternative algorithm for young children. *DSM-5* = proposed DSM-5 posttraumatic stress in preschool children. *DSM-5-UC*= DSM-5 with two symptoms under consideration