Time does not heal all wounds: Identifying children suffering from psychological trauma
Verlinden, E.

Citation for published version (APA):
Chapter 4

Characteristics of the Children’s Revised Impact of Event Scale in a clinically referred Dutch sample

Eva Verlinden
Els P.M. van Meijel
Brent C. Opmeer
Renée Beer
Carlijn de Roos
Iva A.E. Bicanic
Francien Lamers-Winkelman
Miranda Olff
Frits Boer
Ramón J.L. Lindauer

Journal of Traumatic Stress 2014, 27, 338-334
Abstract

Early identification of posttraumatic stress disorder (PTSD) in children is important to offer them appropriate and timely treatment. The Children’s Revised Impact of Event Scale (CRIES) is a brief self-report measure designed to screen children for PTSD. Research regarding the diagnostic validity of the CRIES is still insufficient, has been restricted to specific populations, and sample sizes have often been small. This study evaluated the reliability and validity of the 8-item (CRIES-8) and 13-item (CRIES-13) versions of the CRIES in a large clinically referred sample. The measure was completed by 395 Dutch children (7–18 years) who had experienced a wide variety of traumatic events. PTSD was assessed using the Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent version. A cutoff score of 17 on the CRIES-8 and 30 on the CRIES-13 emerged as the best balance between sensitivity and specificity, and correctly classified 78%–81% of all children. The CRIES-13 outperformed the CRIES-8, in that the overall efficiency of the CRIES-13 was slightly superior (.81 and .78, respectively). The CRIES appears to be a reliable and valid measure, which gives clinicians a brief and user-friendly instrument to identify children who may have PTSD and offer them appropriate and timely treatment.
Introduction

Following exposure to traumatic events, children are at risk of developing a variety of stress reactions, which are comparable to the symptoms of posttraumatic stress disorder (PTSD) described in adults (Yule, 2002). Symptoms of posttraumatic stress are not always simply mild adjustment reactions, but can persist for years and significantly interfere with children’s psychosocial functioning (Yule, Ten Bruggencate, & Joseph, 1994). Research has shown that children and adolescents who suffer from PTSD demonstrate regressive behaviors (e.g., thumb sucking or enuresis), academic difficulties, and withdrawal behaviors from their peers (Armsworth & Holaday, 1993). Given the fact that effective treatments for PTSD are available, it is important to identify children at risk of or suffering from PTSD to prevent chronic problems and offer them appropriate and timely treatment.

Structured diagnostic interviews are the gold standard in the assessment of PTSD in children, but these instruments are time-consuming and often require professional training. Screening tools, however, offer a quick, cost effective, and reliable way to identify children at risk of the disorder for whom the gold standard assessment is appropriate. Obviously, no formal diagnosis can be made using a screening tool; however, it may serve as a first step to identify children who may need further assessment and/or treatment.

One of the most widely used screening tools in the assessment of posttraumatic stress is the Impact of Event Scale (IES) developed by Horowitz, Wilner, and Alvarez (1979). The original 15-item version of the IES was designed for adults to assess the amount of distress, characterized by symptoms of intrusion and avoidance (Smith, Perrin, Dyregrov & Yule, 2003). Although this measure was not initially designed for children, it has been successfully used in a number of studies with children and adolescents (Children and War Foundation, 1998; Joseph, Brewin, Yule, & Williams, 1993; Yule 1992; Yule & Udwin, 1991; Yule & Williams, 1990). Research on the factor structure of the IES in children has confirmed the existence of two factors that correspond to the intrusion and avoidance symptom clusters (Giannopoulou et al., 2006). In a sample of 334 adolescent survivors of the Jupiter cruise ship disaster, aged 11–18 years, Yule et al. (1994), however, found that several items were not loading on those two factors. This finding was confirmed in a sample of 1,787 war-affected children, aged 6–15 years (Dyregrov, Kuterovac, & Barath, 1996) and in a sample of 180 Khmer refugee youths, aged 13–25 years (Sack, Seeley, Him, & Clarke, 1998). Furthermore, according to Dyregrov et al., a number of items were misinterpreted by children and simplification of these items was recommended. These two findings have led to the development of a shortened and more child-friendly version of the IES. Seven items were dropped and the remaining items were modified to make them more accessible to children. These modifications resulted in a new 8-item version, known as the Children’s Revised Impact of Event Scale (CRIES-8), consisting of four intrusion and four avoidance items (Yule, 1997). The psychometric properties of the CRIES-8 have been evaluated in a sample of 87 children who survived the sinking of a cruise ship (Yule, 1997) and a sample of 170 children attending a hospital accident and emergency
department following a road traffic accident or sporting injury (Stallard, Velleman, & Baldwin, 1999). Both studies provide support for the reliability and validity of the CRIES-8 as a screening tool for PTSD, but recommend further evaluation.

According to the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000) symptoms of posttraumatic stress are divided into three separate symptom clusters. The CRIES-8, however, is limited to two symptom clusters. To assess the third DSM-IV-TR symptom Cluster D (increased arousal), five items were added by Yule and colleagues, resulting in a 13-item version of the IES designed for children (CRIES-13; Smith, Perrin, Yule, Hacam, & Stuvland, 2002). The validity of the CRIES-13 was evaluated by Smith et al. (2003) using a sample of 2,976 children in war, aged 9–14 years. Results showed that the CRIES-13 had satisfactory internal consistency. Furthermore, in line with previous studies, factor analyses showed that intrusion and avoidance were robust factors of the CRIES-13. All of the hyperarousal items, however, loaded heavily on the intrusion factor. The authors concluded that the intrusion and hyperarousal items were closely related and not clear, separable factors. These findings were confirmed by Giannopoulou et al. (2006) in a sample of 2,037 Greek children, aged 9–17 years, affected by an earthquake and by Zhang, Zhang, Wu, Zhu, and Dyregrov (2011) in two large samples of children, aged 10–18 years, who survived the Sichuan earthquake in China.

Although most studies have focused on the psychometric properties and factor structure of the CRIES-8 and CRIES-13, there are few validations of the CRIES by structured diagnostic interviews to investigate its utility as a screening tool for PTSD. Perrin, Meiser-Stedman, and Smith (2005) administered the CRIES-13 together with a structured diagnostic interview for PTSD in a sample of 63 children, aged 10–16 years, attending an accident and emergency clinic and a sample of 52 clinically referred children, aged 7–18 years, attending a PTSD clinic. Results showed that a cutoff score of 30 on the CRIES-13 and a cutoff score of 17 on the CRIES-8 maximized sensitivity and specificity in both samples. In addition, they concluded that the CRIES-8 worked as efficiently as the CRIES-13 in correctly classifying children with and without PTSD (overall efficiency rate 75%–83%). A lower cutoff score, however, of 14 on the CRIES-8 was found by Kenardy, Spence, and Macleod (2006) in a sample of 135 children, aged 7–16 years, who were admitted to the hospital following an accident or injury. In addition, Dow, Kenardy, Le Brocque, and Long (2012) found lower cutoff scores than those reported by Perrin et al. (2005) for both the CRIES-8 and CRIES-13 in a sample of 55 children, aged 6–16 years, following admission to the intensive care unit. The latter study also suggested that in contrast to Perrin et al. (2005), the CRIES-13 outperformed the CRIES-8, in that the overall efficiency of the CRIES-13 was slightly superior.

Overall, although the CRIES appears to be an effective tool to screen for PTSD in children, research regarding its utility as a screening tool for PTSD is still insufficient. There is the concern that previous research on its diagnostic validity has been restricted to specific populations, such as children exposed to road traffic accidents, other accidental injuries
or children in need of pediatric intensive care. Furthermore, some sample sizes were small, making interpretation difficult. This study extends previous research in four ways. First, we included a large sample of children. Second, the children in our sample were exposed to a much wider variety of traumatic events. Third, we included both children with single and prolonged exposure to traumatic events, and fourth, children were recruited from the department of youth welfare as well as specialized child trauma centers. In a continuing effort to establish the validity, in particular the concurrent validity, of the CRIES-8 and/or CRIES-13, this study focused on the reliability and validity of the CRIES in a clinically referred Dutch sample. No study so far has been focused on the reliability or validity of the translated version of the CRIES in the Netherlands.

Method

Participants

This cross-sectional study featured a clinically referred sample of 395 children and adolescents, aged 7–18 years, who were exposed to one or more traumatic event(s) during their lives. The sample had slightly more girls (62.5%) than boys with an average age of 12.80 years ($SD = 3.01$). Sample characteristics are shown in Table 1. Children and adolescents (referred to as children here) were recruited from the department of youth welfare and four specialized child trauma centers in different regions in the Netherlands. Data were collected between June 2008 and March 2011.

Measures

An extended adaptation of the PTSD module of the Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Version (ADIS-C/P; Verlinden, van Meijel, & Lindauer, 2009) was used to assess a complete trauma history in children. For each event endorsed, respondents were asked to provide additional information, i.e., the frequency of the event as well as their age at the time of the event. Events were categorized as either single exposure (Type I) or prolonged exposure (Type II).

The CRIES (Children and War Foundation, 1998; Dutch translation by Olff, 2005) is a brief, self-report questionnaire designed to screen for PTSD in children aged 8 years and older. The Dutch version of the CRIES was obtained through a standard forward-backward translation procedure by independent health professionals. There are two versions available. The 8-item version (CRIES-8) consists of four questions to assess intrusion and four questions to assess avoidance. The total score indicates the severity of the posttraumatic stress response (Giannopoulou et al., 2006).
Table 1. Characteristics of clinically referred children

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>148</td>
<td>37.5</td>
</tr>
<tr>
<td>Female</td>
<td>247</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Type of event</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual assault</td>
<td>131</td>
<td>33.2</td>
</tr>
<tr>
<td>Domestic violence</td>
<td>104</td>
<td>26.3</td>
</tr>
<tr>
<td>Accident or injury</td>
<td>47</td>
<td>11.9</td>
</tr>
<tr>
<td>Physical violence</td>
<td>34</td>
<td>8.6</td>
</tr>
<tr>
<td>Traumatic grief</td>
<td>25</td>
<td>6.3</td>
</tr>
<tr>
<td>Bullying</td>
<td>21</td>
<td>5.3</td>
</tr>
<tr>
<td>Emotional abuse or neglect</td>
<td>7</td>
<td>1.8</td>
</tr>
<tr>
<td>Serious illness or death of a loved one</td>
<td>6</td>
<td>1.5</td>
</tr>
<tr>
<td>Serious illness of child</td>
<td>5</td>
<td>1.3</td>
</tr>
<tr>
<td>Stalking</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>Out of home placement</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>Other event</td>
<td>9</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Exposure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single exposure</td>
<td>175</td>
<td>44.3</td>
</tr>
<tr>
<td>Prolonged exposure</td>
<td>220</td>
<td>55.7</td>
</tr>
</tbody>
</table>

*Note. N = 395.*

The Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Version (ADIS-C/P; Silverman & Albaño, 1996; Dutch translation by Siebelink & Treffers, 2001) is a semistructured interview for diagnosing anxiety and other related disorders in children aged 7–17 years. The ADIS-C/P is administered separately to children and their parent(s). Symptoms are rated by respondents as either present (yes), absent (no), or other (e.g., sometimes or don’t know). In addition, impairment ratings of each diagnosis are considered using a 9-point Likert-like scale (0–8). Diagnoses are based upon the child report (ADIS-C) and parent report (ADIS-P) separately. In addition, the interviews provide combined diagnoses based on child and parent reports. In deriving combined diagnoses, diagnoses from both child and parent interview are considered. If one or both interviews yield a diagnosis with an impairment rating of 4 or more, the child receives the diagnosis (Silverman & Albaño, 1996). The ADIS-C/P appears to be a reliable instrument for deriving *DSM-IV-TR* anxiety disorder symptoms and diagnoses in children. It was found to have good to excellent test-retest reliability for the specific diagnoses ($\kappa = .63–.92$) with a test-retest interval of 7–14 days (Silverman, Saavedra, & Pina, 2001). Furthermore, good to excellent interrater agreement ($\kappa = .65–1.0$) was found.
by Lyneham, Abbott, and Rapee (2007) in a sample of 153 children and their parents who attended an anxiety disorders clinic. Interviews were conducted by 16 clinicians of whom 5 rerated the interviews. For the current study, the interrater agreement was excellent ($\kappa = .89$). Interviews were conducted by five clinically trained psychologists. Of all interviews, 40 child and 40 parent interviews were rerated by a sixth psychologist.

**Procedure**

Prior to the study, approval was obtained from the Medical Ethical Committee of the Academic Medical Center in Amsterdam. Children and parents were invited to participate in the study after comprehensive explanation. Children with evidence of mental retardation and children reporting psychotic symptoms were excluded. Written informed consent was obtained from all parents and from children 12 years and older. Children and parents completed an assessment involving the CRIES-13, along with a diagnostic interview (ADIS-C/P) to determine rates of PTSD. Children completed the CRIES-13 by themselves and were instructed to answer in reference to the event they felt was the worst event they experienced, or the event they found most distressing. A psychologist was present to answer any questions when necessary. The psychologists then interviewed children and parents separately. For the test-retest, a subsample of 39 children completed the CRIES-13 again within 1 week after the first assessment.

The assessment took place at the institution. Only in exceptional cases and under certain conditions could the assessment take place at the family home; this applied to 25 children and their parents (6.3%). Comparable to the assessment at the institution, child and parent were interviewed separately and in a quiet room without any distractions.

Assessments were conducted by five different research members (all clinically trained psychologists). All research members were trained extensively in the assessment of the CRIES and the ADIS-C/P. All research members were instructed to follow the introductions and questions of the interview literally, to prevent any interviewer bias. Only in the case of an unclear answer from a child or parent could the interviewer ask for some clarification. In addition, there were regularly scheduled meetings for all research members to discuss all difficulties with each other. If there was doubt, a child psychiatrist with extensive experience in the trauma field was consulted.

**Data analysis**

For the CRIES, data were counted as missing if more than one item on a subscale (> 25.0%) was left blank. Four children had only one missing item on a subscale, these items were scored zero (Smith et al., 2002). For the ADIS-C/P, 3 child interviews and 18 parent interviews were excluded due to incomplete assessment or no parental involvement in the study. Because of skewed data, nonparametric tests were used where necessary. Mann-Whitney $U$ tests were conducted to examine differences between children with and without PTSD.
The internal consistency of the CRIES was assessed using Cronbach’s $\alpha$. Test-retest reliability was estimated using Spearman’s rank correlation coefficient and Wilcoxon signed-rank test. To examine the efficacy of the CRIES in identifying children with PTSD, receiver operating characteristic (ROC) curve analyses and cross-tabulations were conducted. Furthermore, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall efficiency (the proportion of children correctly identified) were calculated. Cutoff scores were chosen to strike the best balance between high sensitivity and reasonable specificity (i.e., over 50%). High sensitivity is important to minimize the likelihood that children with PTSD would fail to be identified by the CRIES. Statistical significance was established at an alpha level of .05. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 19.0 for Windows.

**Results**

According to the ADIS-C, 178 children (45.4%) met DSM-IV-TR diagnostic criteria for PTSD. Based on the ADIS-P, 163 children (43.2%) met criteria for PTSD. Using the combination of child and parent, 240 children (62.3%) met diagnostic criteria for PTSD. Average scores on the CRIES for children with and without PTSD, based on the ADIS-C, are shown in Table 2. Children with PTSD had significantly higher scores on the total scale and all subscales of the CRIES.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total ($N = 395$)</th>
<th>PTSD ($n = 178$)</th>
<th>No PTSD ($n = 214$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$Mdn$</td>
</tr>
<tr>
<td>CRIES-8</td>
<td>19.14</td>
<td>11.04</td>
<td>21</td>
</tr>
<tr>
<td>CRIES-13</td>
<td>29.87</td>
<td>16.56</td>
<td>31</td>
</tr>
<tr>
<td>Intrusion</td>
<td>8.05</td>
<td>5.96</td>
<td>8</td>
</tr>
<tr>
<td>Avoidance</td>
<td>11.09</td>
<td>6.21</td>
<td>12</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>10.73</td>
<td>6.73</td>
<td>11</td>
</tr>
</tbody>
</table>

Note. Mann-Whitney U tests were conducted to examine differences between children with and without PTSD. All five $p$ values were < .001. Median is presented because distributions were skewed. CRIES = Children’s Revised Impact of Event Scale; PTSD = posttraumatic stress disorder.

Internal consistency using Cronbach’s $\alpha$ was .89 for the total score on the CRIES-13 and .86 for the total score on the CRIES-8. For intrusion, avoidance, and hyperarousal, Cronbach’s $\alpha$ was .82, .77, and .74, respectively. The test-retest reliability coefficient was .85 for the total
score on the CRIES-13 and .78 for the total score on the CRIES-8. For intrusion, avoidance, and hyperarousal, the test-retest reliability coefficients were .64, .64, and .79, respectively. A Wilcoxon signed-ranks test indicated that there was a significant difference on the total score between the two administrations of the CRIES-13 ($z = -3.09, p < .05$) and the CRIES-8 ($z = -3.30, p < .05$). Children reported higher scores on the first assessment of the CRIES-13 ($M = 34.72$) and the CRIES-8 ($M = 22.54$) compared to the second assessment of the CRIES-13 ($M = 30.23$) and the CRIES-8 ($M = 18.97$). No significant differences were found on intrusion ($z = -1.94, p = .05$) or hyperarousal ($z = -1.21, p = .23$). A significant difference, however, was found on avoidance ($z = -2.89, p < .05$) with higher scores on the first assessment ($M = 12.54$) compared to the second assessment ($M = 10.51$).

ROC curve analyses revealed that the CRIES-13 was significantly better than chance at identifying PTSD as measured by the ADIS-C: $AUC = .91, 95\% \text{ CI [.88, .94]}$. A cutoff score of $\geq 30$ emerged as the best balance between sensitivity (.88) and specificity (.76). In other words, 157 of the 178 children with a diagnosis of PTSD and 162 of the 214 children without a diagnosis of PTSD were correctly identified by the CRIES-13 using $\geq 30$. The overall efficiency rate was 81.4%. Performance statistics are shown in Table 3. Based on the ADIS-P, ROC curve analyses revealed an $AUC$ value of .68, 95% CI [.63, .73]. Using a cutoff score of 30 or more resulted in correctly identifying 109 of the 163 children with a diagnosis of PTSD and 120 of the 214 children without PTSD. Based on the combined diagnosis from child and parent reports (ADIS-C/P), ROC curve analyses revealed an $AUC$ value of .83, 95% CI [.79, .87]. Using a cutoff score of 30 or more resulted in correctly identifying 174 of the 240 children with a diagnosis of PTSD and 109 of the 145 children without PTSD.

<table>
<thead>
<tr>
<th>Table 3. Indices for the CRIES-8 and CRIES-13 using three methods of diagnosing PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Index</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
</tr>
<tr>
<td>Specificity</td>
</tr>
<tr>
<td>PPV</td>
</tr>
<tr>
<td>NPV</td>
</tr>
<tr>
<td>Overall efficiency</td>
</tr>
</tbody>
</table>

*Note. CRIES-8 cutoff score was $\geq 17$; CRIES-13 cutoff score was $\geq 30$. CRIES = Children’s Revised Impact of Event Scale; PTSD = posttraumatic stress disorder; PPV = positive predictive value; NPV = negative predictive value.*

With regard to the CRIES-8, ROC curve analyses revealed that it was also significantly better than chance at identifying PTSD as measured by the ADIS-C, $AUC = .90, 95\% \text{ CI [.87, .93]}$. A cutoff score of $\geq 17$ emerged as the best balance between sensitivity (.91) and specificity (.67).
In other words, 162 of the 178 children with a diagnosis of PTSD and 144 of the 214 children without a diagnosis of PTSD were correctly identified by the CRIES-8. The overall efficiency rate was 78.1%. Performance statistics are provided in Table 3. Based on the ADIS-P, ROC curve analyses revealed an AUC value of .67 (95% CI [.62, .72]). Using a cutoff score of 17 or more resulted in correctly identifying 117 of the 163 children with a diagnosis of PTSD and 108 of the 214 children without PTSD. Based on the combined diagnosis from child and parent reports (ADIS-C/P), ROC curve analyses revealed an AUC value of .82, 95% CI [.78, .87]. Using a cutoff score of 30 or more resulted in correctly identifying 187 of the 240 children with a diagnosis of PTSD and 99 of the 145 children without PTSD.

**Discussion**

The purpose of this study was to evaluate the characteristics of the CRIES-8 and CRIES-13 in a clinically referred sample exposed to a wide variety of traumatic events. Findings of this study indicate that both the CRIES-8 and CRIES-13 appear to be reliable and valid measures to screen for PTSD in children. The overall internal consistency was good, with acceptable to good values for the three subscales. These findings are similar to those found by others (Giannopoulou et al., 2006; Smith et al., 2003; Zhang et al., 2011). Test-retest correlations were moderate to strong. A significant decrease in level of symptoms, however, was found between the two administrations of the CRIES, indicating questionable test-retest reliability.

A cutoff score of 17 on the CRIES-8 and a cutoff score of 30 on the CRIES-13 emerged as the best balance between sensitivity and specificity, and correctly classified 78–81% of all children based on the child diagnostic interview. These cutoff scores are in line with those found by Perrin et al. (2005). Lower cutoff scores were found, however, by Kenardy et al. (2006) and Dow et al. (2012). Furthermore, findings of this study show that, in contrast to Perrin et al. (2005), the CRIES-13 outperformed the CRIES-8, in that the overall efficiency of the CRIES-13 was slightly superior. Given that the assessment of those five extra hyperarousal items requires little time and provides clinically relevant information regarding arousal symptoms (Dow et al., 2012), preference for the use of the CRIES-13 is suggested.

Not surprisingly, results from the current study showed better diagnostic accuracy for the CRIES based on the child diagnostic interviews (ADIS-C) than based on the parent diagnostic interviews (ADIS-P). Both the CRIES and the child diagnostic interviews were completed by the same informant (i.e., child), whereas the CRIES and the parent diagnostic interview were completed by different informants (i.e., child and parent). Most often, different types of measures of the same construct correlate better with each other if they are administered to the same individual (Nauta et al., 2004).

It is important to identify children at risk of or suffering from PTSD to prevent chronic problems and offer appropriate and timely treatment. To identify those children, appropriate and reliable assessment measures are required. The CRIES is an effective tool for assessing PTSD.
in children. It offers a quick, cost-effective, and reliable way to screen for PTSD. Furthermore, the CRIES does not require professional training. Compared to most other self-report questionnaires for assessment of PTSD in children (e.g., Trauma Symptom Checklist for Children, Briere, 1996) the CRIES is brief, child-friendly and is easy to assess and to evaluate. In addition, other well established self-report questionnaires used for the assessment of PTSD in children such as the UCLA PTSD Reaction Index (Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998) or the Children’s Responses to Trauma Inventory (Alisic, Eland, & Kleber, 2006) lack appropriate validations by structured diagnostic interviews (Alisic & Kleber, 2010; Elhai et al., 2013; Steinberg et al., 2013).

The limitations of this study need to be acknowledged. First, the CRIES-8 consists of eight questions to assess intrusion and avoidance, but lacks any assessment of hyperarousal. Second, the CRIES is a child self-report questionnaire. Children’s self-ratings are of great importance, as research shows that parents tend to underestimate the severity of the posttraumatic stress symptoms in their children (Earls, Smith, Reich, & Jung, 1988; Yule & Williams, 1990). Furthermore, some parental reports may be biased by the parents’ own psychological problems, or they may underestimate the chronic nature of posttraumatic stress symptoms and believe that their child will quickly adjust to a traumatic event (McFarlane, 1987; Yule & Williams, 1990). Gathering accurate information from children, however, is sometimes difficult and potentially stressful for the child. Some questions may be difficult for young children to understand, especially questions that are negatively phrased, e.g., “Do you try not to think about it?” (Van der Kooij et al., 2013). Furthermore, some children are unwilling or unable to respond for themselves due to limited developmental capacities. In these situations, the CRIES might underestimate the true level of distress in children and parent reports can provide valuable information. All in all, it is highly recommended to include both child and parent reports to obtain the most adequate diagnostic information. Both informants may provide unique and useful information (Bird, Gould, & Staghezza, 1992; Jensen et al., 1999; Nauta et al., 2004). A greater amount of information regarding the child may lead to a more complete diagnostic picture (Grills & Ollendick, 2003). Given that the CRIES is currently limited to child’s self-report, future research may address this limitation by examining the use of a parental screening tool for child’s posttraumatic stress.

Third, the interval of less than a week between test and retest limits how much reports could change; the task is not one of remembering what was reported the first time, the task is to show that there is stability over time in the absence of change of symptoms. When the referent is the same several days, the report cannot change except out of error.

Last, the children in the current study were recruited from the department of youth welfare and specialized child trauma centers, where PTSD prevalence is expected to be high. Given the fact that the positive predictive value (PPV) and the negative predictive value (NPV) are base-rate sensitive (Perrin et al., 2005), these results may not be applicable to other samples with a lower base rate of PTSD. Previous research suggests, however, that the CRIES performs
well in other populations with a lower prevalence of PTSD (Dow et al., 2012; Kenardy et al., 2006; Perrin et al., 2005).

Although this study indicates that the CRIES is an effective tool for assessing PTSD in children, we emphasize that it should not be used as a replacement for a full assessment of PTSD (Sack et al., 1998). A proper clinical diagnosis relies on much more detailed information obtained from structured diagnostic interviews that assesses not only the severity of the posttraumatic stress symptoms, but also the duration and subjective impairment in social, occupational, or other important areas of functioning (Children and War Foundation, 1998). Structured diagnostic interviews, however, are time consuming and often require professional training. Kramer and Landolt (2011) recommend in their systematic review a stepped procedure, first screening children for PTSD and then providing interventions only to those children who are at risk of chronic psychological problems. In this, the CRIES may serve as the first step to identify children who are at risk of or suffering from PTSD and may need further assessment and/or treatment.

Acknowledgements

This study was supported by a grant of the Netherlands Organization for Health Research and Development (ZonMw, grant number 15701.0005). We wish to thank Joost Daams, clinical librarian from the Division of Clinical Methods and Public Health, Academic Medical Center, Amsterdam, the Netherlands, for his help with the literature search. We also would like to thank Belinda Dow, Research Fellow at the University of Queensland, Australia, for her help as a native English speaker. Finally, we would like to thank Annu Sharma, Romana Luske, Sanja Goddijn, Mirjam Schippers, and Maj Gigengack, who have done an excellent job in the collection of data.
References


