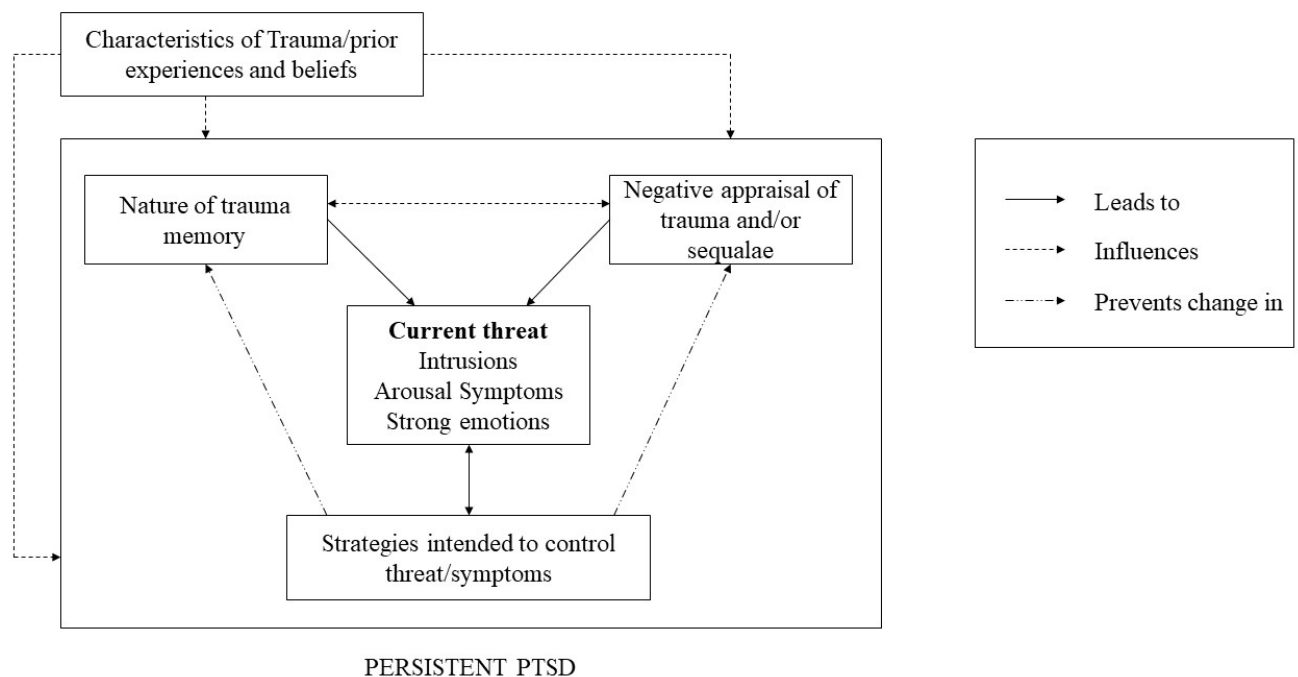


Supplementary material

Overview of the cognitive model of PTSD (Ehlers and Clark, 2000)

The cognitive model proposes that the way in which traumatic events are encoded, contextualised and stored in memory is central to the development of PTSD. Individuals with PTSD have difficulty intentionally recalling traumatic memories in a coherent form, but paradoxically experience intrusive memories about the trauma. They appraise, and seek to make sense of these intrusions, as well as of the trauma event itself and other post-trauma sequelae. If these appraisals give rise to a sense of threat, cognitive and behavioural coping strategies are employed in attempt to manage this threat. Particular coping responses can sustain a sense of threat, thus contributing to the maintenance of PTSD.



Supplementary Figure SF1. A cognitive model of posttraumatic stress disorder – Adapted from Ehlers and Clark (2000)

Complete search terms

Supplementary Table S1

Complete search strategy included in systematic review

Search components	Search terms
Participant	“maltreatment” OR “abuse” OR “neglect” or “maltreated” or “abused” or
Population	“neglected” “child” or “children” or “youth” or “young person” or “young people” or “adolescent” or “adolescence” or “childhood” or “teen” or “teenager” or “infant”
Outcomes	“PTSD” OR “post-traumatic stress disorder” OR “posttraumatic stress disorder” OR “complex PTSD” OR “stress disorders” OR “depression” OR “anxiety”
Psychological Processes	“memory” OR “trauma memory” “appraisal” OR “maladaptive appraisal” OR “cognitive processes” OR “cognitive process” OR “cognitive bias” OR “interpretative bias OR attribution” “coping behaviour” or “coping behaviour” or “coping strategies” or “coping skills” or “coping responses” or “avoidance” or “thought suppression” or “distraction” OR “safety behaviours” OR “safety behaviors” OR “selective attention” or “attentional bias” OR “rumination”

Supplementary Table S2

Overview of studies included in systematic review

Study <i>Country; Quality Assessment¹</i>	Description of Sample <i>Sample size; age(mean); gender; abuse type</i>	Recruitment Setting	Psychological processes: Measures	Outcome Measure	Findings
1. Alix et al.(2017); Canada;41%	N=147; Age=15 (median), R=14-18;100% Female; SA	Treatment centres	ASSQ; AAI; WCQ	CITES-II	Associated with PTSD: Shame, self-blame, avoidance. Shame partially mediated self-blame and PTSD.
2. Bertó et al.(2017);Spain; 50%	N=47; Maltreated n=21; Age=10.8(3.2); 57.1% Female; PA, Neglect (SA n=3)	Mental health services	FACES database	ICD-11 Diagnosis MPSS- SR; BSI	Maltreated children with PTSD show attentional bias away from angry faces, towards sad faces.

¹ Many included studies had different stated aims than ones investigated in the current review. Therefore, low ratings in relation to this review do not necessarily reflect overall quality of each individual paper.

3. Chaffin et al.(1997);USA; 94%	N=84; Age=9.75(1.7), R=7-12; 75% Female; SA	Treatment clinics; Support programs	KIDCOPE	CITES-R	Associated with hyperarousal symptoms: Internalised coping. Not associated with PTSD: Avoidant, angry, active/social coping.
4. Cohen & Mannarino (2000);USA; 78%	N=49; Age=11,R=7-15; 69% Female; SA	Victim advocacy programs; CPS; Police; Court; Mental health services	CAPS	TSCC	Associated with PTSD: Feeling different to peers, reduced interpersonal trust, self-blame for negative events, lower perceived credibility.
5. Crouch et al.(1999);USA; 65%	N=97; Age=12.76(2.6), R=8-17; 86% Female; SA	Clinical services	CITES-R	CITES-R TSCC	Associated with PTSD: Self-blame/guilt, personal vulnerability, powerlessness, perceived negative reactions of others, dissociation. Not associated with PTSD: 'dangerous world' appraisal.

6. Daigneault et al. (2004); Canada; 28%	N=30; Age=15.5(1.4), R=13-17; 100% Female; SA (high rate additional abuse)	Youth protection center	MTRR-99	TSCC	Not associated with PTSD: authority over memory, integration memory and affect, meaning making.
7a. Daigneault, Hébert, & Tourigny, (2006); Canada; 77%	N=103; Age=14.6(1.2);100% Female; SA	Treatment centres	CAPS; CITES-R; WCQ	TSCC	Associated with PTSD: GASB. Not associated with PTSD:ASSB (when GASB and coping controlled), avoidant/approach coping.
7b. Daigneault, Tourigny, & Hébert(2006); Canada; 55%	N=103; Age=14.6(1.2); 100% Female; SA	Treatment centres	CAPS; CITES-R	TSCC	Associated with PTSD: GASB. Not associated with PTSD: ASSB (when GASB controlled). ASSB and PTSD completely mediated by GASB.
8a. de Haan et al. (2017); Germany; 44%	N=231; Age=12(2.5), R=8-17; 42.4% Female; Mixed maltreatment	Welfare services; Mental health services	CPTCI	PTSD-RI	Associated with PTSD: ‘Permanently changed’/‘fragile person in a scary world’.

8b. Münzer, Ganser & Goldbeck (2017); Germany; 67%	N=200; Age=12.23(2.45), R=8-17; 44% Female; Mixed maltreatment	Welfare services; Mental health services	CPTCI	PTSD-RI	Associated with PTSD: ‘Permanently changed’/‘fragile person in a scary world’.
9. Elzy et al. (2013); Canada; 56%	N=44; Age=15,R=12-18; 100% Female; Mixed maltreatment	Residential Services	CRI-Y	TSR-A	Trauma exposure moderated avoidant coping but not approach coping on PTSD.
10a. Feiring et al.(1998);USA; 75%	N=142;8-11years=82;12-15 years =60; 76% Female; SA	CPS; SA medical clinics	Shame: developed for study; CASQ-R	CITES-R	Associated with PTSD: Shame. Not associated with PTSD:GASB
10b. Feiring, Taska, & Chen (2002); USA; 65%	N=137;8-11years=80; 12-15 years=57;74% Female; SA	CPS; SA medical clinics	Shame: developed for study; CASQ-R; AAI; Open-ended question	CITES-R	Associated with PTSD T1: Mother blame T1; Not associated with PTSD T1: Perpetrator blame T1/T2; Not associated with PTSD T2: Mother blame T1/T2, perpetrator blame T1/T2.

10c. Feiring, Taska, & Lewis (2002); USA; 69%	N=147; 8-11years=83; 12-15 years=64; 73% Female; SA	CPS; SA medical clinics	Shame: developed for study; CASQ-R; AAI	CITES-R	Associated with PTSD T2: shame T1/T2, GASB T2; Not associated with PTSD T2: GASB T1 and ASSB T1/T2. Changes in PTSD associated with improvements in ASSB and shame; not associated with improvements in GASB.
11. Freeman & Beck(2000); USA; 28%	N=53; SA PTSD n=20; No PTSD n=13; Age=13.8(1.7) /14.1 (2.0), R=11-17; 100% Female	Mental health services; Community	Modified Stroop Task	K-SADS; PTSD-RI; IES	No group differences on cognitive bias toward threat stimuli. Response latencies for word-stimuli and PTSD intrusion symptoms not associated.
12. Gauthier-Duchesne et al. (2017); Canada; 81%	N=447; Age=8.9(2.05), R=6-12; 71% Female; SA	SA Services	CITES-II	CITES-II	Associated with PTSD: Guilt.

13a. Kaplow et al (2005); USA; 67%	N=156; Age=10.7(1.8), R=7.92-13.92; 83% Female; SA	Treatment facilities	TSCC; Interview	CBCL	Associated with PTSD: avoidance, dissociation.
13b. Shapiro et al. (2012); USA; 64%	N=156; Age=10.7(1.8), R=8-13; 83% Female; SA T2 analysis n = 47	Treatment facilities	TSCC; Interview	CBCL	Associated with PTSD T2: Avoidant coping T1. Not associated with PTSD T2: Positive affective/expressive coping T1.
14. Kaur & Kearney (2013); USA; 50%	N=145; Age=14.5(1.6), R=11-17; 54% Female; Mixed maltreatment	Family services (All in residential care)	PTCI; A-DES	CPTSD-I	Associated with PTSD: Negative cognitions about self/world/self-blame, dissociation.
15. Kaur & Kearney (2015); USA; 55%	N=160; Age=13.27(2.79), R=11-17; 57% Female; Mixed Maltreatment	Family services (all in protective custody)	PTCI; A-DES	CPTSD-I	Associated with PTSD: Negative cognitions about world.

16. Kletter et al. (2009); USA; 89%	N=87; Age=11.7(2.4), R=5.4–16.7; 44% Female; Mixed maltreatment	Social Services; mental health clinics	CAPS-CA	CAPS-CA	Associated with PTSD: Guilt over acts, derealisation. Not associated with PTSD: Survivor guilt, shame, depersonalisation.
17. Kolko et al. (2002); USA; 61%	N=47; Age=12.0(2.8); 62% Female; PA, SA	Youth services	CASP	TSCC; CAPS-C	Associated with PTSD: Perceived victimization, perceived victim consequences. Not associated with PTSD: Abusers negative intentions/negative feelings towards abuser/consequences for abuser.
18. Lam (2015); Hong Kong; 78%	Disclosed abuse n=74; Age=14.75(.96), R=13- 16; 51% Female; SA	Secondary schools	CAPS	CRIES	Not associated with PTSD: Feeling different to peers/reduced interpersonal trust/self-blame for negative events/lower perceived credibility.

19. Mannarino et al. (2012); USA; 77%	N=158; Age=7.6(2.07), R=4-11; 62% Female; SA	Treatment sites	The Shame Questionnaire	K-SADS	Pre-treatment levels of shame not associated with PTSD posttreatment.
20. Ogle et al. (2013); USA; 39%	N=98; Age=15.12(0.95), R=14-17; 86% Female; SA	Treatment Centres; medical clinics; internet; newspapers	The AMI:	CPSS	Associated with PTSD: Dissociation. Not associated with PTSD: Autobiographical memory specificity.
21. Pittenger et al (2016); USA; 40%	N=166; SA Children n=101; Age=10.1(1.7), R=7-14; 71% Female Adolescents n=65; Mean age =14.7(1.5), R=11-18; 92% Female	Therapy groups	CITES-R; PSAES-Y	CITES-R	Associated with PTSD: self-blame/guilt, expectations of the impact of abuse. Not associated with PTSD: Powerlessness.

22. Ross & Kearney (2017); USA; 65%	N=400; Age=13.72(2.39), R=7–18; 59% Female; Mixed maltreatment	Family services (all removed from caregiver)	A-DES; PTCI	CPTSD-I	Post-traumatic cognitions differentiated between maltreated individuals with/without re-experiencing symptoms. Depersonalisation/derealisation differentiated between maltreated individuals with/without PTSD avoidance symptoms. Negative cognitions about self, dissociation differentiated between maltreated individuals with/without PTSD hyperarousal symptoms.
23. Runyon & Kenny (2002); USA; 72%	N=98; PA n=67 Age=11.72(2.77), R=8-17; 48.5% Female SA n=31; Age=12.90(2.84), R=8-17; 87.1% Female	Treatment Centres	CASQ	PTSD-RI	GASB associated with PTSD in SA sample only.

24. Sharma-Patel et al. (2014); USA; 89%	N=128; Age=12 (3.24), R=6–17.9; 87% Female; PA, SA	Outpatient clinic	PERCEIVE	CPSS	High self/perpetrator blame associated with > PTSD severity than i) high self-blame ii) low self/perpetrator blame iii) moderate perpetrator/low self-blame.
25. Sharma-Patel & Brown (2016); USA; 36%	N=118; Age=11.02, R=4-17; 75% Female; Mixed maltreatment	Treatment centres	PERCEIVE	CPSS	Self-blame did not mediate PTSD symptoms across TF-CBT.
26. Shenk et al. (2014); USA; 82%	N=110; Age maltreatment group = 16.78(1.12), R=14-19; 100% Female; Mixed Maltreatment	CPS, primary care	AAQ	CTI	Associated with PTSD: Experiential avoidance
27. Spaccarelli (1995); USA; 50%	N=48; Age=14 (median), R=11-18; 100% Female; SA	Therapy Services	NASAS	Scale from TSCC and IES	Associated with PTSD: Evaluation of self & others/perceptions of harm to self & others/loss of resources/criticism of others.

28. Srinivas et al. (2015); USA; 83%	N=129; Age=16.5(1.6), R=13–20, 92% ≤18; 100% Female; Mixed maltreatment	Welfare services	TAQ ²	TSCC	Associated with PTSD: Shame, Alienation. Not associated with PTSD: ASSB.
29. Wolfe, Gentile & Wolfe(1989); Canada; 70%	N=71; Age=9.9(3.3), R=5-16; 88.2% Female; SA	CPS	CITES-R; KASTAN;	CBCL	Not associated with PTSD: ASSB, GASB.

Not all participants responded to the TAQ in relation to their maltreatment. TAQ trauma type was controlled for in the analysis, but there was no distinction between loss and neglect²

30. Wolfe et al. (1991); Canada; 40%	N=61(FS sample); Age=11.6(2.8), R=8-16; 86.9% Female N=76(Court Sample); Age=12.5(2.4),R=8- 17;74% Female SA- high rate mixed maltreatment	Family Services (FS sample) Victim-witness court	KASTAN; CITES	CITES; CBCL- PTSD	Overall PTSD not associated with: ASSB, vulnerability, empowerment, dangerous world, negative reactions of others, GASB. Associated with intrusive symptoms: ASSB, negative reactions of others, vulnerability. Avoidant symptoms associated with: Vulnerability. Not associated with PTSD symptoms: Empowerment, dangerous world, GASB.
31. Wolfe et al. (1994); Canada; 72%	N=90;Age=12.4; 77% Female; SA	Police; CPS	CITES	Checklist of PTSD symptoms ;CITES	Associated with PTSD: Guilt. Not associated with PTSD: ASSB.

CPS, Child Protective Services. SA, Child Sexual Abuse. PA, Child Physical Abuse. ASSQ, Abuse Specific Shame Questionnaire; NASAS, Negative Appraisals of Sexual Abuse Scale; TSCC, Trauma Symptom Checklist for Children; CITES-R, Children's Impact of Traumatic Events Scale – Revised; CAPS, Children's attributions and perceptions scale; WCQ, Ways of Coping Questionnaire; CRI-Y, Coping Responses Inventory – Youth Form; TSR-A, Trauma Symptom Report – Adolescents; CASQ-R, Children's Attributional Style Questionnaire—Revised; AAI, Abuse Attribution Inventory; K-SADS, Schedule for Affective Disorders and Schizophrenia (Child Version); AMI, Autobiographical Memory Interview; PTSD-RI, PTSD Reaction Index; IES, Impact of Events Scale; CBCL, Child Behaviour Checklist; C/PTCI Child/Post Traumatic Cognitions Inventory; CPTSD-I, The Children's PTSD Inventory, A-DES, The Adolescent Dissociative Experiences Scale; CAPS-C/CA, Clinician-Administered PTSD Scale for children/Child and Adolescent Version; CASP, Children's Abuse-Specific Perceptions; CRIES, Children's revised impact of event scale; CPSS, Child Post-

Traumatic Stress Disorder Symptom Scale; CTI, Comprehensive trauma interview; PERCEIVE, Perceptions of Children Exposed to Interpersonal Violence; AAQ, Acceptance and Action Questionnaire; TAQ, Trauma appraisal questionnaire; KASTAN, Attribution style questionnaire for children; MPSS-SR, Modified PTSD Symptom Scale-Self-Report Severity; BSI, Brief Symptom Inventory; ICD-11, International Classification of Disease 11; FACES database; MTRR-99, Multidimensional Trauma Recovery and Resiliency Interview and scoring package; The Shame Questionnaire; PSAES-Y, Post Sexual Abuse Expectations Scale–Youth; GASB, General attributions of self-blame; ASSB Abuse-specific attributions of self-blame. TF-CBT; Trauma focused CBT.

Supplementary References

- Achenbach, T., & Edelbrock, C. S. (1983). *Manual for the Child Behaviour Checklist and Child Behavior Profile*. Burlington: University of Vermont.
- Armstrong, J. G., Putnam, F. W., Carlson, E. B., Libero, D. Z., & Smith, S. R. (1997). Development and validation of a measure of adolescent dissociation: The Adolescent Dissociative Experiences Scale. *Journal of Nervous and Mental Disease*, 185, 491–497. doi:10.1097/00005053-199708000-00003
- Bouchard, G., Sabourin, S., Lussier, Y., Richer, C., & Wright, J. (1995). Nature des stratégies d'adaptation au sein des relations conjugales: Présentation d'une version abrégée du ways of coping questionnaire [Nature of coping strategies in couples: Brief version of the ways of coping questionnaire]. *Revue Canadienne des Sciences du Comportement*, 27, 371-377.
- Briere, J. (1996). *Trauma symptom checklist for children*. Odessa, FL: Psychological Assessment Resources.
- Brown, E. J. (2000). *Perceptions of Children Exposed to Interpersonal Violence (PERCEIVE)* (Unpublished measure). St. John's University, Queens, NY
- Briere, J., Elliott, D. M., Harris, K., & Cotman, A. (1995). Trauma Symptom Inventory: psychometrics and association with childhood and adult trauma in clinical samples. *Journal of Interpersonal Violence*, 10, 387–401.
- Cloitre, M., Gavert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*, 15(4), 20706. doi: 10.3402/ejpt.v4i0.20706
- DePrince, A. P., Zurbriggen, E. L., Chu, A. T., & Smart, L. (2010). Development of the Trauma Appraisal Questionnaire. *Journal of Aggression, Maltreatment & Trauma*, 19(3), 275–299. doi: 10.1080/10926771003705072
- Derogatis, L. R., & Melisaratos, N. (1983). The brief symptom inventory: An introductory report. *Psychological Medicine*, 13, 595–605.
- Ebner, N. C., Riediger, M., & Lindenberger, U. (2010). *FACES-a database of facial*

- expressions on young, middle-aged: and older women and men: Development and validation. *Behavior Research Methods*, 42, 351–362.
- Falsetti, S. A., Resnick, H. S., Resick, P. A., & Kilpatrick, D. G. (1993). The modified PTSD symptom scale: A brief self-report measure of posttraumatic stress disorder. *The Behavioral Therapist*, 16, 161–162.
- Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The Posttraumatic Cognitions Inventory (PTCI): Development and validation. *Psychological Assessment*, 11, 303–314. doi:10.1037/1040-3590.11.3.303
- Foa, E. B., Johnson, K., Feeny, N. C., & Treadwell, K. (2001). The Child PTSD Symptom Scale (CPSS): A preliminary examination of its psychometric properties. *Journal of Clinical Child Psychology*, 30, 376–384.
- Harvey, M. R., Westen, D., Lebowitz, L., Saunders, E., & Harney, P. (1998). *Multidimensional Trauma Recovery and Resiliency Scale: 1998-1999 Clinical Rating Form with Handscoring Instructions*. (Unpublished manuscript). Cambridge, MA: The Cambridge Hospital Victims of Violence Program.
- Hayes, S. C., Strosahl, K., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., et al. (2004). Measuring experiential avoidance: A preliminary test of a working model. *Psychological Record*, 54, 553–578.
- Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective distress. *Psychosomatic Medicine*, 41, 209–218.
- Kaslow, N. J., Tannenbaum, R. L., & Seligman, M. E. P. (1978). *The KASTAN-R: A Children's Attributional Style Questionnaire (KASTAN-R- CASQ)*. University of Pennsylvania: Unpublished manuscript.
- Kopelman, M. D., Wilson, B. A., & Baddeley, A. D. (1989). The Autobiographical Memory Interview: A new assessment of autobiographical and personal semantic memory in amnesic patients. *Journal of Clinical and Experimental Neuropsychology*, 11, 724–744.
- Mannarino, A. P., Cohen, J. A., & Berman, S. R. (1994). The children's attributions and perceptions scale: A new measure of sexual abuse-related factors. *Journal of Clinical Child Psychology*, 23(2), 204–211.
- Meiser-Stedman, R., Smith, P., Bryant, R., Salmon, K., Yule, W., Dalgleish, T., & Nixon R.

- D. V. (2009). Development and validation of the Child Post-Traumatic Cognitions Inventory (CPTCI). *Journal of Child Psychology and Psychiatry*, 50, 432–40.
- Moos, R. (1993). *Coping responses inventory: Professional manual*. Odessa: Psychological Assessment Resources, Inc.
- Nader, K. O., Kriegler, J. A., Blake, D. D., & Pynoos, R. S. (1994). *Clinician- Administered PTSD Scale for Children (CAPS-C), current and lifetime diagnosis version*. (Unpublished instrument). Aliso Viejo, CA.
- Nader, K.O., Kriegler, J.A., Blake,D.D., Pynoos, R.S., Newman, E., & Weather, F.W. (1996). *Clinician administered PTSD scale, child and adolescent version*. White River Junction, VT: National Center for PTSD.
- Orvaschel, H. (1995). *Schedule for Affective Disorders and Schizophrenia for School-Age Children, Epidemiologic Version-5, Kiddie SADS-E (K-SADS-E)*. Fort Lauderdale, FL: Nova Southeastern University, Center for Psychological Studies.
- Saigh, P. A. (1998). *Children's PTSD Inventory (DSM-IV version)*. New York, NY: Author.
- Spirito, A., Stark, L. J., & Williams, C. (1988). Development of a brief checklist to assess coping in pediatric patients. *Journal of Pediatric Psychology*, 13, 555-574.
- Steinberg, A. M., Brymer, M. J., Decker, K. B., & Pynoos, R. S. (2004). The University of California at Los Angeles Post-Traumatic Stress Disorder Reaction Index. *Current Psychiatry Reports*, 6, 96–100.
- Thompson, M., Kaslow, N. J., Weiss, B., & Nolen-Hoeksema, S. (1998). Children's Attributional Style Questionnaire—Revised: Psychometric examination. *Psychological Assessment*, 10, 166–170.
- Wolfe, V. V. (2002). *Children's Impact of Traumatic Events Scale-II*. (Unpublished assessment instrument). London, ON: Child and Adolescent Centre, London Health Sciences Centre.
- Wolfe, V. V., Wolfe, D. A., Gentile, C., & LaRose, L. (1986). The children's impact of traumatic events scale (CITES). Available from V. Wolfe, Dept. of Pediatric Psychology, Children's Hospital of Western Ontario, London. Canada.

