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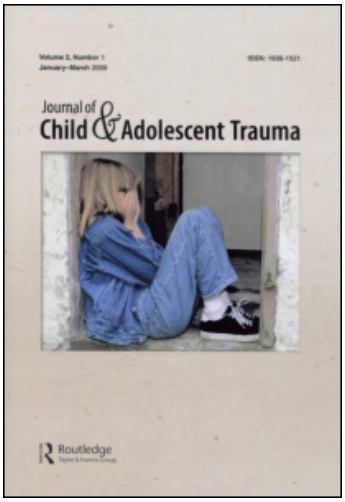

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Posttraumatic Stress Disorder in Young Children Exposed to Terrorism: Validation of the Alternative Diagnostic Criteria

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Effects of Trauma on Children, Adolescents, and/or Their Caregivers

Posttraumatic Stress Disorder in Young Children Exposed to Terrorism: Validation of the Alternative Diagnostic Criteria

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The need to adapt the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, American Psychiatric Association, 1994) criteria for diagnosing posttraumatic stress disorder (PTSD) in young children is widely recognized, yet attempts to validate alternative criteria have been limited. We examined profiles of PTSD symptoms in 29 Israeli children directly exposed to terrorism and a comparison group of 25 unexposed children. Whereas only 7% of the exposed children met PTSD criteria according to the DSM, an additional 24% were identified using the alternative criteria adopted in the revised diagnostic classification of 0 to 3. None of the children in the comparison group met criteria for diagnosis. Significant associations between exposure variables and PTSD supported the validity of the alternative criteria.

Keywords posttraumatic stress disorder, diagnostic validity, young children, terrorism

Recent studies show that children, especially young children, exposed to traumatic events are at a particularly high risk for developing posttraumatic stress disorder (PTSD) and related disorders (Pine, Costello, & Masten, 2005; Salmon & Bryant, 2002; Scheeringa & Zeanah, 2008). However, research on PTSD in young children is lagging behind the investigations of adults and adolescents (Fremont, 2004; Scheeringa, Peebles, Cook, & Zeanah, 2001). This may be partially due to the difficulty in diagnosing PTSD in young children, related both to limitations in diagnostic criteria and to the scarcity of adequate instruments (Task Force on Research Diagnostic Criteria: Infancy and Preschool [Task Force], 2003).

Criteria based on the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*; American Psychiatric Association [APA], 1994) have been criticized for being developmentally insensitive, thus leaving highly symptomatic children undiagnosed (Ohmi et al., 2002; Scheeringa, Zeanah, Drell, & Larrieu, 1995). It has also been argued that young children present with fewer avoidance/numbing symptoms than older children and adults (Yule, 2001) and that they exhibit many regressive behaviors (Osofsky, 1995). Moreover,

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DSM-IV criteria rely heavily on self-report of inner experience, a capacity that is limited in young children (Stafford, Zeanah, & Scheeringa, 2003).

In response to these criticisms, Scheeringa and his colleagues (1995) developed a semistructured diagnostic interview for caregivers, together with an accompanying set of alternative criteria for the diagnosis of PTSD in young children. The interview includes symptom descriptions that are more behaviorally anchored and more developmentally sensitive than those of the *DSM-IV* criteria. Scheeringa and his colleagues (1995) also lowered the requirement for Cluster C (avoidance/numbing) symptoms from 3 to 1, and the requirement for Cluster D (hyperarousal) symptoms from 2 to 1. A new cluster of symptoms was added, including new fears and aggressions (Cluster E).

The alternative criteria were reported to be more sensitive than the *DSM-IV* criteria in identifying PTSD in young children exposed to various traumatic events (Scheeringa et al., 1995, 2001). Following an additional study, these criteria were further modified (Scheeringa, Zeanah, Myers, & Putnam, 2003), and the current recommended algorithm for a PTSD diagnosis is: 1 Cluster B symptom + 1 Cluster C symptom + 2 Cluster D symptoms. A recent review of the current assessment instruments for PTSD in young children strongly recommends the use of the semistructured diagnostic interview based on the alternative criteria (Stover & Berkowitz, 2005). These criteria have also been adopted in the last update of the diagnostic manual for young children (Zero to Three, 2005).

The studies published to date on the validity of the alternative criteria for diagnosing PTSD were based on data collected by Scheeringa and his colleagues in the United States (e.g., Scheeringa et al., 1995, 2001, 2003) and focused on children exposed to domestic violence or abuse identified in clinical settings. The studies that did not focus on maltreated children included children who had undergone invasive medical procedures (Dehon & Scheeringa, 2006) and survivors of natural disasters (Scheeringa & Zeanah, 2008). The present study further expands the validation of the alternative criteria by investigating a different kind of traumatic event and a different cultural context: terror attacks in Israel. The exposure rate of children to terror attacks has increased worldwide over the last few decades (Berman, 2001). Growing evidence points to the harmful consequences of collective traumatic events such as terrorism on children's development and mental health (Joshi & O'Donnell, 2003; Pine et al., 2005; Thabet, Karim, & Vostanis, 2006).

In this study, we examined the relative sensitivity of the alternative criteria in comparison with the *DSM-IV* criteria for diagnosing PTSD in young children directly exposed to terrorism in a sample identified in the general community. The rates of PTSD diagnosis and symptoms were also compared with those found in a group of unexposed children. Although the new Cluster E (new fears and aggression) symptoms were found to be common among young traumatized children, their discriminative value for diagnostic purposes has been debated in previous studies (Stafford et al., 2003). Therefore, we examined the contribution of symptoms of Cluster E for making a PTSD diagnosis.

To validate the alternative criteria, the associations of PTSD symptoms and diagnosis with variables traditionally found to impact traumatic adaptation were examined, namely, the children's severity of exposure to the traumatic event (Yule, 2001) and their caregivers' adaptation following the trauma (Fremont, 2004; Thabet et al., 2006). Associations between exposure measures and the level of the child's behavior problems were also examined to determine the specificity of traumatic impact on symptoms in young children.

It is unclear whether the phenomenology of PTSD in young children exposed to terrorism is similar to that of other types of traumatic events. Although descriptions of symptomatic profiles according to type of traumatic event are rare in the literature, there are suggestions that they may vary (Scheeringa & Zeanah, 1995). For example, it was

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found that traumatic events involving threat to the caregiver resulted in fewer numbing symptoms and more hyperarousal symptoms compared with traumatic events that did not involve threat to the caregiver (Scheeringa & Zeanah, 1995). Therefore, the present study also examined the symptomatic profiles unique to young children directly exposed to the threat of terrorism to themselves and/or their caregivers.

The present study is part of a larger project investigating the influence of exposure to terrorism on the adaptation of young children in Israel during the second Intifada (the Palestinian uprising that erupted in September 2000; Cohen, 2006; Cohen, Chazan, Lerner, & Maimon, in press).

Methods

Participants

The trauma-exposed group consisted of 29 Israeli children (20 boys and 9 girls) aged 3.5–7.5 years (M = 5.47, SD = 1.34). The majority of these children lived in rural areas exposed to high levels of terrorist events during that period. Direct exposure was defined as having experienced a terror attack on themselves or a caregiver, relative, or close friend. The traumatic events included being present at a suicide bombing in a public place, being shot at by a terrorist from a passing vehicle, and experiencing an intrusion into one's home in order to kill its inhabitants. These incidents resulted in various losses for the children being studied. Six children lost a member of their nuclear family: two children lost both parents and a sibling; two children lost their mother; one child lost his father; and one child lost his sister. Four children and seven caregivers were injured during the terror incidents. The elapsed time between the traumatic event and data collection was 6–18 months following the traumatic events. None of the children had received individual therapy, although some have been consequently followed up by school psychologists.

The comparison group consisted of 25 children (13 boys and 12 girls) aged 4–7 years (M = 5.62, SD = 0.87), who resided in two small, isolated communities far from the threats of terror and unexpected intrusion. They, or their families, were not directly exposed to a major traumatic event. However, they may have been exposed to reports on terror attacks through media exposure and adult discussions. Care was taken to match the comparison group in terms of the children's ages and their caregivers' socioeconomic and educational level.

Procedure

The research proposal was approved through the ethics procedures of the Hebrew University of Jerusalem. Families of the exposed group were recruited by school psychologists in areas with high incidence of terror events. All approached families agreed to participate. For those families that might be identified as needing therapeutic services, a shortened referral process was procured to a treatment unit at a regional hospital. The comparison group was matched with the help of school psychologists in two communities unaffected by terrorism.

Due to limitations in meeting caregivers personally related to the risk of travel to dangerous locations, questionnaires were distributed to caregivers via the local school psychologists and returned by mail. The caregivers' responses on the questionnaire were then confirmed via a telephone interview, using the authors' scoring instructions (Scheeringa & Zeanah, 2002). All participating caregivers completed and returned the research questionnaires.

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Measures

Measures were completed by the main caregiver, usually the mother. In cases of children who had lost a parent, the surviving parent completed the questionnaires. The foster mother completed the questionnaires in the case of two children who had lost both parents.

Semistructured Interview and Observational Record for Infants and Young Children (SSIORIYC). The SSIORIYC (Scheeringa et al., 1995, 2003) is a caregiver interview-based questionnaire for assessing PTSD in young children based on *DSM-IV* criteria and adapted for young children. The authors reported good reliability and validity (Scheeringa et al., 2003). The interview includes 29 items rated on a 3-point scale (no-sometimes-yes). The items are divided into five subscales: exposure to a traumatic event; re-experiencing the event; avoidance and numbing of responsiveness; increased arousal; and new fears and aggression. Symptoms were counted as present when checked by caregivers both as clearly evident ("yes"), or as "sometimes" evident. The inclusion of symptoms that are "sometimes" evident is justified when considering the tendency of this population of parents to minimize difficulties in coping (Cohen, 2006). This questionnaire was scored for a PTSD diagnosis based both on the *DSM-IV* definition and on the alternative diagnostic criteria (Scheeringa et al., 2003). The sum of posttraumatic symptoms was computed for each child, considering the advantages of continuous rather than categorical data on PTSD (Stafford et al., 2003).

For the comparison group, we instructed the caregivers to assess the impact of the indirect exposure to terror events on the children (e.g., via the media). Previous research has shown that indirect exposure to terrorist events can also cause posttraumatic distress in children (Pfefferbaum et al., 2003), albeit its effect is obviously more limited.

Child Behavior Checklist (CBCL). The CBCL (Achenbach, 1991; Achenbach & Edelbrock, 1983) was used in its Israeli standardized version (Zilber, Aurebach, & Lerner, 1994). The scale is a widely used measure for identifying the existence and severity of behavioral and emotional disorders in children and has very good reliability and validity. It is based on the caregiver's ratings (on 3-point scales) of the existence and level of various problematic behaviors of the child. The measure yields an overall score, as well as more specific subscales for externalizing and internalizing behaviors and for specific syndromes. Depending on the child's age, a version of the CBCL for 1.5–5-year-olds (100 items) or a version for 6–16-year-olds (113 items) was used. Due to the different number of items, we used adjusted standardized *t*-scores for both subscales and total CBCL scores.

Child's Traumatic Exposure. This questionnaire was constructed by the first author, since no published questionnaire was found addressing young children and the details of relevant terrorism incidents. Item choice was based on developmental and clinical considerations of risk as listed in the literature (e.g., Pine et al., 2005). The caregiver was requested to list the dates of the terror events to which the family had been exposed indirectly and directly. The caregiver was asked to describe the last incident involving direct exposure and to mark the presence or absence of a list of event characteristics. These characteristics, related to major aspects of the event and its aftermath, were the basis for the following four measures: (a) Severity of Traumatic Event was a summed score (ranging from 0–4) based on the child's exposure to the following four traumatic experiences: the child's witnessing of a terrorism incident involving threat to his or her own life or to the life of his or her caregiver; exposure to gruesome sights; being separated from caregivers during the event; being separated from caregivers after the event. (b) Death of a Member of the

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Nuclear Family as a Result of the Terror Incident was scored dichotomously. (c) Child's Injury and Disability was a summary score (ranging from 0–2) indicating the listing of possible injury and subsequent disability. (d) Caregiver's Injury and Disability was a summary score (ranging from 0–2) listing possible injury and subsequent disability ability. In addition, stressful life events unrelated to terrorism were recorded (e.g., health issues, exposure to other traumatic events).

Familial Background. Caregivers were asked to provide information regarding their education, family income, and family size.

Caregiver PTSD. Caregiver PTSD was assessed using the Posttraumatic Diagnostic Scale (Foa, Riggs, Dancu, & Rothbaum, 1993) in its Hebrew version. It has been used in previous studies (Gil, 2005) and is a widely used scale based on *DSM-IV* criteria (APA, 1994) with very good psychometric properties (Gil, 2005). The first 18 scale items address the three major symptom subscales (re-experiencing, avoidance and numbing, and increased arousal), which are rated on 4-point scales of frequency (ranging from *none* or *once* to *five times a week* or *almost always*). The additional 10 items rate duration of disorder and the level of impairment in functioning. In our analyses, we used both the criteria for a PTSD categorical diagnosis and a composite score of the sum and frequency of PTSD symptoms, which were highly correlated ($r = .92$, $p < .001$). As demonstrated by Shalev, Tuval, Frenkiel-Fishman, Hadar, and Eth (2006), indirect exposure to terrorism may also have posttraumatic effects. Therefore, we also asked caregivers in the comparison group to report on the indirect influence of terrorism on their feelings and behavior.

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Results

Preliminary Analyses

To control for prior exposure to stressful life events, children in both groups were compared on the frequency of exposure to such events. No significant differences were found between the groups (31% in the exposed group; 28% in the comparison group, $\chi^2[2, N = 54] = 0.10$, *ns*). Furthermore, within the exposed group, differences in prior exposure to terror events were examined. All the children were involved directly in only one major terror event, although all of them were previously indirectly exposed to reports of terror incidents in their communities.

The age and gender of the child and the elapsed time since the traumatic event were not correlated with any of the dependent variables (PTSD diagnosis and sum of PTSD symptoms). Given the small sample size, we thus conducted our analyses without controlling for age, gender, or time elapsed since the traumatic event.

PTSD Diagnosis: DSM-IV in Comparison to the Alternative Criteria. The frequencies of PTSD diagnoses obtained according to both the criteria of the *DSM-IV* (APA, 1994) and the alternative criteria (Scheeringa et al., 2003) were computed separately for the exposed and comparison groups. The selection process for the studied groups ensured that none of the children in the comparison group and all of the children in the exposed group met the first criterion for Cluster A in a PTSD diagnosis (i.e., experiencing or witnessing an event that threatens the life or physical integrity of self or others; APA, 1994). All the children in the exposed group met the second criterion for Cluster A of a response to the traumatic event involving fear, helplessness, agitation, or disorganized behavior.

Using *DSM-IV* criteria (1 Cluster B + 3 Cluster C + 2 Cluster D symptoms) resulted in a PTSD diagnosis for 2 (7%) of the 29 children in the exposed group and none of the children in the comparison group. This difference in frequency of PTSD was not statistically significant. Using the alternative criteria (1 Cluster B + 1 Cluster C + 2 Cluster D symptoms) 9 of the 29 children in the exposed group (31%) and none of the children in the comparison group warranted a PTSD diagnosis; this difference was statistically significant, $\chi^2(1, N = 54) = 9.3$, $p = .002$. The group of nine children who had met the alternative criteria included the two children who had also met the *DSM-IV* criteria.

PTSD Symptomatic Profiles

Distribution of Symptoms Within Clusters. Table 1 presents the frequency of PTSD symptoms according to each cluster. Re-experiencing symptoms (Cluster B) were ubiquitous among the exposed children: more than half showed greater than three re-experiencing symptoms, and almost all the exposed children (83%) had at least two such symptoms. Of the children who met the alternative PTSD criteria, all had at least two re-experiencing symptoms. Avoidance/Numbing symptoms (Cluster C) were much less prevalent: more than half of the exposed children did not show any such symptoms. Both Hyperarousal symptoms (Cluster D) and symptoms of New Fears and Aggressions (Cluster E) were common in the exposed group: more than half of the group showed more than two

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Table 1
PTSD symptom frequency in the trauma-exposed and comparison groups

Criteria	Number of symptoms	Trauma-exposed group (n = 29)*	PTSD group (n = 9)	Comparison group (n = 25)
B. Reexperiencing cluster	None	2 (7%)	0	15 (60%)
	One	3 (10%)	0	9 (36%)
	Two	8 (28%)	1 (11%)	1 (4%)
	Three +	16 (55%)	8 (89%)	0
		mode=2	mode=3	mode=0
C. Avoidance/Numbing of responsiveness cluster	None	16 (55%)	0	23 (92%)
	One	8 (28%)	5 (56%)	2 (8%)
	Two	3 (10%)	2 (22%)	0
	Three +	2 (7%)	2 (22%)	0
		mode=0	mode=1	mode=0
D. Hyperarousal cluster	None	7 (24%)	0	21 (84%)
	One	7 (24%)	0	3 (12%)
	Two	5 (17%)	2 (22%)	1 (4%)
	Three +	10 (35%)	7 (88%)	0
		mode=0	mode=3	mode=0
E. New fears & aggression cluster	None	5 (17%)	0	20 (80%)
	One	9 (31%)	1 (11%)	5 (20%)
	Two	9 (31%)	3 (33%)	0
	Three +	6 (21%)	5 (55%)	0
		mode=1	mode=2	mode=0

*All children in the trauma-exposed group met criterion A for a PTSD diagnosis.

symptoms in each of these clusters. It is noteworthy that 40% of the participants in the comparison group showed at least one Cluster B symptom, and 20% showed one Cluster E symptom.

In order to examine the contribution of Cluster E to the diagnosis of PTSD, we compared the number of children who received a PTSD diagnosis according to the alternative criteria with and without Cluster E symptoms. There was no difference in the number of identified children. However, children who were exposed to a terror event presented with significantly more Cluster E symptoms (M = 1.76, SD = 1.38 for the trauma-exposed group; M = 0.20, SD = 0.41 for the comparison group; $t[52] = 5.44$, $p < .001$, $d = 1.51$). Moreover, within the exposed group, children who received a PTSD diagnosis had significantly more Cluster E symptoms in comparison with children who did not receive a PTSD diagnosis (M = 3, SD = 1.32 for children with PTSD; M = 1.20, SD = 1.00 for the children without PTSD; $t[27] = 4.04$, $p < .001$, $d = 1.55$).

Gender Differences. Although no gender differences were found in the frequency of PTSD diagnoses or in the sum of PTSD symptoms, a difference was found in the distribution of PTSD symptoms among the diagnostic clusters. Girls had significantly fewer Cluster D symptoms than boys (M = 0.89, SD = 1.05 for girls; M = 2.25, SD = 1.52 for boys; $t[27] = 2.43$, $p = .02$, $d = 0.94$).

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Validation of the PTSD Diagnosis according to the Alternative Criteria

Sum of Symptoms and Categorical Diagnosis. In order to ascertain whether the diagnosis identified the most symptomatic children, we compared the number of PTSD symptoms in children who met diagnosis using the alternative criteria to those who did not. Children who met the alternative criteria had significantly more PTSD symptoms (M = 12.11, SD = 3.62) than children in the exposed group who did not meet diagnostic criteria (M = 5, SD = 3.06). This difference was statistically significant, $t(27) = 5.47$, $p < .001$, $d = 2.10$.

Behavior Problems and PTSD Symptoms and Diagnosis. Comparisons between the exposed and the comparison groups were conducted using the adjusted standardized t-scores of the CBCL. Children in the exposed group had more elevated scores in the CBCL (M = 0.16, SD = 0.13) than children in the comparison group (M = 0.07, SD = 0.06). This difference was statistically significant, $t[52] = 3.14$, $p = .003$, $d = 0.87$.

The mean total CBCL standardized scores for the nine children who met the alternative criteria for PTSD (M = 0.26, SD = 0.12) was compared with those of the 20 trauma-exposed children who did not meet diagnosis (M = 0.12, SD = 0.12). The level of behavior problems in the diagnosed group was significantly higher, $t[27] = 3.07$, $p = .005$, $d = 1.18$. Similar findings were obtained with both the CBCL Internalizing and Externalizing subscales. Children who met the alternative criteria had significantly higher scores in both the Externalizing (M = 0.27, SD = 0.14) and Internalizing (M = 0.33, SD = 0.19) subscales, compared with children who did not meet diagnostic criteria (Internalizing: M = 0.09, SD = 0.10, $t[27] = 4.02$, $p < .001$, $d = 1.55$; Externalizing: M = 0.17, SD = 0.17, $t[27] = 2.24$, $p = .033$, $d = 0.86$). The total CBCL scores correlated positively and significantly with the number of PTSD symptoms ($r = .67$, $p < .001$), as did the Internalizing subscale ($r = .68$, $p < .001$) and the Externalizing subscale ($r = .49$, $p = .007$).

PTSD Symptoms and the Child's Level of Exposure. Table 2 presents the correlations between aspects of the child's exposure to the traumatic event and the levels of PTSD

Table 2
Pearson correlations between aspects of the child's traumatic exposure and both ptsd symptoms and behavior problems in the trauma-exposed group (n = 29)

	Sum of PTSD symptoms	CBCL Total score	CBCL Internalizing	CBCL Externalizing
Severity of traumatic event	0.40*	0.01	–0.06	–0.05
Injury/disability of child	0.64**	0.45*	0.52**	0.24
Injury/disability of caregiver	0.62**	0.30	0.23	0.25
Caregiver PTSD symptoms	0.56**	0.51**	0.52**	0.42**
Caregiver PTSD diagnosis +	0.27	0.25	0.30	0.11
Death of family member +	0.21	0.08	–0.11	0

*$p < .05$, ** $p < .01$.
+ Point biserial correlations.

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symptoms and behavior problems. As can be seen in Table 2, the measure of severity of traumatic event correlated positively and significantly with the sum of PTSD symptoms. This measure did not correlate significantly with measures of behavior problems. The same was true for the measure of caregiver's injury and disability, which correlated positively and significantly only with the rate of their children's PTSD symptoms. Children's injury and disability were positively and significantly correlated with their sum of PTSD symptoms, as well as with the Internalizing subscale and total score of the CBCL. However, the correlation between the death of a member of the child's family and the child's measures did not reach significance.

Child's PTSD Diagnosis and Level of Exposure. Differences in exposure measures between children diagnosed with PTSD and nondiagnosed children were also calculated. The injury and disability of the caregiver significantly differentiated between those who received a PTSD diagnosis and those who did not ($\chi^2[2, N = 29] = 9.18$, $p = .01$), as did the injury and disability of the child ($\chi^2[2, N = 29] = 7.39$, $p = .03$). Although children who met the PTSD diagnostic criteria suffered from more severe traumatic event exposure ($M = 12.56$, $SD = 2.07$) than the children who did not meet the diagnostic criteria ($M = 10.50$, $SD = 3.62$), this difference did not reach significance.

Caregivers' PTSD and Child Adaptation. All caregivers in the exposed group, except for one foster parent, met the exposure criteria of Cluster A. All caregivers were previously exposed indirectly to terror incidents through social networks and media exposure. However, the current terror incident was their first direct exposure. Eight (36.4%) of the caregivers in the exposed group met the full diagnostic criteria for PTSD, whereas only two caregivers (8%) in the comparison group met criteria for PTSD. This difference was statistically significant, $\chi^2(2, N = 54) = 5.61$, $p = .02$. The mean sum of PTSD symptoms among caregivers of the exposed group was 7.09 ($SD = 4.80$), whereas for the comparison group, the mean sum of PTSD symptoms among caregivers was 3.12 ($SD = 3.04$). This difference was statistically significant, $t(52) = 3.42$, $p = .001$, $d = 1.02$.

As can be seen in Table 2, although the caregiver's PTSD diagnosis did not correlate significantly with any of the child's measures, the composite score of the caregivers' sum and severity of PTSD symptoms was positively and significantly correlated with the child's sum of PTSD symptoms, as well as all three CBCL scale scores.

Discussion

The results of the present study clearly show that the *DSM-IV* criteria for PTSD (APA, 1994) do not distinguish between young children who were directly exposed to terrorist attacks and those who were not. Consistent with previous research (Scheeringa et al., 1995, 2001), the use of the *DSM-IV* criteria resulted in a low incidence of PTSD diagnosis (7% of the exposed group), leaving highly symptomatic children undiagnosed. Using the alternative criteria (Scheeringa et al., 2003; Task Force, 2003) for diagnosing PTSD in young children resulted in the diagnosis of significantly more children (31% in the directly exposed group). This incidence of PTSD is similar to that reported in the literature for young children exposed to the violence of terror and war (Fremont, 2004; Salmon & Bryant, 2002). The ability to better diagnose young children with PTSD will enable more children to access needed therapeutic services. Indeed, following our study and consultations with the school psychologists and caregivers, a number of the studied children have been referred for treatment.

Examination of the symptomatic profiles of the children in the present study largely supports the algorithm suggested for the alternative PTSD criteria, while highlighting specific characteristics of the symptomatic profile of children exposed to terrorism. Consistent with previous research (Fletcher, 1996; Scheeringa, Wright, Hunt, & Zeanah, 2006), children who met the PTSD diagnosis had few avoidance/numbing symptoms (Cluster C). This finding supports the decision to lower the requirement to only one symptom from Cluster C in the new algorithm (Scheeringa et al., 1995, 2003; Task Force, 2003).

Although the current requirement for Cluster B (re-experiencing symptoms) is only one symptom, it is important to note that in the present group all the children who met a PTSD diagnosis according to the alternative criteria presented with at least two re-experiencing symptoms, and that a large majority (89%) presented with more than three such symptoms. It has previously been suggested that the type of the traumatic event may be associated with the level of re-experiencing symptoms (Ulman, 1995). The present study focused on trauma associated with terrorist attacks, which recurred frequently during the time stretch of our group's direct exposure (September 2000–December 2004) and received much media coverage. According to data from Israel's Social Security Administration, Israeli civilians were exposed to 7,622 terrorist incidents during that time period. It seems highly likely that the children in the present study were exposed to many traumatic reminders that might have aggravated re-experiencing symptoms (Pfefferbaum et al., 2003). This finding has implications for treatment, as a clear focus is needed on alleviating re-experiencing symptoms. Some data suggest that these symptoms are best treated using techniques such as prolonged exposure and especially imaginal exposure, as compared to avoidance symptoms, which are best treated through in vivo exposure (Bryant, 2000; Scheeringa et al., 2007).

In line with previous findings, we found that adding the requirement of one symptom from Cluster E to the diagnostic algorithm made no difference in the number of children who met diagnosis, supporting the decision to exclude this requirement for PTSD diagnosis (Scheeringa et al., 2003; Task Force, 2003). However, our data suggest that although Cluster E symptoms may appear in some nontraumatized children, possibly as a response to everyday stresses, they appear in significantly higher frequencies in children exposed to traumatic events in comparison with unexposed children. The inclusion of these symptoms as "associated features" (Zero to Three, 2003) may help differentiate between children suffering from PTSD who are in need of individual trauma-focused therapy and children exhibiting new fears and aggression without other PTSD symptoms. In the latter case, sensitive environmental handling of the child's behavioral changes is called for, and

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developmental guidance to caregivers may become the intervention of choice. Parental guidance, emphasizing the normality of regressive and acting-out behaviors in young children who have experienced a traumatic event, as well as the transient nature of these changes, which usually subside when the child's sense of security is reestablished, may contribute to the alleviation of parental anxiety and increase their support for the child (Cohen, 2009).

In line with previous findings (Scheeringa & Zeanah, 2008), no gender differences were found in this study in either the incidence of PTSD diagnosis or frequency of PTSD symptoms. Girls, however, exhibited fewer hyperarousal symptoms than boys. This finding adds to previous research on young children, showing that girls present with fewer externalizing symptoms than boys (Osofsky, 1995; Thabet et al., 2006). Traumatized girls may therefore be identified less easily and therefore denied necessary treatment.

A higher frequency of behavior problems was found in the exposed group compared with the comparison group. Furthermore, within the exposed group, both PTSD symptoms and diagnosis were significantly associated with elevated levels of behavior problems. The comorbidity of PTSD and both internalizing and externalizing behavior problems following traumatic exposure has been previously established (e.g., Marsee, 2008; Scheeringa & Zeanah, 2008). However, in the present study, this comorbidity was not uniform across exposure characteristics. The severity of the traumatic event was associated only with PTSD measures and not with behavior problems. Only experiences associated with the long-term effects of the traumatic event that affected the child's quality of life (i.e., the child's injury and disability and the caregiver's PTSD the symptoms) were associated with both the child's PTSD symptoms and behavior problems. These findings may support the specificity of the alternative PTSD criteria to traumatic exposure.

The literature to date is lacking in data on the determinants of PTSD in comparison to other comorbid disorders that appear following a traumatic event. However, Marsee (2008) presented evidence for a model showing a potential pathway from traumatic exposure of adolescents (via PTSD symptoms and poorly regulated emotions) to reactive aggression and behavior problems. This pathway may also be relevant to understanding the behavior problems of the children in our study, who may have been more poorly regulated emotionally due to the need to cope with the long-term debilitating consequences of the traumatic event, in addition to the exposure and their posttraumatic reactions to it.

The measure of the sum of PTSD symptoms (both for the children and for the caregivers) proved to be more sensitive to associations with the various aspects of traumatic exposure in comparison with the categorical diagnostic measure. This finding, in line with a similar report by Stafford et al. (2003), emphasizes the utility of using a continuous measure of PTSD symptoms in addition to the categorical diagnosis. Caregivers' posttraumatic symptoms, as well as their injury and disability, were highly and positively associated with child PTSD measures. This further highlights the great sensitivity of young children to their caregivers' well-being and adaptation in the aftermath of traumatic events (Cohen, 2009). The positive high associations between the child's own injury/disability, PTSD diagnosis, and level of symptoms emphasize an additional vulnerability of young children: a preoccupation with threats to bodily safety and wholeness. The research literature has not devoted attention thus far to this aspect of posttraumatic adaptation in young children. Our data suggest that children exposed to injury and disability should be considered a high risk group for PTSD.

Associations between the occurrence of death in the nuclear family and PTSD did not reach significance. This may be due to the small size of our sample and the low incidence of death cases on this dichotomous measure. The required correlation analysis when one

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of the measures is dichotomous is point biserial, rendering values identical with the presented Pearson correlations. However, when the distribution of cases is skewed, as in the present case (6 incidents of death out of 29), the point biserial correlations should be interpreted as much stronger than the Pearson correlations of the same magnitude (Cohen & West, 2003).

This study has several limitations. Our sample was relatively small and therefore further support is needed in order to generalize our findings. Furthermore, associations reported between measures of traumatic exposure and the child's adaptation are based on the same source (the caregivers' reports), a procedure that may increase the size of correlations. However, since the reports on traumatic exposure were based largely on factual information (e.g., the occurrence of death or injury), this limitation may be possibly relevant only for some of the more subjective ratings, such as the child's and the caregiver's symptoms. In addition, each caregiver's written report on the child's PTSD symptoms was corroborated via telephone interview, rather than a face-to-face interview, as originally suggested by the authors of the SSIORIYC (Scheeringa et al., 1995, 2003). The reliability of this form of administration needs to be established in future studies.

The present study is the first report supporting the better validity of the alternative criteria in comparison with the *DSM-IV* criteria in diagnosing PTSD in young children exposed to terrorism. Future studies should further expand the applicability of the alternative criteria to young children outside of the United States exposed to a variety of traumatic events.

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