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

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A parental tool to screen for posttraumatic stress in children: First psychometric results

Eva Verlinden
Yvette L. van Laar
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

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Abstract

The Children’s Revised Impact of Event Scale (CRIES-13) is a brief self-report measure designed to screen children for posttraumatic stress disorder (PTSD). This study investigates the psychometric properties of a Dutch version of the CRIES-13–parent version and evaluates its correlation with the child version. A sample of 59 trauma-exposed children (8 years–18 years) and their parents completed an assessment including the CRIES-13 (child/parent version) along with the Anxiety Disorders Interview Schedule for DSM-IV: Parent version. Results demonstrated good internal consistency ($\alpha = .87$) with acceptable values for the 3 subscales. A strong correlation ($r = .73$) with another measure of PTSD and lower correlations with a behavioral measure ($r = .15$ to .38) were found, confirming the convergent/divergent validity. A cutoff score ≥ 31 emerged as the best balance between sensitivity and specificity, and correctly classified 83.6% of all children as having a diagnosis of PTSD. This study provides support for the reliability and validity of the CRIES-13–parent version as a screening measure for posttraumatic stress in children.
Introduction

Posttraumatic stress disorder (PTSD) can persist for years and significantly interfere with children’s psychosocial functioning (De Bellis & Van Dillen, 2005). Therefore, it is important to recognize children at risk of or suffering from PTSD. Screening tools 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 PTSD in children is the Children’s Revised Impact of Event Scale (CRIES-13; Children and War Foundation, 1998). The CRIES-13 is a child self-report questionnaire. Some children, however, lack the cognitive abilities to reliably and validly report symptoms (Jensen et al., 1999). In these situations, parental report can provide valuable information or enhance child self-report (Ghesquiere et al., 2008). Although prior research has indicated poor symptom and diagnostic agreement between parents and children, both informants provide unique and useful information that may lead to a more complete diagnostic picture to guide proper diagnosis and care (Jensen et al., 1999). This has led to the development of a parent version of the CRIES-13. Compared to other parent measures to assess PTSD in children (e.g., Trauma Symptom Checklist for Young Children; Briere, 2005), the CRIES-13 is brief and easy to score. This study is the first study of which we are aware to examine the reliability and validity of this parent version of the CRIES-13 as well as its correlation with the child version.

Method

Participants

This cross-sectional study featured a clinical sample of 59 children and adolescents (referred to as “children” herein), aged 8 years–18 years old, who had been exposed to one or more traumatic event during their lives. The sample had slightly more girls (52.5%) than boys with an average age of 12.59 years (SD = 2.95). Children and one of their parents were recruited from three specialized child trauma centers and the department of youth welfare in different regions in the Netherlands. Sample characteristics are presented in Table 1.

Measures

The CRIES-13–child version (Children and War Foundation, 1998; Dutch translation by Olff, 2005a) is a 13-item self-report questionnaire designed to screen for PTSD in children aged 8 years and older (see Verlinden et al., 2014). The internal consistency of the CRIES-13 in the current study was $\alpha = .88$.

The CRIES-13–parent version (Olff, 2005b) was developed in the Netherlands and based on the original Dutch CRIES-13–child version. The questions of the parent version were formulated as closely as possible to the corresponding questions of the child version (e.g., “Do you try not talk about it?” vs. “Does your child try not talk about it?” For the complete questionnaire, please contact the corresponding author.)
Table 1. Characteristics of the sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>28</td>
<td>47.5</td>
</tr>
<tr>
<td>Female</td>
<td>31</td>
<td>52.5</td>
</tr>
<tr>
<td>Type of event</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic violence</td>
<td>19</td>
<td>32.2</td>
</tr>
<tr>
<td>Accident or injury(^a)</td>
<td>10</td>
<td>16.9</td>
</tr>
<tr>
<td>Sexual assault</td>
<td>9</td>
<td>15.3</td>
</tr>
<tr>
<td>Physical violence</td>
<td>4</td>
<td>6.8</td>
</tr>
<tr>
<td>Traumatic grief</td>
<td>4</td>
<td>6.8</td>
</tr>
<tr>
<td>Bullying</td>
<td>3</td>
<td>5.1</td>
</tr>
<tr>
<td>Serious illness of child</td>
<td>3</td>
<td>5.1</td>
</tr>
<tr>
<td>Emotional abuse or neglect</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Serious illness or death of a loved one</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Stalking</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Out of home placement</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Other event</td>
<td>3</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Note. N = 59.

\(^a\) Single traumatic events such as traffic accidents, falls, robberies, shooting incidents.

The Trauma Symptom Checklist for Young Children (TSCYC; Briere, 2005; Dutch translation by Tierolf & Lamers-Winkelman, 2014) is a 90-item caretaker measure designed for the assessment of posttraumatic symptomatology in children, aged 3 years–12 years. The internal consistency of the TSCYC in the current study was $\alpha = .97$.

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997; Dutch translation by Van Widenfelt, Goedhart, Treffers, & Goodman, 2003) is a brief questionnaire used to identify behavioral and emotional problems in children, aged 4 years–16 years. In the current study, the internal consistency of the SDQ was $\alpha = .88$.

The Anxiety Disorders Interview Schedule for DSM-IV: Parent version (ADIS-P; Silverman & Albano, 1996; Dutch translation by Siebelink & Treffers, 2001) is a semistructured interview for diagnosing anxiety and related disorders in children, aged 7 years–17 years. An extended adaptation of the PTSD module was used to assess a complete trauma history (Verlinden, van Meijel, & Lindauer, 2009). For the current study the interrater agreement was $\kappa = .8$ for the diagnosis of PTSD.
Procedure
Prior to the study, approval was obtained from the Medical Ethical Committee of the Academic Medical Center in Amsterdam, the Netherlands. All children and parents were informed about the study after their first appointment at the institution through an information brochure. Children and parents who were eligible for the study were invited to participate after receiving further information. Children with evidence of mental retardation and children reporting psychotic symptoms were excluded. Written informed consent was obtained from all parents and assent from children aged 12 years and older. Parents completed an assessment at the institution starting with the parent version of the CRIES-13, the TSCYC, and the SDQ, followed by a diagnostic interview (ADIS-P). Children completed the CRIES-13–child version. Both children and parents were instructed to base their posttraumatic symptom reports upon the worst event or the event considered most distressing for the child. Children and parents were assessed separately by a psychologist trained in conducting the ADIS-P.

Data analysis
Because of skewed data, nonparametric tests were used where necessary. Mann-Whitney U tests were conducted to investigate potential differences in gender and age. The internal consistency was assessed using Cronbach’s α. Spearman’s rank correlations were estimated to examine convergent and divergent validity. To examine diagnostic accuracy, receiver-operator characteristic (ROC) curve analyses and cross tabulations were conducted. Cutoff scores were chosen to strike the best balance between sensitivity and specificity. Correlations between the child and parent version of the CRIES-13 were estimated using Spearman’s rank correlation coefficient.

Results
Parent-reported (CRIES-13) posttraumatic symptoms are given in Table 2. No significant difference was found between boys and girls (z = −0.18, p = .859), or between younger and older children (z = −1.54, p = .125) based on a median split of the sample (13 years).

The internal consistency of the CRIES-13–parent version was α = .87 for the total score. Regarding the three subscales of Intrusion, Avoidance, and Hyperarousal, Cronbach’s α was .78, .78, and .71, respectively.

To examine convergent validity, correlations were conducted between the total scale of the CRIES-13 and the total posttraumatic stress scale (PTS-TOT) of the TSCYC. The TSCYC has an age range of 3 years to 12 years, which limited this test to 22 children. The correlation between the CRIES-13 and the TSCYC was considered strong (r = .73, p < .001). To examine divergent validity, the total scale and all subscales of the CRIES-13–parent version were correlated with the total behavioral problem scale of the SDQ. Due to missing data, the SDQ was available for 51 children. Correlations between the SDQ and the total scale of the CRIES-13 (r = .38, p
and the three subscales of Intrusion \( r = .37, p = .008 \), Avoidance \( r = .15, p = .300 \), and Hyperarousal \( r = .46, p = .001 \) were at a lower level.

**Table 2.** Means, standard deviations, and medians for the parent version of the CRIES-13, pooled and separately by PTSD status

<table>
<thead>
<tr>
<th>Variable</th>
<th>PTSD ( n = 18 )</th>
<th>No PTSD ( n = 37 )</th>
<th>Total ( N = 55 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>Mdn</td>
</tr>
<tr>
<td>Intrusion</td>
<td>11.33</td>
<td>3.97</td>
<td>11.50</td>
</tr>
<tr>
<td>Avoidance</td>
<td>13.78</td>
<td>3.54</td>
<td>14.00</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>15.78</td>
<td>5.52</td>
<td>16.50</td>
</tr>
<tr>
<td>Total</td>
<td>40.89</td>
<td>7.50</td>
<td>42.00</td>
</tr>
</tbody>
</table>

Note. Groups were based on the parent diagnostic interview (Anxiety Disorders Interview Schedule for DSM-IV: Parent version). Mann-Whitney U tests were conducted to examine differences between children with and without PTSD. All \( p \) values were < .001. Median is presented because tests were nonparametric. CRIES-13 = Children’s Revised Impact of Event Scale; PTSD = posttraumatic stress disorder.

On the basis of the parent diagnostic interview (ADIS-P), 18 children (32.7%) met diagnostic criteria according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) for PTSD. Children with PTSD had significantly higher scores on the total scale and all of the subscales compared to children without PTSD (see Table 2). ROC curve analyses revealed that the parent version of the CRIES-13 differentiated children with and without PTSD excellently, area under the curve = .90, 95% confidence interval (CI) [.81, .98]. A cutoff score of ≥ 31 emerged as the best balance between sensitivity and specificity. Performance statistics for this cutoff score and two other potential cutoffs are presented in Table 3.

Low to moderate parent–child correlations were found regarding the total scale of the CRIES-13 \( r = .55, p < .001 \) and the three subscales of Intrusion \( r = .48, p < .001 \), Avoidance \( r = .40, p = .001 \), and Hyperarousal \( r = .54, p < .001 \).

**Discussion**

The purpose of this study was to investigate the psychometric properties of a parent version of the CRIES-13 in a sample of trauma-exposed children and to evaluate its correlation with the child version of the CRIES-13. The findings of this study provide support for the reliability and validity of the CRIES-13–parent version as a screening measure for posttraumatic stress in children. A cutoff score ≥ 31 emerged as the best balance between sensitivity and specificity, and correctly classified 83.6% of all children as having a diagnosis of PTSD. This
cutoff score is comparable to the recommended cutoff score ≥ 30 of the child version of the CRIES-13 (Verlinden et al., 2014).

Table 3. Diagnostic accuracy of the CRIES-13–parent version

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cutoff ≥ 30</th>
<th>Cutoff ≥ 31</th>
<th>Cutoff ≥ 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>.94</td>
<td>.94</td>
<td>.83</td>
</tr>
<tr>
<td>Specificity</td>
<td>.73</td>
<td>.78</td>
<td>.81</td>
</tr>
<tr>
<td>PPV</td>
<td>.63</td>
<td>.68</td>
<td>.68</td>
</tr>
<tr>
<td>NPV</td>
<td>.96</td>
<td>.97</td>
<td>.91</td>
</tr>
<tr>
<td>Overall efficiency</td>
<td>.80</td>
<td>.84</td>
<td>.82</td>
</tr>
</tbody>
</table>

Note. N = 55. CRIES-13 = Children’s Revised Impact of Event Scale; PPV = positive predictive value; NPV = negative predictive value.

Results from this study showed low to moderate concordance between the parent and child version of the CRIES-13. These results are in line with previous studies concerning parent–child agreement on PTSD (Meiser-Stedman, Smith, Glucksman, Yule, & Dalgleish, 2007; Shemesh et al., 2005). As posttraumatic stress reactions are mainly internalizing symptoms, parental knowledge of these stress reactions is dependent upon reports from their child (Stover, Hahn, Im, & Berkowitz, 2010). Children, especially traumatized children, are not always able to express their thoughts and feelings, or may try to hide their distress in fear of upsetting their parents (Yule, Perrin, & Smith, 1999). Furthermore, parents can also suffer from posttraumatic stress symptoms following their child’s exposure to a traumatic event. Such parental reactions may influence their report of the child’s posttraumatic symptoms because of difficulties in differentiating between their own and their child’s posttraumatic reaction (Shemesh et al., 2005). All in all, both child and parent may provide unique and useful information to guide proper diagnosis and care. Therefore, it is highly recommended to obtain both child and parent reports.

This study is limited by a relatively small sample size, which should lead to caution in interpreting the results. Furthermore, test-retest reliability of the parent version of the CRIES-13 was not examined. Also, children in the current study were recruited from the department of youth welfare and specialized child trauma centers with a reasonably high base rate of PTSD. Therefore, the findings may not apply to a general population with a lower base rate of PTSD. Finally, this study examined a sample of children and adolescents, aged 8 years–18 years, which hampers generalization to younger children. More research is needed to determine whether similar results hold true in other populations and larger sample sizes. If so, the parent version of the CRIES-13 may provide both clinicians and researchers with a brief, valid, and reliable tool in the public domain to screen for posttraumatic stress in
children and thereby increase chances of adequate further assessment and treatment.

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References


