

PROPOSAL TO INCLUDE CHILD AND ADOLESCENT AGE RELATED MANIFESTATIONS AND AGE RELATED SUBTYPES FOR PTSD IN DSM-V

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INTRODUCTION

In an effort to enhance the usefulness of DSM-V, Work Groups are attempting to integrate developmental themes into manifestations of various disorders. The Child and Adolescent Disorders Work Group has proposed several different ways that this might occur. First, all disorders will have a text section describing age-related features of each disorder. Second, there may be text included to reflect age-related manifestations of particular criteria. Third, there may be age related subtypes of a particular disorder, such as when criteria “count” in one age group but not in another or when numbers of symptoms at different ages differs. The purpose of this targeted review is to consider possible age related manifestations or age related subtypes of PTSD in preschool or school aged children. This is important to consider because although PTSD has been widely reported in preschool and school age children, the DSM-IV criteria were developed from and field tested for adults and adolescents (ages 15 years and older) but not younger individuals (Matthew Friedman, personal communication, 8/4/08). Despite this, the DSM-IV makes several age related comments, with notes added about different manifestations of symptoms in Criteria A2, B1, B2 and B3. Moreover, DSM-IV is frequently used as the basis to assign PTSD diagnoses to individuals younger than 15. In the decade and a half since the DSM-IV criteria were developed, several studies have carefully assessed symptoms and signs of PTSD in young children exposed to serious traumatic events. This review focuses on research pertinent to two age groups, preschool and school-age children.

PRESCHOOL CHILDREN

The first question one might ask, for purposes of this review, is whether there is any evidence that PTSD exists in preschool children. Without question, many young children are exposed to trauma, placing them at-risk for PTSD. A substantial number of studies have documented exposure of young children to potentially traumatic events, ranging from abuse (Cohen & Mannarino, 1996; 1997) to witnessing interpersonal violence (Lieberman, van Horn & Ozer, 2005) to motor vehicle accidents (Meiser Stedman et al., 2008; Scheeringa et al., 2003; 2005) to experiences of natural disasters (Scheeringa & Zeanah, 2008) and conditions of war (Laor et al., 1996; 1997). Thus, there is no doubt that children in this age group experience serious and potentially traumatic events in large numbers.

Despite substantial exposure, several studies examining rates of PTSD using DSM-IV criteria find them to be surprisingly low (see Table 1). In severely traumatized young children, even consecutive clinic admissions of traumatized young children, the rates ranged only from 13-20%. In samples of children recruited to participate in studies following exposure to trauma, the rates were 0-12%. Finally, two community studies have found prevalence rates of 0.1 and 0.2%. This compares to a 12 month prevalence rate of 3.9% in the National Comorbidity Study (Kessler et al., 1999) and 1.3% in the Australian National Survey of Mental Health and Well Being (Creamer, Burgess & MacFarlane, 2001). Lower rates in young children may derive from one of two reasons. First, they may be relatively protected, perhaps by cognitive and perceptual immaturity, from developing PTSD following the experience of trauma, or alternatively, the rates may be low because the criteria themselves are not developmentally sensitive enough to detect the presence of manifestations of the disorder in this age group.

Thus, current evidence suggests that PTSD can be identified using DSM-IV criteria but that rates of PTSD in young children exposed to trauma appear lower than in older children exposed to trauma.

An Alternative Algorithm

Suggesting that the DSM-IV criteria needed to be more behaviorally anchored and developmentally sensitive to detect PTSD in preschool children, Scheeringa and colleagues (Scheeringa et al., 1995; Scheeringa et al., 2001) proposed an alternative to the DSM-IV criteria for children 6 years old and younger. This approach used DSM-IV criteria as a starting point, but made changes in the criteria and studied the effects of those modifications in a series of studies of preschool children. This approach was refined empirically over several years (Scheeringa et al., 1995; Scheeringa et al., 2001; Scheeringa et al., 2003) and critiqued and endorsed by a task force of experts (Task Force on Research Diagnostic Criteria: Infancy and Preschool, 2003). In this review, this approach is referred to as the Post Traumatic Stress Disorder-- Alternative Algorithm (PTSD-AA).

This alternative algorithm, displayed in Table 2, makes several modifications in DSM-V criteria. First, the A2 criterion is dropped, on the grounds that subjective experience is difficult to determine in preschool children and that “disorganized and agitated behavior” are vague and not well operationalized. Second, in B1, “or repetitive behaviors” is added following “repetitive play” for purposes of clarity. In B1, “recurrent and intrusive distressing recollections of the event...,” includes a note that “distress may not be obvious in preschool children.” Young children may be preoccupied with trauma reminders without overt displays of distress. Third, for C4, “markedly diminished interest or participation in significant activities,” is modified by a

note specifying “constriction of play.” Fourth, C5 includes a note about “social withdrawal” which is more behavioral than “detachment or estrangement from others,” which is more subjective and abstract. Fifth, in D2, add “extreme temper tantrums in young children” after “irritability or outbursts of anger). Finally, the threshold for C cluster is reduced from three to one. [Note: Originally Criterion D was also reduced from 2 to 1, but subsequent research indicated that using 1 or 2 items from D did not meaningfully change prevalence rates and so 2 were retained]. The rationales for these changes in the PTSD-AA from the DSM-IV PTSD criteria are described below.

Cluster A Modifications

The A2 criterion is eliminated in the PTSD-AA. In fact, there are serious doubts about its validity in the adult literature (see Friedman, in press). If A2 is retained in DSM-V, then the following discussion applies regarding preschool children.

As noted, “fear, helplessness, or horror” at the time of a traumatic event are difficult to infer, especially in retrospect, from a young child. Further, it is not clear what “disorganized” or even “agitated” behavior refer to, nor what data supports their use as substitutes for fear, helplessness or horror in young children.

Table 3 presents unpublished data from Scheeringa’s study (NIMH MH065884) on 276 3-6 year-old children who experienced a heterogeneous mixture of traumatic events (e.g., domestic violence, motor vehicle accidents, Hurricane Katrina exposure). These are the only known data on A2 reactions of young children. Data were collected between 2003 and 2008. All children experienced at least one traumatic event. Reaction was coded to the most severe trauma if the

child had experienced more than one event (Scheeringa, personal communication, 8/15/08).

These data are useful in addressing two relevant questions: Is the A2 criterion regarding “intense fear, helplessness, or horror” useful for preschool children? That is, does “intense fear, helpless, or horror” capture children who otherwise meet criteria for Full PTSD, or do the child modifiers in DSM-IV of “disorganized or agitated” lead to identifying children with a diagnosis of PTSD who might otherwise be missed?

Data collected by Scheeringa included items regarding initial reactions of “fear” and “helplessness,” but there was no assessment of “horror.” In this sample, 92.1% (n=104) of children with Full PTSD-AA (ignoring A2) had *either* fear or helplessness (80.9% of subclinical PTSD-AA had one or the other). Therefore, if A2 were included, using fear *or* helplessness, 7.9% (n=9) of preschool children who otherwise met criteria for PTSD (PTSD-AA) would be missed. Although these data suggest that fear or helplessness capture most young children, it would be useful to know if there were any differences in the severity of the symptoms in the group who did and did not display fear or helplessness by parental report.

Since DSM-IV specifically mentioned that children might display “disorganized or agitated” behavior instead of “fear, helplessness or horror,” Scheeringa’s data are helpful in examining how this affected the diagnostic threshold. He did not inquire about “disorganized” behavior, but when he found that using “agitated” *instead of* fear, helplessness or horror, the number of children meeting the A2 criterion actually decreased. If, however, agitated was *added to* the “fear, helplessness or horror” criterion, an additional 3 of the 9 children from among the total of 113 who met PTSD-AA criteria but who were missed by the inclusion of A2 “fear or helplessness” were identified. With all 4 responses included “fear,” “helplessness” or

“physically agitated,” 96% of the children who otherwise meet criteria would be correctly identified.

Cluster A Recommendations for Preschool Children

Cluster A is undergoing extensive review by the PTSD subgroup of the working disorders group. Based on available data for preschool children, if A2 is retained, it should be stated as “the person experienced fear or helplessness, or displays agitated behavior.” Based on available data, rates of PTSD in preschool children would be only slightly lower if A2 were retained.

Cluster B Modifications

In the PTSD-AA, a note qualifying B1 indicates that preschool children do not always manifest distress, even when they report intrusive thoughts or at least seemed preoccupied by traumatic reminders. This change was based on small samples of severely traumatized, clinic referred children that showed considerable variability in reactions of young children who were re-experiencing the trauma from distress to “overbright” reactions (Scheeringa et al., 1995, 2001).

In Scheeringa’s sample of 276 3-6 year-old traumatized preschool children, parents were asked to report on their children’s emotions when the children were recounting their traumatic experiences either verbally or through play (see Table 3). Parents were asked to endorse the two most prominent feelings from a menu of eight options, plus a category for “other.” Percentages add up to more than 100% because respondents were asked to pick the two most prominent emotions.

First, even though the obviously “distressing” emotions – fear, anxiety, sadness – were the three most common in those with higher severity (middle column), they were present in fewer than half of the children (see Table 3). Second, other emotions that clearly do not represent distress also occurred (excitement 19%, no affect 11%, enjoyment/pleasure 6%). It would be useful to know if distress is indicative of differences in severity or course, but no data have yet addressed that question.

Cluster B Recommendations for Preschool Children

Based on research to date, there are sufficient data to suggest an age related modification in the form of a note indicating that distress may not be present in the re-experiencing signs in preschool children.

Cluster C Modifications

This is the symptom cluster with the largest number of modifications in the PTSD-AA approach. Qualifiers about the wording in specific criteria represent age related modifications and were made originally based on clinical observations. These are considered next.

Criterion C4 is, “Diminished interest or participation in significant activities.” In the PTSD-AA, a qualifying note indicates that in young children this may manifest as constricted play. Young children do not necessarily have school, and do not have work or hobbies as “significant activities.” Play serves significant social, emotional and cognitive functions in preschool children. This modification is based on purely clinical and logical grounds.

Criterion C5 is, “Feeling of detachment or estrangement from others.” In the PTSD-AA, this is modified to add a note that “this may be manifest in young children as social withdrawal.” This anchors the item in an observable behavior, apparent to caregivers, with the implication that it is the outward manifestation of detachment and estrangement. Again, this modification is made on clinical and logical grounds.

There is also a change in the threshold for Cluster C in the PTSD-AA for preschool children that if included in DSM-IV would represent an age specific subtype of PTSD. The question is whether the requirement of 3 Criterion C signs/symptoms is the appropriate threshold for young children. Relevant to this discussion is that C3 (inability to recall an important aspect of the trauma) and C7 (foreshortened future) are virtually never endorsed for preschool children, meaning that the total number of potential C criteria to be endorsed effectively drops for preschool children from 7 to 5. As shown in Table 4, four studies have compared the threshold of 3 Criterion C signs/symptoms when using the DSM-IV to the 1 Criterion C threshold of PTSD-AA (Levendosky et al., 2002; Scheeringa et al., 2003; Scheeringa et al., 2006; Ghosh Ippen et al., unpublished; Scheeringa, unpublished). This allows a head-to-head comparison. The rates of children meeting the DSM-IV requirement of 3 Cluster C signs/symptoms are exceedingly low (ranging between 2% and 16% in clinical samples), making it clear that this requirement serves as a gatekeeper for young children in meeting the diagnostic threshold. In addition, these studies also reported rates of the B, C, and D criterion. These show that even when the threshold was lowered from 3 in DSM-IV to 1 in PTSD-AA, the rates of criterion C in 6/8 studies are lower than the rates of criterion B and lower than the rates of criterion D, suggesting that the threshold for criterion C has not been lowered too far.

Cluster C Recommendations for Preschool Children

There are two age related modifications that seem warranted. The first is a qualifying note in C4 regarding “diminished interest in significant activities.” This modification involves adding a note indicating that, “In young children, this may be manifest as constriction in play.” The second is a modification in C5, regarding “feeling of detachment or estrangement from others (e.g., unable to have loving feelings).” The modification adds a note that, “In young children this may be manifest as social withdrawal.” The age related subtype change involves lowering the threshold from 3 Cluster C signs/symptoms to one.

Cluster D Modifications

Criterion D2 requires, “Irritability or outbursts of anger.” The PTSD-AA modifies this criterion with the addition of, “extreme temper tantrums.” The behavior being described has to be new onset or worsening of prior tantrum intensity or frequency following a traumatic event for it to be counted as endorsed. This modification is based on purely clinical and logical grounds.

Cluster D Recommendations for Preschool Children

The only modification in Cluster D involves including a note that adds “extreme temper tantrums” to criterion D2, “irritability or outbursts of anger.”

Validity of PTSD-AA

The validity of the PTSD-AA has been examined in several different ways. Below, we consider the discriminant, predictive and criterion validity of the PTSD-AA.

Convergent and Discriminant Validity

Several studies have examined convergent validity of the PTSD-AA. Studying preschool children following a gas explosion in a nursery school in Japan, Ohmi et al. (2002) reported that scores on the CPTSD-RI (Child Post-traumatic Stress Disorder Reaction Index) predicted those children who met criteria for PTSD-AA. Similarly, Meiser-Stedman et al. (2008) Pediatric Emotional Distress Scale (PEDS) scores at T1 were correlated with T1 PTSD-AA-PR ($r = 0.52$) and PEDS scores at T2 were correlated with T2 PTSD-AA-PR ($r = .30$) in an analysis that included both preschool and school aged children. Scheeringa et al. (2003) reported higher levels of CBCL internalizing scores in a group of traumatized young children with PTSD than in a group who were traumatized without PTSD. Dehon & Scheeringa (2006) also showed moderate convergence of an interview based diagnostic assessment of PTSD and parent reported CBCL internalizing ($r = 0.57$) and externalizing scores ($r = 0.41$). Also, replicating findings about biological correlates in adults, Scheeringa et al. (2004) found that young children with PTSD (using the PTSD-AA method) exhibited increased heart rate when traumatic as opposed to pleasant memories were recalled.

The validity of the PTSD-AA criteria also have been studied with regard to their ability to discriminate traumatized and control children. Three studies have included non-traumatized comparison children and in each study; trauma exposed preschool children had more signs/symptoms than unexposed control children in B, C and D clusters (Levendosky et al., 2002; Scheeringa et al., 2001; Scheeringa et al., 2003). What is lacking is a comparison of children with PTSD to children with other disorders.

Predictive Validity

Although Omhi et al. (2002) showed longitudinal stability of PTSD-AA symptoms in preschool children at four time points following a gas explosion in a nursery school, they reported on categorical diagnosis of PTSD only at 6 months following the trauma. Two studies have followed children longitudinally after exposure to trauma using the PTSD-AA, however.

Meiser-Stedman and colleagues (2008) studied 62 preschool children 2-4 weeks (Time 1) and then 6 months (Time 2) after they had experienced motor vehicle accidents (MVA). Of the exposed children, 6.5% met PTSD-AA criteria at Time 1 and 10% at Time 2. The diagnosis was stable from Time 1 to Time 2, whereas diagnosis of DSM-IV Acute Stress Disorder (ASD) at Time 1 was not predictive of DSM-IV PTSD at Time 2—in fact, no cases of ASD at Time 1 were diagnosed with PTSD at Time 2. Thus, PTSD-AA criteria had more evidence of predictive validity than the DSM-IV criteria. Nevertheless, only 50% of the children whose parents reported them as having PTSD at Time 1 also were identified by the PTSD-AA criteria as having PTSD at Time 2.

Scheeringa and colleagues (2005) studied 62 children with mixed traumatic experiences 4 months (Time 1) after the trauma, and again at 16 months (Time 2) and 28 months (Time 3) after the trauma. They found significant stability of symptoms over the two years. At 4 months post-trauma, the group that had been diagnosed with PTSD-AA at visit 1 had an estimated mean of 6.1 PTSD symptoms and the group of traumatized children who had not met criteria for PTSD at Time 2 had a mean of 2.7 PTSD symptoms. This number of symptoms did not diminish by even as much as one symptom over 2 years for either group. PTSD diagnosis at Time 1 significantly predicted degree of functional impairment 1 and 2 years later and predicted PTSD diagnosis 2 years later but not 1 year later. The lack of 1-year diagnostic continuity

between baseline and T1 was explained by children with new traumas after the baseline assessment. There was no report of the predictive validity of the DSM-IV criteria in this study.

There are no other longitudinal studies in preschool children. It may be possible to analyze longitudinal data in Scheeringa's larger sample of 276 preschool children, however.

Criterion Validity of PTSD-AA vs. DSM-IV

A small initial study examined criterion validity of the DSM-IV and PTSD-AA in severely traumatized preschool children (Scheeringa et al., 2001). A second study replicated the initial findings, which highlighted the better fit of PTSD-AA (Scheeringa et al., 2003). First, using best estimate diagnosis of PTSD as a reference, children who met criteria for that diagnosis had the most PTSD-AA symptoms, children who were traumatized but not best estimate PTSD had intermediate levels of PTSD-AA symptoms, and unexposed control children had the lowest levels of PTSD-AA symptoms. This dimensional correlation was not evident in the DSM-IV symptom counts compared with the best estimate diagnosis in either sample. Second, in the PTSD-AA method, the mean number signs/symptoms in the children diagnosed with PTSD was significantly higher than the number of signs/symptoms in the children who were traumatized but not diagnosed with PTSD, whereas this was not true using the DSM-IV approach.

PTSD IN SCHOOL AGE CHILDREN

As noted, studies that informed the DSM-IV process did not include school age children, raising many of the same questions regarding them as about preschool children. Nevertheless, the PTSD-AA criteria were developed explicitly for preschool children, and fewer directly relevant studies have been conducted with school age children compared with preschool children. Table

5 lists those studies that reported rates of the B, C, and D criteria. The only epidemiologic study of school age children reported a 3 month prevalence rate of 0.03% of PTSD and a lifetime prevalence of only 0.1%, both using DSM-IV criteria (Copeland et al., 2007). These remarkably low rates – lifetime prevalence in the National Comorbidity Study was 7.8% (Kessler et al., 1995) and 6.8% in the National Comorbidity Study Replication (Kessler et al., 2001) -- raise questions about whether the DSM-IV criteria are appropriate for school age children as well as preschool children.

Alternative Algorithm

Only two studies that have examined the PTSD-AA in school age children. Meiser-Stedman et al. (2008) included 52 7-10 year olds in the short-term longitudinal study of children who had experienced a MVA, interviewing them and their parents 3 weeks and 6 months after the trauma. Scheeringa et al. (2006) studied children between 1 and 18 years of age who were seen at a Level I trauma center following acute injury.

Predictive Validity

Using best estimate diagnosis of PTSD 6 months after the trauma, Meiser Stedman et al. (2008) compared parent-reported PTSD-AA and DSM-IV ASD as predictors of parent reported PTSD at 6 months after the trauma in 7-10 year old children. They found that 69% of the PTSD-AA cases were stable from 3 weeks to 6 months, but using DSM-IV criteria, none of the cases of ASD at 3 weeks were diagnosed with PTSD at 6 months. This is similar to Kassam Adams and Winston (2004) who reported little predictive validity for DSM-IV ASD in 8 to 17 year old children following injuries sustained as a pedestrian, bicyclist, or motor vehicle passenger. In the Meiser Stedman et al. (2008) study, however, when parent and child reports were

combined, using the “or” rule, PTSD-AA was stable 66% of the time, but stability using DSM-IV ASD and DSM-IV PTSD was 80%. This suggests that when relying on parent report alone, there is an advantage for the PTSD-AA criteria, but with combined parent and child reports, the advantage is not evident.

Discriminant and Convergent Validity

Only one study has examined the convergent validity of the PTSD-AA in school aged children. Meiser Stedman and colleagues (Meiser Stedman et al., 2008) reported moderate convergence between the PTSD-AA and the PEDS 3 weeks and 6 months following a motor vehicle accident in an analysis that included both preschool and school aged children. No studies have examined the discriminant validity of PTSD-AA scores in traumatized and non-traumatized school aged children, or between school aged children diagnosed with the PTSD-AA and those with other disorders.

Criterion Validity

Studies of criterion validity are more limited in school age children than in preschool children. A review of the studies using DSM-IV criteria indicate that in 7 out of 10 studies, the rate of criterion C is lower than the rates for criteria B and D. This is consistent with adult literature that often indicates criterion C is less frequent and acts as the threshold cluster for making the diagnosis (Kilpatrick & Resnick, 1993), but the question remains about whether criterion C is inappropriately low in this age group as it seems to be in preschool children.

In a study of victims of acute injury, Scheeringa et al. (2006) interviewed parents two months later. They showed that when the C threshold was lowered from three symptoms to one

symptom in the 7-11 year-old group, the rate of positive criterion C went from 9.1% to 45.5%. By comparison, when the C threshold was lowered in the 12-18 year-old group, the rates of criterion C went from 17% to 62%. The prevalence of criterion C did not increase when the threshold was lowered from three to two symptoms (9.1%), but it increased substantially when only one symptom was required (45.5%). There was no report of the relationship between the numbers of PTSD signs/symptoms and diagnosis with PTSD-AA and DSM-IV criteria as there is for preschool children. For 7-11 year-olds, there is a need for more data on the question of Criterion C threshold.

SUMMARY AND RECOMMENDATIONS

Regarding age related modifications in PTSD for DSM-V, this review has considered evidence regarding several specific changes, highlighted in Table 2. First, there could be text added in the description of PTSD indicating varying manifestations of PTSD in young children. Second, several criteria could include specific notes regarding criteria. Third, there could be a developmental subtype of PTSD in preschool children that we have called PTSD-AA in this review.

The PTSD-AA, which is how modifications have been studied, has preliminary convergent, discriminant, criterion and predictive validity in preschool children. It has been studied head to head against DSM-IV criteria in 7 (mostly small) published studies of traumatized children and in two community studies of children attending a pediatric clinic. In addition, this review includes data from three larger unpublished data sets, a data set of 284 preschool children assessed in post-Katrina New Orleans (Scheeringa et al., unpublished), a data set of 158 preschool children exposed to domestic violence in San Francisco (Ghosh Ippen et al.), and a

study of 349 children attending pediatric clinics in Bucharest, Romania (Gleason et al.). Results from both published studies and unpublished data sets are remarkably uniform (see Table 1). Using DSM-IV criteria, rates of PTSD are much lower in preschool children than in older individuals. In adults in the US, for example, 50-60% all adults will have had one traumatic episode in their lives. Following this, 7.8% (10% female and 5% male) will develop PTSD. Thus about 16% of traumatized adults in the US develop PTSD (Kessler et al., 1995).

An important question is whether results from a small number of studies, several involving small numbers of preschool children, have provided sufficient reason to consider changing DSM-IV criteria in DSM-V. On the other hand, it also is worth remembering that the DSM-IV criteria for PTSD have no validity in preschool children, other than “derivative validity” from older individuals with PTSD. The question is whether the data accumulated to date are sufficiently compelling to warrant age related manifestations or an age related subtype of PTSD in young children.

To consider first the question of age related manifestations, the PTSD-AA suggest changes in the wording of several criteria (B1, C4, C5, and D1, as noted above). These changes could be handled as age related manifestations of PTSD in DSM-V. These changes rest primarily on face validity of expert opinion (e.g., see AACAP Task Force on Research Diagnostic Criteria: Infancy and Preschool, 2003). In addition, two studies assessing criterion validity of the PTSD-AA and the DSM-IV criteria both have favored the PTSD-AA approach.

Beyond these age related manifestations, the PTSD-AA also represents what would be an age related subtype of PTSD for preschool children in DSM-V. This age related subtype would

lower the threshold for Cluster C from 3 signs/symptoms to 1 sign/symptom. The evidence favoring changing the threshold for Cluster C derives primarily from the studies of criterion and predictive validity of PTSD-AA cited above. The evidence supporting eliminating the A2 criterion, which also is part of the PTSD-AA, is less convincing. Depending on whether the A2 criterion is retained and/or modified for older individuals, evidence from preschoolers suggests that A2 that included fear, helplessness, or agitated behavior would capture most of the children meeting A1 and B-D clusters.

The data regarding application of PTSD-AA in school age children are more limited and less consistent. In particular, more data on predictive and criterion validity are needed in school age children to inform decisions about A2 and the question of threshold in Cluster C. It is likely that existing data sets could be examined with regard to A2 and Cluster C. If field trials are conducted, with new data collection or re-analysis of existing data sets, predictive and discriminant validity of DSM-IV and PTSD-AA should be compared. Without clear differences, the DSM-IV criteria should be retained for school age children.

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Table 1. Studies of PTSD in Preschool Children Comparing DSM-IV and PTSD-AA Criteria

Citation	Age	N	Sample	Traumatic Events	DSM-IV Diagnosis	PTSD-AA Diagnosis
Scheeringa et al., 1995	1-3 yrs	12	Severely traumatized, clinic referred	Mixed	13%	69% ^a
Scheeringa et al., 2001	1-3 yrs	15	Severely traumatized, clinic referred	Mixed	20%	60% ^a
Levendosky et al., 2002	3-5 yrs	62	Recruited	Domestic violence	3%	26% ^a
Ohmi et al., 2002	2-6 yrs	32	Recruited	Gas explosion in nursery school	0%	25% ^a
Scheeringa et al., 2003	1-6 yrs	62	Recruited	Mixed	0%	26% ^b
Stoddard et al., 2006	1-3 yrs	52	Referred from burn unit	Burns	Not reported	29% ^{b,c}
Egger et al., 2006	2-5 yrs	314	Community (Pediatric Clinic)	Mixed	0.2%	0.6%
Scheeringa et al., 2006	1-6 yrs	21	Recruited from Level I Trauma Center	Mixed	4.8%	14.3%
Scheeringa et al., personal communication	3-6 yrs	276	Traumatized and recruited	MVA, DV, Hurricane	12%	41% ^b
Gleason, personal communication	2-5 yrs	349	Community (Pediatric Clinic)	Mixed	0%	0.2%
Ghosh-Ippen, et al., personal communication	0-6 yrs	158	Recruited	Domestic violence	0-3: 2% 4-6: 1%	0-3: 47% ^a 4-6: 39% ^a

^aAlternative algorithm required 1 B symptom, 1 C symptom, 1 D symptom and 1 from an experimental E cluster.

^bAlternative algorithm required 1 B symptom, 1 C symptom, and 2 D symptoms.

^cChildren assessed within 1 month of burn trauma.

Table 2. DSM-IV Criteria for PTSD Showing Alternative Algorithm Changes

Diagnostic criteria for Posttraumatic Stress Disorder

- A. The person has been exposed to a traumatic event in which ~~both~~ of the following were present:
1. the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others (No change from DSM-IV).
 - ~~2. the person's response involved intense fear, helplessness, or horror. *Note:* in children, this may be expressed instead by disorganized or agitated behavior.~~
- B. The traumatic event is persistently re-experienced in one (or more) of the following ways:
1. recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. **Note:** in young children, repetitive play *or repetitive behaviors* may occur in which themes or aspects of the trauma are expressed. *Furthermore, recollections may appear not to be distressing in young children.*
 2. recurrent distressing dreams of the event. **Note:** in children, there may be frightening dreams without recognizable content.
 3. acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). **Note:** in young children, trauma-specific reenactment may occur.
 4. intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
 5. physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
- C. Persistence avoidance of stimuli associated with the trauma and numbing of responsiveness (not present before the trauma), as indicated by ~~three~~ *one* or more of the following:
1. efforts to avoid thoughts, feelings, or conversations associated with the trauma.
 2. efforts to avoid activities, places, or people that arouse recollections of the trauma.
 3. inability to recall an important aspect of the trauma.
 4. markedly diminished interest or participation in significant activities. **Note:** *In young children, this may be manifest as constriction in play.*
 5. feeling of detachment or estrangement from others (e.g., unable to have loving feelings). **Note:** *In young children this may be manifest as social withdrawal.*
 6. restricted range of affect.
 7. sense of foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)
- D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:
1. difficulty falling or staying asleep.

2. irritability, ~~or~~ outbursts of anger, or *extreme temper tantrums in young children*.
3. difficulty concentrating.
4. hypervigilance
5. exaggerated startle response

E. Duration of the disturbance (symptoms in Criteria B.C and D) is more than 1 month.

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Table 3. Preschool Children's Reactions Immediately Following Traumatic Events

Acute Reaction	Met PTSD-AA Criteria N=114	Subclinical symptoms or no signs of PTSD n=162
Surprise	66%	61%
Fear	85%	80%
Helplessness	62%	46%
Worry	64%	36%
Sadness	87%	79%
Anger	45%	36%
Numb	22%	10%
Other Emotional	9%	7%
Cry	69%	62%
Scream	48%	40%
Physically agitated	51%	29%
Aggressive toward people	27%	18%
Aggressive toward things	20%	9%
Confused	70%	53%
Quiet	47%	39%
Feeling sick	19%	6%
Other Behavioral	8%	8%

Note: All data from Scheeringa unpublished

Table 4 The Cluster C Threshold

Citation	n (time since trauma)	Type of trauma	3 Cluster C signs	2 Cluster C signs	1 Cluster C sign	1 Cluster B sign	2 Cluster D signs
Levendosky et al., 2002	62 (not reported)	DV [^]	3%	not reported	not reported	85%	39%
Scheeringa et al., 2003*	62 (4 mos)	mixed	2%	11%	39%	68%	45%
Scheeringa et al., 2005*	47 (1 yr)		not reported	not reported	44.7%	48.9%	34%
	35 (2 yr)		not reported	not reported	42.9%	37.1%	51.4%
Scheeringa et al., 2006	21 (2 mos)	MVA ⁺	4.8%	14.3%	23.8%	61.9%	33.3%
Meiser-Stedman et al., 2008**	62 (2-4 wks)	MVA	not reported	not reported	25.8%	50%	35.5%
	60 (6 mos)		not reported	not reported	18.3%	35%	31.7%
Ghosh Ippen, et al., personal communication	158	DV	5.7%	11.4%	32.3%	83.5%	53.8%
Scheeringa, personal communication	276	mixed	16%	not reported	71%	89%	66%

*same sample, reported 4 months post-trauma in 2003 and at 16 and 28 months post trauma in 2005

**same sample, reported at 2-4 wks post trauma and then 6 months post trauma

[^]DV = domestic violence

⁺MVA = motor vehicle accident

Table 5 PTSD in School-Age Children Reporting Cluster

Citation	Ages	N	Traumatic Events	1 Cluster B symptom	3 Cluster C symptoms	1 Cluster C symptom	2 Cluster D symptoms	DSM-IV Diagnosis
Landolt et al., 1998	5-16 yrs	23	High risk -MVA, burn, cancer:	91%	70%	NR	52%	52%
		11	Low risk – minor surgery	64%	36%		18%	18%
Aaron et al., 1999	8-17 yrs	40	Brain injury	68%	25%	NR	50%	23%
McDermott & Cvitanovich, 2000	8-13 yrs	26	MVA	40%	8%	NR	28%	8%
Herskovits et al., 2002	4-19 yrs	94	Closed head injury	44%	13%	NR	59%	10%
Keppel-Benson et al., 2002	7-16 yrs	50	MVA	56%	16%	NR	24%	14%
Carrion et al., 2002	7-14 yrs	59	Mixed	76%	51%	NR	46%	24%
Mertin and Mohr, 2002	8-16 yrs	56	Maltreatment	91%	20%	NR	89%	20%
Copeland et al., 2007	9-13 yrs		Mixed	2% (painful recall)	NR	NR	NR	0.03 (3 month) 0.1 (lifetime)
Scheeringa et al., 2006	7-11 yrs	11	Acute injury 7-11 yrs	55%	9%	46%	64%	9%
Meiser-Stedman et al., 2008	6-10 yrs	51	MVA	65%	21%	67%	56%	18.8%

NR= Not reported