

Life events and post-traumatic stress: the development of a new measure for children and adolescents

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ABSTRACT

Background. A new interview measure of life events and post-traumatic stress disorder (PTSD) has been developed for children and adolescents aged 9 through 17, for use in both epidemiological and clinical studies. It includes 'high magnitude' events associated with PTSD as well as other 'low magnitude' events.

Method. The interview is designed as a module of the Child and Adolescent Psychiatric Assessment, an interviewer-based interview conducted with parent and child separately by trained lay interviewers. The module includes: (1) questions about a wide range of events; (2) a screen for key PTSD symptoms (painful recall, avoidance, hypervigilance); and (3) a detailed interview on all PTSD symptoms, including onset, duration, severity and co-morbidity. A test–retest reliability study was conducted with 58 parents and children, who were interviewed twice by different interviewers.

Results. Intraclass correlations were 0.72 (child) and 0.83 (parent) for high magnitude events, and 0.62 (child) and 0.58 (parent) for low magnitude events. Kappa coefficients ranged from high for violence and sexual abuse to low for child reports of serious accidents and natural disasters. The reliability of the PTSD screen symptoms was fair to excellent ($\kappa = 0.40\text{--}0.79$), and reliability of PTSD symptoms in those who passed the screen was excellent (ICC = 0.94–0.99). Compared with a general population sample ($N = 1015$), the clinic-referred subjects and their parents were twice as likely to report a traumatic event and, depending on the event, up to 25 times as likely to report symptoms of PTSD.

Conclusions. The results support the reliability and discriminant validity of the measure.

INTRODUCTION

This paper describes the development of a new measure for assessing traumatic events and post-traumatic stress disorder (PTSD) in children and adolescents. The main reason for developing another psychiatric assessment instrument was that most measures of PTSD, developed for use in clinical contexts, either assume the occurrence of a traumatic event, or focus on a specific type

of event, such as sexual or physical abuse. For community-based studies of PTSD, exposure must be established in relation to the full range of potentially traumatic events before symptoms of PTSD can be studied. Secondly, since the criteria for PTSD were developed mainly in clinical work with adults, much still needs to be done to define the best criterion set of potentially traumatic events and ensuing symptoms for children at various developmental stages; it may be that these do not wholly overlap with the criterion sets specified for adults. Even for adults, the distinctions among traumatic events, stressors, and minor 'hassles' can be hard to

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make (Sutker *et al.* 1991; March, 1993). It, therefore, makes sense for a measure of potentially traumatic events in children's lives to cast its net fairly widely. Thirdly, there is clinical and research value in a single instrument that can explore the causal relationship between events and other disorders, such as anxiety and depression, whose onset or exacerbation may also be stress-related. We also find that an interviewer-based instrument, with probes to explore both the nature of the events and the severity of the reported symptoms, is particularly valuable in an area such as PTSD. Since we were unable to find a measure that met all these criteria, a new one was developed and tested.

Table 1 lists other available measures of either potentially traumatic events or PTSD in children. We have restricted the list to those for which published psychometric information on reliability is available. Three measures of the reliability of a psychiatric instrument are widely used: internal consistency, or instantaneous reliability, inter-rater reliability, and test-retest reliability. Internal consistency reliability refers to the extent to which a scale measures a common underlying characteristic, and is usually assessed by a correlational statistic such as those proposed by Kuder & Richardson (1937) or Cronbach (1951). As Fergusson & Horwood point out in their discussion of the psychometrics of life event research, internal consistency is an inappropriate test for life event scales 'which do not measure a common underlying trait but rather a set of heterogeneous items grouped together because they are assumed to have a common effect rather than arising from a common source' (Fergusson & Horwood, 1986, p. 54). Thus, we have omitted from Table 1 instruments for which internal consistency is the only measure of reliability provided (Fitzpatrick & Boldizar, 1993). Inter-rater reliability is assessed when two or more observers rate the same interview or other data-collection method. The source of information is the same for all raters; the only source of variability lies in the raters' recording of this information. In contrast, test-retest reliability is assessed by administering a questionnaire or interview more than once to the same subject; when the measure is administered by interview, it is normal to use different interviewers on each occasion. Thus, many more sources of variability and error are under

scrutiny when test-retest rather than inter-rater reliability is the criterion, and test statistics tend to be lower.

When evaluating both inter-rater and test-retest reliability, it is important to use measures that control for the possibility of chance agreement (Bartko & Carpenter, 1976). Pearson or Spearman correlation coefficients for scales, or percentage agreement for individual items, do not deal with this. Intraclass correlation (ICC) (Bartko, 1976) measures agreement beyond chance for continuous data such as scales, while Cohen's κ is widely used as a measure of agreement on individual items, although it is affected by the prevalence of the phenomenon under study in the population (Cohen, 1960). Interviewers trained for research studies are typically expected to achieve inter-rater agreement of $\kappa = 0.90$ or higher for individual items. Reliability assessed using the test-retest criterion rarely achieves this level; most psychiatric researchers accept Fleiss's (1981) rule of thumb that $\kappa \leq 0.39$ = poor, $\kappa = 0.40-0.74$ is fair to good, $\kappa = 0.75-1.00$ is excellent.

A fourth measure sometimes cited is agreement between two different informants, usually parent and child (Monck & Dobbs, 1985; McLeer *et al.* 1992; Fisher *et al.* 1993). While there is substantive interest in examining differences in what parents and children report, without a gold standard for deciding who is right it is not clear what parent-child agreement tells us about the psychometric properties of an instrument, so it is not discussed further in this paper.

Measures of traumatic events

According to the American Psychiatric Association's Diagnostic and Statistical Manuals over the past decade (American Psychiatric Association, 1987, 1994), an 'extreme traumatic stressor' (American Psychiatric Association, 1994, p. 424) must have occurred in order for PTSD to be diagnosed. It is not required by the DSM criteria that the event be identified by the subject as traumatic; rather, the stressor must be one that 'would be markedly distressing to almost anyone' (American Psychiatric Association, 1987, p. 247), or be experienced with 'intense fear, helplessness, or horror (or, in children, the response must involve disorganized or agitated behavior)' (American Psychiatric

Table 1. Psychometric properties of measures of potentially traumatic events and associated symptoms: test-retest reliability

Measure	Purpose	Clinic/community sample	Number and age of subjects	Test of agreement	Results
1 (Coddington, 1972) Social Readjustment Rating Questionnaire Also used (with modifications) by Bailey & Garralda (1987)	Adaptation for children of Holmes & Rahe's SRRS	2 Clinic	2 N = 101 Adults (mothers)	2a Inter-rater (κ) 2b Self-report questionnaire v. Interview (κ)	2a $\kappa = 0.52-0.86$ 2b $\kappa = 0.37-0.78$
3 Garrison <i>et al.</i> (1985)		3 Community	3 N = 33 adolescents	3 Test-retest (3-month) (Pearson <i>r</i>)	3 $r = 0.69$
4 Garrison <i>et al.</i> (1987)		4 Community	4 N = 52 age 12-15	4 Test-retest (3-month) (κ for items, Pearson <i>r</i>)	4 $\kappa > 0.40, r = 0.64$
5 Goodyer <i>et al.</i> (1985) (interview)		5 Clinic	5 N = 20 clinic, age 4-16	5 Inter-rater	5 * Agreement > 0.90'
6 Compas <i>et al.</i> (1987) Adolescent Perceived Events Scale	Major and daily stressful events	6 Community	6 N = 95: 22 age 12-14, 22 age 15-17, 51 age 18-20	6 Test-retest (2 = week) (Pearson <i>r</i>)	6 Age 12-14, $r = 0.85$ Age 15-17, $r = 0.84$ Age 18-20, $r = 0.77$
7 Dise-Lewis (1988) Life Events and Coping Inventory	Life stress and coping	7 Community	7 N = 85, 7th and 8th grades	7 Test-retest (11 weeks) (Pearson <i>r</i>)	7 Overall $r = 0.97$, for individual items, $r = 0.07-0.56$, median $r = 0.25$
8 Glen <i>et al.</i> (1993) Sandberg <i>et al.</i> (1993) Psychological Assessment of Childhood Experience (interview)	Impact of life events	8 Clinic	8 N = 15, mean age 12.3	8 Test-retest (κ , % agreement)	8 % agreement = 0.46 (child), 0.54 (parent) κ for individual items 0.51-0.86† κ for impact and threat 0.51-0.82 (child), 0.59-0.86 (parent)

* Some judgements based on consensus between parent and child.

† Based on items reported by at least six subjects at Time 1.

Association, 1994, p. 424). The events listed in DSM-IV include military combat, sexual assault, physical attack, being kidnapped, being a prisoner of war or in a concentration camp, natural or manmade disasters, severe accidents, or diagnosis of a life-threatening illness. However, the DSM makes it clear that potentially traumatic experiences include, but are not limited to, experiencing or witnessing events of this type.

There are no interview measures for children that concentrate on extreme stressors of this type. Two questionnaires have severe traumatic events as their specific focus. For the NIMH community violence project, Richters & Martinez (1993) developed an exposure index assessing urban violence entitled 'Things I Have Seen and Heard'. In a community (school) sample of 21 children, age 6–12, this instrument demonstrated a 1 week test–retest correlation of $r = 0.81$. The only other measure with a specific focus on traumatic events is the Traumatic Events Questionnaire developed for use with young adults (Vrana & Lauterbach, 1994). A Pearson correlation of 0.91 is quoted for a 2-week test–retest with 51 college students.

Measures of stressful events

The assumption that the same sorts of events will act as 'extreme stressors' for both adults and children can be tested by studying the onset of PTSD in the context of a wider range of events, from the life-threatening to minor 'hassles'. Several researchers have developed measures that cover such a range. The 'Psychosocial Assessment of Childhood Experiences' (PACE) (Sandberg *et al.* 1993), the latest in a series of measures from the Institute of Psychiatry in London, is an interview for children that covers a range of potentially stressful events and psychosocial adversities. Rather than listing events as the questionnaires do, the PACE covers areas of a child's life, defining something as a life event if 'most children of the subject's age would find the incident either: (a) threatening, upsetting, or unsettling; or (b) very pleasant' (Sandberg *et al.* 1993, p. 882). Test–retest reliability, quoted as concordance between two administrations of the PACE a week apart, was 0.46 for children and 0.54 for parents. Kolvin, followed by Goodyer, (Goodyer *et al.* 1985, 1988) used Coddington's adaptation of Holmes & Rahe's Social Readjustment Rating

Scale as the basis for a semi-structured interview for mothers: the Child Life Events Schedule. Inter-rater reliability is given as 'agreement of greater than 90%' in a sample of 20 mothers (Goodyer *et al.* 1985). All the other measures of stressful events take the form of questionnaires for the child and/or parent. Many studies have used Coddington's scale (Coddington, 1972; Garrison *et al.* 1987) or an adaptation of it (Bailey & Garralda, 1990). Test–retest reliability for individual events was in the $\kappa = 0.20$ – 0.60 range (Garrison *et al.* 1987), with a correlation of $r = 0.64$ for the scale. Compas *et al.*'s Adolescent Perceived Events Scale (Compas *et al.* 1987) also covers a wide range, including both positive and negative events. Pearson correlations over 2 weeks were $r = 0.74$ – 0.89 for negative events, in the three age-groups tested. The Life Events and Coping Inventory (Disel Lewis, 1988) was developed to study stress across a broad range of severity, and includes 125 items ranging from 'One of your parents died' to 'You had to take a gym class'. The author reports a Pearson product-moment correlation coefficient of $r = 0.97$ over an 11-week retest interval. Similarly, a cartoon scale keyed to urban violence, entitled 'Levon', achieved $r = 0.81$ in a 1 week test–retest (Richters & Martinez, 1993).

Measurement of post-traumatic stress

To meet the criteria for PTSD, experience of an 'extreme stressor' must be associated, immediately or with delayed onset, with a characteristic syndrome that includes persistent re-experiencing of the traumatic event, avoidance of stimuli associated with the event and increased arousal. All three types of symptom must be present for the diagnosis to be made. Under each heading, several different symptoms are possible; for example, re-experiencing or painful recall may take one or more of the following forms: recurrent and intrusive distressing recollections; recurrent distressing dreams; illusions, hallucinations, and dissociative flashbacks; distress at exposure to cues symbolizing or resembling the traumatic event; physiological reactivity in response to such cues. There are also duration criteria for symptoms, which vary by type of disorder (acute *v.* chronic *v.* delayed onset). Thus, assessment of PTSD can be quite complex and lengthy.

Table 2. Psychometric properties of measures of post-traumatic stress symptoms: test-retest reliability

Measure	Purpose	Clinic/community sample	Number and age of subjects	Test of agreement	Results
McLeer <i>et al.</i> (1992) PTSD checklist	PTSD in sexually abused children	Clinic	22	Inter-rater reliability (Pearson r)	$r = 0.86$ for presence of PTSD
'Levon': (Richters & Martinez, 1993)	Exposure to violence and PTSD symptoms	School	21 age 6–12	Test-retest reliability (Pearson r)	$r = 0.81$
Vrana & Lauterbach (1994)	Exposure to traumatic events and PTSD symptoms	College students	51 college age	Test-retest reliability (Pearson r)	$r = 0.91$
Silverman & Eisen (1992)	PTSD in anxious children	Clinic	96 age 6–17	Test-retest (κ)	$\kappa = 0.43$ (child) $\kappa = 0.25$ (parent)
Saigh <i>et al.</i> (1998)	PTSD in youth exposed to traumatic events	PTSD clinic	47 age 8–18	Inter-rater (κ) Agreement with clinician diagnosis (κ)	$\kappa = 1.0$ for diagnosis of PTSD (child) $\kappa = 0.87$ for agreement on diagnosis

Few of the measures developed to assess post-traumatic stress symptoms in children are linked to a measure of potentially traumatic events, and few have published psychometric data. The Pynoos–Nader version of the Stress-Reaction Index (CPTSD-RI), which is the oldest and best studied instrument, is a semi-structured interview intended for use when a traumatic event is already known to have occurred. Ten exposed children were interviewed twice with a 1-week interval (Pynoos *et al.* 1987) using the CPTSD-RI; Cohen's κ was 0.88, indicating excellent test-retest reliability, as would be expected given the highly selected sample. In an unrelated study of children exposed to an American earthquake, Pynoos *et al.* report test-retest reliability for a backward translated version (English to Armenian to English) of the CPTSD-RI of $\kappa = 0.98$ (Pynoos *et al.* 1993), again using a highly exposed sample. McLeer *et al.* (1992) using a version of the K-SADS-E with a newly developed PTSD module, interviewed 22 clinic-referred sexually-abused children and adolescents. They reported excellent inter-rater reliability but did not examine test-retest reliability. Silverman & Eisen examined test-retest reliability for PTSD as part of a wider evaluation of the reliability of the Anxiety Disorders Interview for Children (ADIS) using children attending a clinic for anxiety disorders (Silverman & Eisen, 1992). Only two of 96 children presenting to an out-patient anxiety disorders programme met DSM-III-R diagnostic criteria for PTSD and test-retest reliability for PTSD was fair to poor: Cohen's $\kappa = 0.43$ for

the child and $\kappa = 0.25$ for the parent interview. Fisher and colleagues developed a PTSD module for the Diagnostic Interview Schedule for Children version 2.3, but have not yet examined test-retest reliability (Fisher *et al.* 1993). Earls *et al.* (1988) report developing a new PTSD section for the Diagnostic Interview for Children and Adolescents (DICA) but provide no psychometric data. Saigh *et al.* have developed an interview for assessing PTSD in children and adolescents with known exposure to traumatic events: the Children's Posttraumatic Stress Disorder Inventory (Saigh *et al.* 1988). The instrument is currently undergoing psychometric testing. Preliminary results show kappas close to 1 for inter-rater reliability of the PTSD diagnosis, in 47 clinic-referred youth seen following exposure to a DSM-IV 'extreme stressor'. The CPTSDI also showed excellent agreement with diagnoses derived from clinical interviews.

Validity

The question of how to assess the validity of PTSD measures is complicated. Reporting of events can be checked against 'objective' records, but this has rarely been done. Since PTSD symptoms can, by definition, only occur after a traumatic event, it is logically inconsistent to compare symptoms in exposed and non-exposed children as a measure of validity. Pynoos *et al.* (1987), solved this by using a dose-response model to test validity. They showed that exposure (proximity) to sniper fire on a school playground was linearly related to the

risk for PTSD symptoms, and that children's memory disturbances, indicating distorted cognitive processing during the event, closely followed exposure (Pynoos & Nader, 1988). Saigh *et al.* (1998) have used clinician diagnosis following a (presumably unstructured) interview as the criterion, and report high validity for their CPTSDI.

Despite the considerable amount of work that has gone into developing measures of life events and PTSD symptoms in the past decade, we found an unmet need for a reliable measure that: (1) used an interviewer-based rather than a questionnaire approach; (2) covered not only the 'extreme traumatic stressors' specified by DSM-IV as a precursor to PTSD, but also less extreme stressors that might contribute, individually or collectively, to increased vulnerability (Garmezy, 1986) and co-morbidity; (3) explored a wide range of PTSD symptoms that go beyond the core DSM-IV criteria and that interest PTSD researchers; (4) provided details of the timing of events and onset of symptoms so that temporal relationships could be traced; (5) permitted a causal link to be made not only with PTSD symptoms but also with those of other disorders that have been associated with stress; for example, depression, anxiety, and eating disorders; and (6) could be used in community-based as well as clinical studies. In this paper we describe a new measure of life events and PTSD designed to meet these needs, and examine some psychometric properties of the various components in two samples of children and adolescents.

METHOD

Measures

Life events assessment

The Child and Adolescent Psychiatric Assessment (CAPA) (Angold & Costello, 1995; Angold *et al.* 1995) is a psychiatric interview for children aged 9 to 17. The CAPA is an interviewer-based interview; that is, while using a highly structured format of questions and probes, it trains the interviewer to ensure that the parent or child being interviewed understands the construct under review, and provides enough detail and examples for a clear rating of the clinical severity of each symptom to be made. A detailed glossary

provides the operational rules for identifying each symptom. The CAPA is designed to interview parent and child separately, using different interviewers. Diagnoses are made using computer algorithms, according to DSM-III, DSM-IV, and ICD-10 criteria. They may be based on information from a single respondent, or using the 'either – or' rule common in clinical practice, by which a symptom is counted as present if reported by either parent or child.

The reference period for the CAPA psychiatric symptoms is 3 months (except where the DSM criteria specifically require otherwise). When a symptom is reported as present within the past 3 months, questions are asked to pin down the date of its first occurrence. The CAPA life events module contains questions about two sets of events: the 'extreme stressor' set defined by DSM-IV as precursors of PTSD, and an additional set of events covered by most life event scales used in the context of research on depression and anxiety (see Appendix A). We refer to these two sets of events, for brevity, as 'high magnitude' and 'low magnitude' events (Thoits, 1983). For high magnitude life events the reference period is the child's whole life, while for low magnitude events the 3-month reference period is used.

Since the Life Events/PTSD module was designed as part of a full psychiatric and risk factor assessment, several procedures were included to reduce the average length of the interview by controlling the likelihood that children without PTSD would receive the full module. First, restricting the reference period for low magnitude events to 3 months reduces the number of children with a qualifying event for the PTSD interview. Secondly, parents and children reporting events are asked screening questions to establish whether the child has the three core symptoms of PTSD: re-experiencing or painful recall, hypervigilance, and avoidance. Because painful recall or reexperiencing an event is relatively common, this question is asked first, and questions about hypervigilance and avoidance are asked only if the child experiences painful recall. Only if all three core symptoms are present, and if the subject specifically links them causally to the event under discussion, is the full PTSD assessment administered.

The Life Events section uses the same general structure as the rest of the CAPA: that is, for

each potentially traumatic event, the interviewer is required to determine whether the event occurred, and if so, when it occurred. For items where severity is a relevant construct, a level of severity must also be determined (see Fig. 1 for an example). In the case of events such as physical abuse or being the cause of harm to others, interviewers code the subject's relationship to the perpetrator or victim, the level of intentionality, and the availability of social and emotional support. The interviewer also asks the child or parent whether the event 'affected any of the problems we have been talking about', and if necessary goes through a list of the 17 symptom areas that have previously been reviewed in the CAPA (see Fig. 1). This provides an attributional link between the event and one or more co-morbid psychiatric symptoms. Then the screening questions are administered, followed if appropriate by the detailed PTSD section of the interview.

Detailed PTSD interview

The PTSD section of the CAPA first enquires about a series of acute emotional and somatic responses to an event that has been established as being associated with the three screening symptoms and about fantasies of intervention, rescue, or revenge. These responses are listed in Appendix B. It then explores in much more detail the precise characteristics of the three main symptom clusters of painful recall, avoidance and hyperarousal (Criteria B, C and D in the DSM definition). For example, under painful recall the interviewer enquires about whether or not recall is externally cued, whether the child actively recalls the event, or suffers failure to be able to recall it and whether s/he 'relives' the event. Coping mechanisms such as normal, obsessional, and compulsive suppression are explored, and questions are asked about autonomic effects such as panic attacks. After the detailed exploration of the three main symptom clusters, the interviewer asks about other behaviours such as changes in religious beliefs and practices, survivor guilt, and indulgence in deliberately risky behaviours. The onset date of every reported symptom is noted, so that DSM-IV Criterion E, duration of at least 1 month, can be established. Criterion F requires 'clinically significant distress or impairment'. Distress is necessary for most of the symptoms discussed

above to be coded as present (Angold *et al.* 1995), so if Criteria B, C, and D are met, then F is logically met also. However, the interview also enquires about impairment in ability to function normally with parents, siblings, peers, teachers and other adults, in a range of settings, and asks the subject to attribute the impairment to one or more of the symptoms areas previously reviewed, including post-traumatic stress symptoms. The symptom onset data permit the distinction among acute, chronic and delayed onset PTSD to be made.

Setting and subjects

Two groups of subjects were used to examine the psychometric properties of the CAPA life events and PTSD sections. The clinic sample was recruited from the waiting list of a Child Guidance Clinic that serves a town in the southeastern United States. The sample consisted of 58 parent-child pairs, each one interviewed twice within a period of 2 weeks, using different interviewers for each informant on each occasion. The community sample were taking part in a longitudinal epidemiological study of the development of psychiatric disorders and need for mental health services in the southeastern United States. The first year interview with 1015 parent-child pairs are used for this comparison; the data are weighted to be representative of the total population of 12000 children aged between 9 and 13 living in the study area (Costello *et al.* 1996). Table 3 shows the age, sex, racial and income distribution of the two samples. The proportions of males and females were similar, but the clinic sample covered a wider age-range than that of the community sample, and included more African-American children and children living in poverty. The clinic sample provided the data for examining the test-retest reliability of the measures, while a comparison of the clinic and community samples tested discriminant validity, controlling for the differences in race and income. For both samples, informed consent was obtained from both parent and child, and each was paid \$10 after each interview.

Data management and analyses

Interviewers coded the interview by entering scores in the boxes shown in the right-hand column of Fig. 1, using their notes and the tape-

Child and Adolescent Psychiatric Assessment

Definitions and questions

ACCIDENT

Serious physical harm caused involuntarily by self or others (e.g. car accident, boating accident), that is life-threatening or carries risk of long-term disfigurement or disability. Code accidents involving fire under Fire.

**Have you (since the last interview) been in a serious accident?
*Or been badly hurt in an accident?
What happened?
Could you have died?
Did it change the way your body looks or works?
Are you still affected by it?*

IF ACCIDENT IN LAST 3 MONTHS OR IF RESULTS OF PREVIOUS ACCIDENT STILL POSE THREAT TO LIFE, DISFIGUREMENT, OR DISABILITY, COMPLETE ATTRIBUTION AND PAINFUL RECALL. OTHERWISE SKIP TO PREGNANCY (PAGE 305) OR MAKES PREGNANT (PAGE 307)

ATTRIBUTION

**In the last 3 months, has "life event" affected any of the problems we have been talking about?
Which ones?
In what way?*

PAINFUL RECALL

**In the last 3 months have thoughts or pictures of "life event" come into your mind?
*Even when you didn't want them to?
What was that like?
Have you had any nightmares about the event?*

IF PAINFUL RECALL PRESENT, ASK AVOIDANCE AND HYPERAROUSAL. OTHERWISE SKIP TO NEXT LIFE EVENT.

AVOIDANCE

**Do certain things/thoughts remind you of "life event"?
What things?
Do you try to avoid these things/thoughts?*

HYPERAROUSAL

**Since "life event", have you been more jumpy or irritable?
*Have you had any trouble sleeping?
Have you been "on the alert" for bad things happening?

IF ALL SCREENS ARE POSITIVE, PLACE CHECKMARK ON PTSD CHECKLIST

Coding rules

STLI: SERIOUS ACCIDENT

0 = Absent
2 = Present

SERIOUS ACCIDENT

0 = Absent
2 = Accident or lasting threat to life disfigurement or disability from previous accident

ATTRIBUTION OF LIFE EVENT AS CONTRIBUTING TO PROBLEM WITH:

- 1 = School non-attendance
- 2 = Separation anxiety
- 3 = Worries/anxiety
- 4 = Obsessions/compulsions
- 5 = Depression
- 6 = Mania
- 7 = Physical symptoms
- 8 = Food-related behavior
- 9 = Hyperactivity/ADD
- 10 = Conduct disorder
- 11 = Alcohol/drugs
- 12 = Psychosis
- 13 = Relationships with parent #1 and/or parent #2
- 14 = Relationships with other parent #1 and/or other parent #2
- 15 = Relationships with other adults
- 16 = Sibling relationships
- 17 = Peer relationships

PAINFUL RECALL SCREEN

0 = Absent
2 = Present

AVOIDANCE SCREEN

0 = Absent
2 = Present

HYPERAROUSAL SCREEN

0 = Absent
2 = Present

Codes

CKC9E01
STLI: Intensity

CKC9V01
STLI: Frequency

CKC9001
STLI: Onset

 / /

CKC9I01
Intensity

CKC9002
Onset

 / /

CKC9X01

CKC9X02

CKC9X03

CKD0101

CKD0102

CKD0103

FIG. 1. Example of Life Events Question from the Child and Adolescent Psychiatric Assessment (CAPA).

Table 3. *Characteristics of the clinic and community samples*

	Clinic sample (<i>N</i> = 58)	Community sample (<i>N</i> = 1015)
Sex: %		
Female	46.6	49.3
Male	53.4	50.7
Race: %		
White	34.6	92.9
African-American	61.8	7.1
Hispanic	1.8	0.0
Other	1.8	0.0
Age: %		
8–9	29.3	36.2
10–11	17.2	34.3
12–13	22.4	29.5
14–17	31.0	0.0
Below federal poverty line: %	50.0	26.9
Mean family income (s.d.)	\$27 430 (\$16 800)	\$29 570 (\$18 500)

recorded interview. The CAPA glossary provided criteria for each symptom and event, and rules to prevent double counting of an event. The codes were entered into a computer program that produced counts of events and symptoms, and diagnoses using DSM and ICD criteria.

We examined the test–retest reliability of three constructs; (1) potentially traumatic events; (2) PTSD screen symptoms of painful recall, hyperarousal and avoidance; (3) symptoms of PTSD in children passing the screen. Analyses were carried out separately for parent and child reports, and also for joint reports, with an event or symptom counted as present if reported by either informant. To examine test–retest reliability, intraclass correlations (Bartko, 1976) were calculated for three life event scales: any event, high magnitude events, and low magnitude events. Intraclass correlation was also used to test the reliability of symptoms reported in the detailed PTSD assessment. We calculated Cohen's κ (Cohen, 1960) as a measure of agreement beyond the level of chance on the occurrence of all individual events that were reported by at least four informants on one or both occasions. Cohen's κ was also used as the measure of reliability of the three PTSD screen symptoms. Discriminant validity was examined by comparing relative rates of events, and of symptoms given events, in the clinic and community samples, using the first

administration of the instruments to the clinic sample. The *z* test was used to evaluate the risk ratio (Fleiss, 1981).

RESULTS

Reliability of reports of life events

At the first interview with the clinic sample, 26 parents (45%) and 31 children (53%) reported low magnitude events; 42 parents (74%) and 35 children (60%) reported high magnitude events. At the second interview, the equivalent numbers were 26, 26, 42, and 33. Table 4 shows intraclass correlations for the two administrations of the life event interview. Parents were more reliable as reporters of high magnitude than low magnitude events (ICC = 0.83, for high magnitude events, ICC = 0.58 for low magnitude events). The same was true of children, although the difference was less pronounced (ICC = 0.72, 0.62).

Reliability of individual events

Table 5 shows the reliability of all events reported by at least four informants on one or other occasion. For the seven events reported by at least four children, test–retest reliability varied from a low of $\kappa = 0.16$ for reports of a serious accident to a high of $\kappa = 0.81$ for reports of sexual abuse. Of the nine events reported by at least four parents, five were the same as those reported frequently by children. Test–retest reliability ranged from a low of $\kappa = 0.25$ (learned about a traumatic event) to a high of $\kappa = 0.88$ (diagnosis of a serious illness). It is particularly significant for research on sexual abuse that these children's retest reliability for sexual abuse occurring at any time during their lives was excellent ($\kappa = 0.81$). κ for joint reports ranged from 0.30 to 0.81.

Table 4. *Intraclass correlations for different types of potentially traumatic events*

	Child report	Parent report	Either or both
High magnitude events (lifetime)	0.72	0.83	0.74
Low magnitude events in the past 3 months	0.62	0.58	0.63

Table 5. Test-retest reliability of events reported by four or more informants

	Child			Parent			Either or both		
	Time 1	Time 2	κ	Time 1	Time 2	κ	Time 1	Time 2	κ
Moved home four times or more in last 5 years	10	14	0.46	*	*	*	14	16	0.70
Death of sibling or close friend	14	9	0.41	8	8	0.85	12	11	0.65
Witness to traumatic event	7	7	0.34	10	6	0.42	12	10	0.43
Learned about a traumatic event	*	*	*	6	6	0.25	7	7	0.30
Serious accident	6	3	0.16	*	*	*	6	5	0.48
Serious physical illness diagnosed	*	*	*	4	5	0.88	5	5	0.84
Experienced major natural disaster	6	6	0.23	4	8	0.63	6	6	0.61
Fire	*	*	*	4	3	0.85	6	6	0.67
Victim of physical abuse by family member	3	5	0.73	4	5	0.39	4	5	0.40
Victim of sexual abuse	10	9	0.81	14	11	0.74	14	12	0.81
Victim of sexual coercion	*	*	*	2	4	0.65	3	5	0.72

* Reported by fewer than four informants on either occasion.

Table 6. κ coefficients for PTSD screening symptoms

	Child	Parent	Either or both
Painful recall	0.40	0.79	0.68
Hyperarousal	0.51	0.40	0.45
Avoidance	0.45	0.62	0.48

Reliability of the PTSD screening symptoms

Data on the reliability of the three screening symptoms for PTSD are based on the subgroup of children with one or more reported events. Table 6 shows the κ coefficients for agreement beyond chance on the presence of the three screening symptoms: painful recall, hyperarousal and avoidance. Reliability was in the fair range for the children ($\kappa = 0.45$ to 0.51), and ranged from fair to excellent for the parents ($\kappa = 0.40$ to 0.79).

Symptoms and diagnosis of PTSD

Eight cases met the necessary criteria for completing the detailed PTSD interview at Time 1, and eight at Time 2, with considerable overlap, resulting in detailed PTSD interviews on one or more occasions with a total of nine families. All those interviewed met the required duration criterion of one month or more for at least one symptom. Nine children (16%) in the clinical

sample received diagnoses of PTSD based on one or more interviews with one or both informants. Six (10%) received diagnoses at Time 1, seven (12%) at Time 2; four received a PTSD diagnosis on both occasions. Agreement on diagnosis for both parents and children was fair to good: $\kappa = 0.64$ for the children, and $\kappa = 0.54$ for parents. Although the number of subjects completing the detailed PTSD section of the interview was small, the reliability of the detailed PTS symptom data was high: the intraclass correlation for the total symptom scale was 0.94 for the children and 0.99 for the parents.

Discriminant validity

To test the discriminant validity of the PTSD section of the CAPA, we compared rates of events and symptoms in the clinic sample with rates in the community sample. Our assumptions were that community children would report fewer potentially traumatic events, and that those events that did occur would less often be associated with PTSD symptoms.

Table 7 shows the percentage of clinic and community children reporting one or more potentially traumatic events, and the proportion of these that reported one or more of the PTSD screening symptoms, and met criteria for the diagnosis. About half as many community as clinic children reported a potentially traumatic event. This was true of both lifetime high

Table 7. Potentially traumatic events and PTSD in clinic and community samples

	Child			Parent			Either or both		
	Clinic	Community	$z\ddagger$	Clinic	Community	$z\ddagger$	Clinic	Community	$z\ddagger$
Reporting one or more high magnitude events (lifetime) %	51.1	22.0	4.3***	69.3	33.6	4.4***	77.3	43.1	3.2***
Reporting one or more low magnitude events in the past 3 months %	42.0	20.7	4.2***	45.5	24.7	4.1***	56.8	35.2	2.9***
Percentage of those reporting a qualifying event who had:									
Painful recall	37.9	5.6	5.6***	29.8	7.0	2.3*	51.4	17.2	2.1*
Hyperarousal	13.8	0.5	5.1***	7.0	0.7	1.0	18.9	1.8	2.0*
Avoidance	13.8	2.5	2.7*	13.8	2.9	1.7	21.6	7.4	2.0*
Percentage of total sample with PTSD diagnosis	8.6	0.5	4.7***	5.3	0.4	2.1*	9.1	0.9	4.6***

† The statistical significance of the difference between the samples was assessed using the z statistic (Fleiss, 1981).

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

magnitude and recent low magnitude events, and of events reported by both informants. In the presence of a potentially traumatic event, the clinic children were three to four times more likely to report symptoms of PTSD, or to have them reported by their parents. In the case of hyperarousal, the difference between the groups was even more extreme. The rate of PTSD diagnosis was 17 times higher in the clinical sample than in the community sample. Thus, data from the life events and PTSD screening sections of the CAPA not only reflected the expected excess of symptoms and diagnoses in a clinic population, but also suggested that children who reached clinic settings were more likely to have experienced potentially traumatic events.

DISCUSSION

This paper addresses some psychometric properties of a new measure of potentially traumatic life events, post-traumatic symptoms and PTSD diagnoses. Development of a new instrument was driven by the need for an interviewer-based measure for both parents and children, that could be used in both community and clinic settings, and would permit examination not only of the antecedents and symptoms of PTSD, but also the relationship between life events and other psychiatric disorders. As discussed earlier, while there are several measures that meet part of this need, we could find none that met all of them.

The data presented here support the ability of the CAPA Life Events section to produce data of fair to excellent reliability from children and parents. To our knowledge this is the first paper to report the reliability of individual traumatic events. For the diagnosis of PTSD, where high magnitude events, or 'extreme stressors', are particularly salient, it is encouraging that both parents and children showed excellent reliability in reporting many such events. Among the individual events reported by at least four subjects, reliability varied widely, but the κ s for high magnitude events such as sexual abuse were excellent for both informants. PTSD symptoms associated with events were reported more reliably by parents than by children. However, in the event that a child had the three types of symptom required for a diagnosis of PTSD, the test-retest reliability of the more detailed symptomatology was excellent in both parents and children.

It is difficult to compare the test-retest reliability of the CAPA scales with that of other measures, because most report reliability in terms of Pearson correlation, which does not correct for agreement by chance, as does the intraclass correlation statistic used in this report. Where the κ statistic is used for individual items or diagnoses (e.g. Sandberg *et al.* 1993; Silverman & Eisen, 1992), the present study shows similar or better reliability in most areas. While Saigh *et al.* (1998) report greater reliability, their sample of traumatized youth was more highly selected than the sample used here.

Limitations of the study

A limitation of this methodological study is that the test–retest reliability study was carried out on a relatively small, clinic-referred sample of children. Ideally, one would wish to test a measure designed for both clinical and epidemiological use on a community sample. This is, however, a very expensive process, given the two sets of parent and child interviews needed for the test–retest design, and the large sample that is required to obtain a reasonable number of potential ‘cases’: only 19 out of 1015 children, or fewer than 1% when weighted back to population rates, had PTSD in the first year of our community study. The clinical sample was also too small to permit more fine-grained analyses by age, sex, or ethnic group. On the other hand, the sample was drawn from the waiting list of a general child guidance clinic, not a specialty trauma or PTSD, and so is a reasonable test of the module’s ability to discriminate PTSD cases from children with other types of psychopathology.

Limitations of the CAPA life events and PTSD module

The CAPA life events and PTSD module is not suitable for some types of research. It requires well-trained interviewers, although they do not need to be clinicians. It is not suitable for very brief assessments: the life events section takes about 10 minutes to go through with a child who has few life events and no symptoms, but the whole Life Events-PTSD module can take up to an hour if a child has experienced multiple events and is symptomatic. The CAPA in general has shown adequate reliability when used with children aged 9 and older, but 8 is about the limit of use with children, although of course the parent interview can be used with reference to younger children (Angold & Costello, 1995).

A third limitation of the CAPA module as delivered in this study is that it is designed to cut down on the number of full PTSD interviews that will result in no diagnosis being made. Thus, it restricts the full PTSD interview to those children who report either lifetime occurrence of one of the DSM’s extreme stressors, or another event occurring in the past 3 months. The low magnitude events were treated this way because, while on the one hand we did not want

to pre-judge the question of what events are traumatic for children, we also did not want to generate too many ‘false positives’ requiring the full PTSD interview. Whether PTSD is triggered by the same events in adults and children is an empirical question; for this methodological paper it is worth pointing out that the time frames for high and low magnitude events can easily be changed to suit the research questions of a particular study. In the same way, the protocol used in this study required children to have all three core PTSD symptoms in order to receive the full PTSD interview; this too could be altered if preferred (for example, for a study that focused on symptoms rather than diagnoses).

In the samples used for these analyses, the issue of ‘dependent’ and ‘independent’ events was not addressed. The CAPA life events section could quite easily be used as a basis for making this judgement, by training interviewers to ask the necessary questions, and setting up the procedures required for making the independent assessment (Brown & Harris, 1978). While this has not been an issue of concern to PTSD researchers, it would be a useful extension of the measure for research concerned with depression or anxiety, or for older adolescents with whom Axis 2 disorders were a focus.

Within these limitations, the CAPA life events/PTSD module offers another alternative to the small group of measures available for the detailed study of potentially traumatic events and their sequelae in the lives of children and adolescents.

APPENDIX A

Child and Adolescent Psychiatric Assessment Life Events Module: list of items

High magnitude events

Death of close relative or friend
 Witness to a traumatic event
 Natural disaster (hurricane, tornado, earthquake, etc.)
 Diagnosis of life-threatening or disabling physical illness
 Serious accident
 Fire
 Exposure to a life-threatening toxic agent (radiation, pesticide, etc.)
 Learned of a traumatic event affecting a close family member or friend

War or terrorism
Cause of death or serious harm to someone else
Physical violence by someone other than a family member
Physical abuse by a family member
Kidnapping, captivity, being held hostage
Sexual abuse
Rape
Sexual abuse with coercion

Low magnitude events

New child come to live in the home (if unwelcome)
Pregnancy (own or partner's)
 Learned of
 Premature termination*
 Childbirth*
 Placement of child
Parental separation
Parental divorce
New parental figure (e.g. step-parent)
Moving house recently or repeatedly
Change of school other than normal promotion
Loss of best friend through move
Break-up with best friend
Break-up with boyfriend or girlfriend
Parental arrest
Serious reduction in standard of living
Forced separation from home
Other event

APPENDIX B

Child and Adolescent Psychiatric Assessment Detailed PTSD interview module: areas covered

Acute responses to traumatic event

Acute emotional responses to traumatic event
 Surprise, helplessness, derealization, fear, worry, anger, emotional numbness, disgust or revulsion, feeling out of control, sadness, confusion, detachment, guilt, sense of betrayal, embarrassment
Acute somatic responses
 Dizziness, faintness, dry mouth, choking or smothering, difficulty breathing, rapid breathing, palpitations, tightness or chest pain, sweating, nausea, frequent urination, butterflies in the stomach, diarrhoea, trembling or shaking, muscle soreness, flushing, pallor, paraesthesiae, lump in the throat, abdominal churning
Intervention fantasies
Rescue fantasies
Revenge fantasies

Cognitive intrusions

Externally cued painful recall

* Coded as high magnitude if resulting in death of the child.

Avoidance, normal suppression, obsessional suppression, compulsive suppression, autonomic effects
Painful recall not externally cued
 Avoidance, normal suppression, obsessional suppression, compulsive suppression, autonomic effects
Active recall
 Worry, sadness, anger, guilt, sense of mastery
Failure of recall
Reliving of event
 Associated panic (hypnogogic, hypnopompic, nocturnal, daytime)
Nightmares
 Autonomic effects, needs reassurance, needs anticipatory reassurance

Hyperarousal

Non-restorative sleep, inattention, anger, anger dyscontrol, hypervigilance, exaggerated startle response
Arousal, phasic exacerbation

Numbing

Detachment, loss of affect (positive and negative), loss of emotional expression (positive and negative)

Other behaviours

Play recapitulating the event, dangerous activities, increased attention to religion, decreased attention to religion, omen formation, survivor guilt, revenge fantasies, changed expectation of long-term future

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