The Children's Revised Impact of Event Scale (CRIES):
Validity as a Screening Instrument for PTSD

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Abstract

The Children's Revised Impact of Event Scale (CRIES) is a brief child-friendly measure designed to screen children at risk for Posttraumatic Stress Disorder (PTSD). It has good face and construct validity, a stable factor structure, correlates well with other indices of distress, and has been used to screen very large samples of at-risk-children following a wide range of traumatic events. However, few studies have examined the scale's validity against a structured diagnostic interview based on the DSM-IV criteria for PTSD. In the present study, the CRIES and the PTSD section of the Anxiety Disorders Interview Schedule- Child and Parent Version (ADIS-CP) were administered to a sample of children and adolescents (n=63) recruited from hospital accident and emergency rooms and the validity of the CRIES as a screening tool evaluated. Cutoff scores were chosen from this sample with a low base-rate of PTSD (11.1%) to maximise sensitivity and minimise the likelihood that children with a diagnosis of PTSD would fail to be identified. Cutoff scores were then cross-validated in a sample of 52 clinically referred children who had a high base-rate of PTSD (67.3%). A cutoff score of 30 on the CRIES-13 and a cutoff score of 17 on the CRIES-8 maximised sensitivity and specificity, minimized the rate of false negatives, and correctly classified 75-83% of the children in the two samples. The CRIES-8 (which lacks any arousal items) worked as efficiently as the CRIES-13 (which includes arousal items) in correctly classifying children with and without PTSD. Results are discussed in light of the current literature and of the need for further development of effective screens for children at-risk of developing PTSD.

Keywords: PTSD, children, measurement, validity.

Bill Yule

Many of the participants in the present study were recruited from the Child Traumatic Stress Clinic (CTSC), in which the first (PS) and third (SP) authors have worked with Bill for over 10 years. Bill set up the CTSC to meet the clinical needs of traumatised children and to serve as an international centre for training and research. It has fulfilled all of these roles many times over. Bill has supervised dozens of mental health professionals in the clinic over the years, and together they have treated hundreds of traumatised children and their families. Many of these professionals have returned to their native countries and established trauma services where none existed before. Bill's work in the clinic has spawned much innovative research including the first RCT of CBT for PTSD in children ever carried out in the UK (led by the third author) and the first prospective study of Acute Stress Disorder in children (led by the second author - RMS).

My (SP) first contact with Bill came in 1995 when he posted an email to a trauma bulletin board, asking for help to set up a programme for war-affected children in Bosnia. After a few emails we agreed to meet at a conference in Paris later that year to discuss this project. I remember thinking it odd that Bill didn't see the necessity to arrange a specific time or place to meet although we had never met. I became rather apprehensive that I would actually get to meet Bill as on the first day of the conference, and despite the fact that everyone seemed to know who Bill was, I could not get anyone to slow down long enough to point him out. I decided my best chance to meet him was his keynote address. However, there were more than 300 people in the auditorium and only seats in the back were still available. Nevertheless, any apprehension I had about meeting Bill quickly faded when he walked onto the platform - wearing a light blue leisure suit with dark black socks and sandals. I also remember Bill pausing on two slides of a child's drawings, asking the audience (with his usual dramatic flair) to consider what each represented. He explained that the first (a jumble of lines) only made sense when you considered it from the point of view a child recalling the inside of a dark, slowly capsizing ship. As for the second (a tree with a black hole in the trunk), Bill said a therapist had told him the hole signified the powerlessness and grief felt by the child. Everyone in the room laughed when Bill said the child had told *him* that hole was where a bird lived!

There is perhaps no more fitting tribute to a man who has admonished everyone to listen to children, that the measure he designed specifically for screening trauma-exposed children (the CRIES) has been translated into Chinese, Finnish, Norwegian, Dutch, Turkish, Greek, Bosnian, Arabic, Farsi, Hindi, and Tamil. The CRIES has been used to screen tens of thousands of children around the world in the aftermath of wars, earthquakes, and most recently the tsunami that struck Southeast Asia. Bill's continuing commitment to helping traumatised children is evident from his work with the Children and War Foundation (ChildrenandWar.org), which he helped set up and now leads, and which offers the CRIES and empirically supported treatment manuals for the treatment of traumatised children.

Introduction

Between 1990 and 2003 there were 59-armed conflicts around the world, with an estimated 1.6 million children killed and untold numbers wounded (UNICEF, 2005). In that same period more than 20 million children were forced from their homes because of human rights violations (UNICEF, 2005). In 2002 alone, more than 608 million individuals were directly affected by some form of natural disaster (IFRC, 2003). Several million more will have been added to that number as a result of the tsunami that struck Asia on the 26th of December 2004.

In the immediate aftermath of such events, a high percentage of children will experience symptoms of Posttraumatic Stress Disorder (PTSD) with perhaps 20-30% going on to develop the full disorder in the first 6 months (see Schnurr, Freidman & Bernardy, 2002 for a review of epidemiological investigations of PTSD). While PTSD is not the only disorder to emerge after a traumatic event, it is certainly one of the most common (Schnurr et al., 2002). Left untreated, PTSD can persist for years, increase the children's risk of developing other disorders, and impair their psychosocial functioning (Bolton, O'Ryan, Udwin, Boyle & Yule, 2000). Given that we now have effective treatments for PTSD (see Cohen, Berliner & March, 2000 for a review), it is important that we identify children at risk for developing PTSD as soon as possible after the trauma (Vernberg & Vogel, 1993). Structured diagnostic interviews are the gold standard for assessing PTSD (Cohen et al., 1998) but are simply impractical in the wake of large-scale traumas (Yule & Udwin, 1991). Brief, child-friendly, self-report measures that can accurately identify PTSD are needed for screening large numbers of trauma-affected children (Brewin, Rose, Andrews et al., 2000; Stallard, Velleman & Baldwin, 1999; Yule & Udwin, 1991).

Over the years numerous measures of PTSD have appeared in the literature (see McNally 1996 for a review) but few have been used as widely as the Impact of Event Scale (IES) (Horowitz, Wilner & Alvarez, 1979) (see Joseph, 2000 for a review of research on the IES). Developed prior to the adoption of the PTSD criteria in DSM-III (1980), items for this measure were drawn from the responses of 66 clinically referred adults, half of whom were bereaved and the other half injured in a traumatic event (Horowitz et al., 1979). In its final form the measure had 7 items assessing trauma-related intrusion and 8 items assessing avoidance. Factor analytic studies supported the existence of separate intrusion and avoidance factors, although not all items loaded consistently on either factor with some studies suggesting a third "numbing" factor (Zilberg, Weiss & Horowitz, 1982; Schwarzwald, Solomon, Weisenberg & Mikulincer , 1987; Joseph, Williams & Hodgkinson, 1993; Joseph, Williams, Yule & Walker, 1992).

Malmquist (1986) was the first to use the IES with children, administering it in interview format to a group of 5 to 10 year olds who had witnessed the murder of one of their parents. These traumatised and bereaved children produced similar IES profiles as the adults in Horowitz et al.'s (1979) original validation study; a finding notable given data available at that time suggesting that children were resilient in the face of traumatic events (e.g. Handford, Mayes, Mattison et al., 1986; McFarlane, Policansky & Irwin, 1987; Masten Best & Garemezy, 1990). Yule & Williams (1990) were the next to use the measure with children. They administered it to seven adolescents who had been on a ship, "Herald of Free Enterprise" which sank off the coast of Belgium in 1987. Similar to Malmquist (1986), these young adolescents' IES scores were as high as traumatised adults from the same disaster. In 1988, the cruise ship Jupiter carrying over 400 British school children sank off the coast of Athens.

Yule and Udwin (1991) had worked with one of the schools where some of the children from the ship were attending. Ten days after the trauma, they administered the IES to 24 girls and again found their scores to be comparable to those of traumatised adults from the Herald of Free Enterprise (Yule & Udwin, 1991). The girls' IES scores at 10 days post-trauma also predicted help-seeking behaviour over the next three months.

Because of this work and their work with the survivors of the Herald of Free Enterprise, Yule and colleagues were asked by solicitors acting on behalf of the children to screen all 400 survivors of the Jupiter disaster. Using the IES as well as self-report measures of fear and depression, Yule (1992) found high levels of distress and trauma-specific fears in the 334 children who returned the screening measures 5-9 months after the trauma. Of those who were seen to be at high risk based on measures including the IES, more than half were found to meet the DSM-III-R criteria for PTSD when interviewed nearly a year after the event (Yule, 1992). Further analyses (Yule, 1994) indicated that the IES had a factor structure in children very similar to that found in traumatised adolescents (Sack, Seeley, Him & Clarke, 1996) and adults (Zilberg et al., 1982; Schwarzwald et al., 1987; Joseph et al., 1992, 1993), i.e. two clear intrusion and avoidance factors with several items not loading on either of these factors.

Yule, ten Bruggencate & Joseph (1994) noted that several of the items on the IES were subject to misinterpretation by the children. This finding, along with the issue of several items not loading on intrusion or avoidance factors, was later confirmed by Dyregov, Kuterovac and Barath (1996) in their study of war-affected children from the former Yugoslavia. With this information, Yule dropped 7 of the 15 items that did not load properly on the intrusion and avoidance scales, and slightly reworded the remaining items to make them more accessible to children as young as eight (Yule, 1997). This new 8-item, child friendly version (Children's Revised Impact of Event Scale: CRIES-8) correlated well with the original IES ($r = .95$, $p <. 001$), and with the number of DSM PTSD symptoms present in a sample of traumatised adolescents ($r = 0.6970$, $p <.01$) (Yule, 1997). In a separate analysis of 87 survivors of the Jupiter sinking, it was found that the 62 children who received a DSM-III-R diagnosis of PTSD scored 26.0 on the 8-item version while the 25 who did not reach DSM criteria for a diagnosis of PTSD only scored 7.8 ($p < 0.001$). Using these data, it was found that a combined score (Intrusion + Avoidance) of 17 or more misclassified fewer than 10% of the children (Yule, 1997).

The validity of a screening battery developed by Yule (1992), which included the IES, was evaluated by Stallard et al. (1999). The authors administered the original, 15-item IES (which included the 8-items of the CRIES), measures of trait anxiety and depression, and a structured diagnostic interview for PTSD to 170 children who had presented at a hospital accident and emergency department. Children with a diagnosis of PTSD scored significantly higher than those without PTSD on both the IES and the CRIES-8. However, the full 15-item IES was slightly superior to Yule's 8-item version in correctly identifying children with and without PTSD (75% vs. 69%, respectively). The authors concluded that both versions of the measure were valid as screening tools but that further evaluation of the CRIES-8 was warranted.

As the DSM criteria with their 17 symptoms across three symptom clusters became the predominant view of PTSD, measures that more closely mirrored these criteria began to appear in the literature (e.g. Foa et al., 1993). Following this lead, Yule and colleagues added 5 new items drawn from the arousal symptom cluster in DSM-IV to create the CRIES-13 (Children and War Foundation, 2005). The validity

of the CRIES-13 was investigated by Smith and colleagues in a large representative sample (n=2976) of war-affected children (aged 9-14) in Bosnia-Hercegovina (Smith, Perrin, Yule, Rabe-Hesketh, 2001; Smith, Perrin, Yule, Hacam, & Stuvland, 2002; Smith, Perrin, Dyregov, & Yule, 2003). The CRIES-13 was translated into Bosnian and back-translated by a separate Bosnian speaker to establish its accuracy, and showed good internal consistency for the Intrusion (Chronbach's alpha= 0.70), Avoidance (0.73), Arousal (0.60), and full scale (0.80) (Smith et al., 2003). Factor analysis revealed a 3-factor solution corresponding to the intrusion, avoidance, and arousal subscales, however, the arousal items also loaded heavily on the intrusion scale (Smith et al., 2003). In line with expectations, scores on the CRIES-13 were significantly elevated in this at-risk community sample and were found to relate to the child's level of traumatic exposure, anxiety, and depression (Smith et al., 2002), maternal and teacher ratings of the child's distress, and maternal reports of their own exposure and distress (Smith et al., 2001).

Despite the proliferation of PTSD measures over the past 20 years, there is still a need for brief self-report measures that can accurately identify individuals with diagnosable PTSD (Brewin et al., 2002). The CRIES-8 has been shown to be valid for this purpose (Stallard et al., 1999) but it does not tap all three PTSD symptom clusters and further evaluation of its validity is needed. The CRIES-13 appears to be a valid measure of posttraumatic distress (Smith et al., 2003) but its utility as a screening tool for PTSD has yet to be examined.

The main aim of the present investigation was to examine the *sensitivity* (i.e. the probability that someone with a diagnosis of PTSD will screen positive) and *specificity* (i.e. the probability that someone without a diagnosis of PTSD will screen negative) of the CRIES-13 and CRIES-8. Sensitivity and specificity are independent of the baserate of PTSD in the population sampled, allowing these properties of the screening measure to be compared across studies (Brewin et al., 2002). However, as the main objective of a large-scale screenings is to get help where it is most needed, it is important that those who screen positive actually have the disorder of interest. The ability of a screen to achieve this end is its Positive Predictive Value (PPV). The reverse, or the likelihood that someone who screens negative does not have the disorder, is the screen's Negative Predictive Value (NPV), and may also be of interest if there is a need to conserve precious resources (e.g., medicine, therapist time). Both the PPV and NPV are baserate-sensitive. Thus, it is important to evaluate the utility of the screen in different at-risk (trauma-exposed) groups, with different expected PTSD base-rates.

In the present study, therefore, cutoff scores for PTSD were derived for the CRIES-13 and CRIES-8 in an at-risk sample of children from a hospital accident and emergency room with a low baserate of PTSD and in a sample of children referred to a specialist PTSD clinic. To our knowledge this is the first study to undertake an evaluation of this kind with the CRIES (in both of its versions).

Method

Participants

Accident &Emergency Room (A&E) Sample: Participants were 63 children and adolescents aged 10-16 years who completed both the CRIES-13 and a structured diagnostic interview for PTSD, 6 months after their index trauma. Participants were recruited between October 2001 and October 2002 from an Accident and Emergency

department in a South London Hospitals as part of a prospective study of traumatised youth by the third author (Meiser-Stedman et al., 2005). Only children who had experienced a road traffic accident or were assaulted were invited to participate in the prospective study.

Clinic Sample: Participants were 52 children and adolescents aged 7 to 18 years who completed both the CRIES-13 and a structured diagnostic interview for PTSD. Participants were referred for assessment of PTSD by their solicitors to the Child Traumatic Stress Clinic (CTSC) at the Maudsley Hospital in South London, and represented consecutive referrals to the first author between January 2001 and March 2005. The characteristics of the two samples can be seen in Table 1.

Measures

All participants completed the CRIES-13, which includes all of the items on the CRIES-8 taken from the original Impact of Event Scale (Horowitz et al., 1979), as well as 5 items derived from the arousal criterion in the DSM-IV (APA, 1994). Individual items are rated according to the frequency of their occurrence during the past week (None = 0, Rarely = 1, Sometimes = 3, and A Lot = 5) and in relation to a specific traumatic event written at the top of the scale. Scores are obtained for the 4 intrusion items (e.g. Do you think about it even when you don't mean to?), 4 avoidance items (e.g. Do you try not to talk about it?), and 5 arousal items (e.g. Do you have sleep problems?). Total scores on the scale range from 0 to 65 with a cutoff score of 17 or above on the 4 intrusion and 4 avoidance items having been found to correctly identify >80% of children with a diagnosis of PTSD (Yule, 1998; Stallard et al., 1999).

All subjects, and where necessary their parents, were interviewed with the PTSD section of the Anxiety Disorders Interview Schedule – Child and Parent Versions (ADIS-C/P) (Silverman & Albano, 1996). The ADIS-C/P is one of the most widely used structured diagnostic interviews for children and adolescents and has proven to be a valid and reliable measure of anxiety including PTSD (Silverman, Saavedra & Pina, 2001). Where separate PTSD interviews were carried out with parents and children, information from both interviews was combined to arrive at a best-estimate diagnosis and in the case of discrepancies between child and parent reports, preference was given to the children's responses.

Procedure

All subjects completed the CRIES-13 prior to a face-to-face interview with a doctoral level psychologist using the ADIS-C/P. In the A&E sample the ADIS-C/P was administered six months post trauma by the third author, who had been trained in the use of the ADIS-C/P by CTSC staff, and who had regular supervision on his assessments from an internationally recognised expert in childhood PTSD (William Yule). Audiotapes of the ADIS-C/P interviews were double-scored by the third author and the Kappa coefficient of agreement was 1.0.

In the Clinic sample, the CRIES-13 and the ADIS-C/P were completed at the time of the assessment, which occurred anywhere from 5 months to 13 years after the index trauma. The ADIS-C/P interviews were administered by the first author who was trained in the use of the ADIS-C/P by one of its authors (Anne Marie Albano), has served as the gold standard interviewer on several large-scale studies of child

anxiety, had extensive clinical experience of PTSD in both children and adults, and was supervised by an expert in child PTSD (William Yule).

Scores on the CRIES-13 and CRIES-8 were computed and then plotted against the presence/absence of a DSM-IV diagnosis of PTSD to determine the best cutoff score. It was decided a priori to choose a cutoff score that maximised sensitivity but minimised the likelihood that children with PTSD would fail to be identified by the screen (i.e. that it would produce few false negatives). This decision was taken so as to test the utility of the screen as it might be used in practice after a large-scale trauma, and where the purpose of the screen was to detect as many children with PTSD as possible and to offer them help.

Results

Table 1 presents the characteristics of the two samples. Although not matched on any specific criteria, the two were roughly similar in terms of gender and age. Subjects in the Clinic Sample were more likely to have been in a road traffic accident than an assault and this is mainly due to the fact that they were referred for assessment by solicitors. As anticipated, the Clinic Sample had a significantly higher baserate of PTSD on the ADIS-C/P than did the A&E sample (67.3% vs. 11.1%) and significantly higher scores on all subscales of the CRIES (see Table 1).

Insert Table 1 About Here

Table 2 presents the sensitivity, specificity and power to predict PTSD using the CRIES-13 and CRIES-8.

Insert Table 2 About Here

CRIES-13:

Clinic Sample (N=52): Cutoff scores between 25 and 35 were examined and again a cutoff score of 30 emerged as the one striking the best balance between sensitivity (.91) and specificity (.65). Thus, 32 of the 35 children with DSM-IV PTSD and 11 of 17 children without PTSD were correctly identified by this screen. This translates into an overall efficiency rate (i.e. proportion of correctly classified cases) of 82.7%. The screen had high a Positive Predictive Value (.84), i.e. of the 38 subjects identified as PTSD positive by the screen, 32 had DSM-IV PTSD. The Negative Predictive Value (.79) was equally high. However, the low specificity values means that in a sample of 1000 trauma-exposed children where the baserate of PTSD was 30%, a cutoff score of 30 would lead to 147 children being incorrectly identified as having PTSD.

A&E Sample (N=63): Cutoff scores between 25 and 35 were examined and again the best balance between sensitivity (.86) and specificity (.73) was found with a cutoff score of 30. Owing to the low baserate of PTSD in this sample (11.1%), the Positive Predictive Value (.29) was low. Thus, of the 21 subjects identified as PTSD

positive by the screen, only 6 had met the DSM-IV diagnostic criteria for PTSD. The screen was effective, however, in identifying true negative cases in this sample (Negative Predictive Power = .98) and had a reasonable overall efficiency rate of 75%. In contrast to the previous example given above, the specificity value found here (.75) means that in a sample of 1000 trauma-exposed children where the baserate of PTSD was 30%, a cutoff score of 30 would lead to only 56 children being incorrectly identified as having PTSD.

CRIES-8:

   Clinic Sample (N=52): Cutoff scores between 14 and 20 were examined and the cutoff score that maximised the balance between sensitivity (.94) and specificity (.59) was 17. Of the 40 children who screened positive for PTSD, 33 had a DSM-IV Diagnosis of PTSD (Positive Predictive Power = .83). The screen did equally well at identifying children without PTSD (Negative Predictive Power = .83) and its overall efficiency rate was 82.7%. Again, specificity was rather low suggesting that the use this screen in a different sample might lead to a high percentage of false positives.

   A&E Sample (N=63): Cutoff scores between 14 and 20 were examined and the best balance of sensitivity (1.0) and specificity (.71) was found with a cutoff score of 17. In contrast to the CRIES-13, the CRIES-8 produced no false negatives, correctly identifying 7 of the 7 subjects with a diagnosis of PTSD. Again the Positive Predictive Value was low (.30) and Negative Predictive Value high (1.0). The overall efficiency of the CRIES-8 was 75%.

Discussion

   As has been pointed out elsewhere (Brewin et al., 2002; Stallard et al., 1999), screening instruments for PTSD are better when they contain the minimum number of items necessary to accurately identify individuals with the disorder. In the case of children, it is also particularly important that the screening instrument also be easily understood (Yule, 1992). If the instrument is to be used in the aftermath of large-scale traumas, it should work well with different types of trauma, with different periods of time elapsed since the trauma, in populations with varying baserates of PTSD, and be easily scored by nonprofessionals (Brewin et al., 2002). The CRIES appears to meet these criteria with certain provisos. It is a brief, self-report measure designed specifically for children and in a language appropriate for all children with a reading age of at least 8 years. It is easily scored by nonprofessionals and has been translated into other languages where it has maintained its factor structure and its relationship to other measures of distress and exposure (Smith et al., 2001, 2003).
   In the present study, the criterion validity of the CRIES was examined in two samples with very different baserates of PTSD (67.3% vs. 11.1%) and differences in the mean time elapsed since the trauma (3.3 years vs. 6 months). Sensitivity and specificity were comparable for both versions of the CRIES across the two samples, suggesting that the CRIES is a robust and valid measure of PTSD. Both versions of the CRIES proved particularly good at identifying true cases of PTSD in samples with either low or high baserates of PTSD, however it does so at the cost of generating significant numbers of false positives.
   However, the utility of the CRIES as a screening instrument will depend largely upon the objectives of those carrying out the screen. If the objective is solely

to identify children with a likely diagnosis of PTSD to be confirmed by subsequent interview, while minimizing the number of unnecessary interviews, then higher cutoff scores may be appropriate. Such an objective may be valid in certain types of research, but (arguably) should not be the ultimate objective of any screen of large samples of traumatized children (e.g. in the aftermath of an earthquake). This is because children who are sub-threshold for a PTSD diagnosis in the immediate aftermath of a trauma may go on to develop the disorder (c.f. Meiser-Stedman et al., 2005) or may need treatment anyway (c.f. Stallard et al., 1999). This raises several important issues about the use of cutoff scores on scales in screen-and-treat programs.

In the present study, the authors chose cutoff scores that maximized the probability of detecting PTSD cases while minimizing the probability of false negatives, owing to the greater harm that might result from failing to identify children with a diagnosis of PTSD. In a screen-and-treat program, such an approach would be appropriate but would necessitate a second level of screening of the children above cutoff to help identify those who no longer have PTSD or don't need treatment. In the aftermath of large-scale traumas this may mean seeing children in groups to ascertain the level of current need. Indeed just such an approach was undertaken by Yule and colleagues in Bosnia during the war in that country. What is still needed are large-scale prospective studies using the CRIES or similar measures to see how scores on the measure in the weeks after the trauma are related to the child's subsequent developmental trajectory. Such information will help clinicians and researchers to choose cutoff scores that achieve a reasonable balance between identifying children who need assistance (either with PTSD or sub-threshold) and expending resources on those who don't.

Based on the present findings, there seems little practical advantage of including the arousal items in the CRIES when using it in any large-scale screen of at-risk children. While these five items were derived from the DSM-IV arousal criterion and have good face/construct validity, dropping them from the CRIES did not lower the efficiency of the measure in either the A&E (CRIES-13 = 75% vs. CRIES-8 = 75%) or the Clinic samples (CRIES-13 = 83% vs. CRIES-8 = 83%). Such a finding may reflect a strong overlap between intrusion and arousal symptoms. In their factor analytic study of the CRIES-13, Smith et al. (2003) found that the arousal items did indeed load very highly on the 4-item intrusion scale. Whatever the relationship between the intrusion and arousal items on the CRIES, it appears that the intrusion items are critical to the correct identification of cases. In a series of post hoc analyses, we examined the utility of using cutoff scores based on the 5 arousal and 4 avoidance items of the CRIES and found that these items were much less efficient than the intrusion and avoidance items of the CRIES-8 in both the clinic (71% vs. 83%) and A&E samples (63% vs. 75%). Nevertheless, recent research by Brewin et al. (2002) found the use of 6 or more intrusion *or* arousal symptoms on a brief self-report measure produced a 90% efficiency rate in a sample of traumatized adults. Additional research examining the predictive power of individual intrusion and arousal items from the CRIES is needed and underway.

The present findings for the CRIES-8 are largely consistent with those of Stallard et al. (1999) who examined the scales utility in 170 children recruited from a hospital A&E department, whose baserate of PTSD was 23%, where the time elapsed since the trauma was 6 weeks. While Stallard et al. (1999) found the CRIES-8 to have lower sensitivity (.69) and specificity (.92) values in their A&E sample than found here (1.0 and .71, respectively), these differences are likely a function of the different methods used for assessing PTSD caseness and the time elapsed since the trauma (6

weeks in the Stallard et al. study versus 6 months here). Nevertheless, the reported efficiency rate for the CRIES-8 in the Stallard et al. study was 80%, comparable to that found in both the A&E (75%) and Clinic (83%) samples used here. Thus both studies suggest that the CRIES-8 is a valid screening tool for PTSD. However, Stallard et al. (1999) found sensitivity to PTSD was maximized when they used a PTSD cutoff score of 30 or more made up from the child's combined scores on the CRIES-8, the Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1978), and the Birleson Depression Scale (Birleson, 1981). Replication of these findings is underway in a separate study by the present authors.

The present study provides clear support for the validity of a brief, self-report measure of PTSD for use with children in the aftermath of traumatic events – the CRIES. The face, construct, and predictive validity make it useful in a variety of settings and the easy scoring make it accessible for use by both professionals and nonprofessionals alike. As few as 8 intrusion and arousal items were able to accurately identify a high percentage of children with PTSD in two different trauma samples, and suggested that enquiring about arousal symptoms during large-scale screens may not be necessary. If the arousal items can be dropped from the CRIES, then it is worth investigating whether a few items relating to trait anxiety or depression might be added to maximize its posttive predictive power as suggested by the Stallard et al. (1999) study. Nevertheless, the large numbers of children exposed to traumatic events each year means that further research on this measure and comparison with other PTSD screening instruments is warranted.

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Table 1. Characteristics of clinically referred (Clinic) and non-referred (A&E) children exposed to a traumatic event. Continuous variables are mean (SD). Categorical variables are % (n).

	Sample				Statistic	
	Clinic (N=52)		A&E (N=63)		$\chi^2(1)/t(114)$	p
Female	51.9	(27)	39.7	(25)	1.5	ns
Age	13.1	(2.5)	13.9	(1.8)	2.3	.023
Trauma Type						
RTA	90.4	(47)	46.0	(29)	25.0	.000
Assault	9.6	(5)	54.0	(34)		
Age at Trauma	9.7	(3.1)	13.4	(1.8)	7.9	.000
Yrs. since Trauma	3.3	(2.2)	0.58	(.08)	9.7	.000
CRIES Scores						
CRIES-13	37.8	(12.7)	21.3	(17.3)	5.7	.000
CRIES-8	23.9	(9.4)	12.9	(11.6)	5.5	.000
Intrusion	11.4	(5.8)	5.3	(5.2)	5.9	.000
Avoidance	12.5	(5.1)	7.7	(7.1)	4.2	.000
Arousal	13.8	(5.1)	8.4	(6.9)	4.7	.000
PTSD Positive						
ADIS-C/P	67.3	(35)	11.1	(7)	38.8	.000
CRIES-13 $\geq$ 30	73.1	(38)	33.3	(21)	18.0	.000
CRIES-8 $\geq$ 17	76.9	(40)	36.5	(23)	18.8	.000

ADIS-C/P = Anxiety Disorders Interview Schedule – Child & Parent Version; PTSD = Posttraumatic Stress Disorder; CRIES = Children's Revised Impact of Event Scale; RTA = Road Traffic Accident.

Table 2. Sensitivity, Specificity and Power to Predict PTSD based on two versions of the Children's Revised Impact of Event Scale[a].

	Sample	
	Clinic	A&E
Scale (Cutoff)	(N=52)	(N=63)
CRIES-13 (Total $\geq$ 30)		
Sensitivity	.91	.86
Specificity	.65	.73
Positive Predictive Value	.84	.29
Negative Predictive Value	.79	.98
Overall Efficiency	.83	.75
CRIES-8 (Total $\geq$ 17)		
Sensitivity	.94	1.00
Specificity	.59	.71
Positive Predictive Value	.83	.30
Negative Predictive Value	.83	1.00
Overall Efficiency	.83	.75

[s] Sensitivity is the probability that a true case of "PTSD" will be correctly identified by the CRIES cutoff; Specificity is the probability that a true case of "no PTSD" will be correctly identified by the CRES cutoff; Positive Predictive Value is the probability that a child scoring above the CRIES threshold is a true case of PTSD; Negative Predictive Value is the probability that a child scoring below the threshold for CRIES cutoff is a true case of "no PTSD"; Overall Efficiency refers to the percentage of true negatives and true positives correctly classified by the CRIES cutoff.