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Journal of Aggression, Maltreatment & Trauma

ISSN: 1092-6771 (Print) 1545-083X (Online) Journal homepage: https://www.tandfonline.com/loi/wamt20

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To cite this article: Beatriz O. M. Lobo, Alice E. Brunnet, Kimberly K. Ecker, Luiziana S. Schaefer, Adriane X. Arteche, Gustavo Gauer & Christian H. Kristensen (2015) Psychometric Properties of the Child Posttraumatic Cognitions Inventory in a Sample of Brazilian Children, Journal of Aggression, Maltreatment & Trauma, 24:8, 863-875, DOI: 10.1080/10926771.2015.1043065

To link to this article: https://doi.org/10.1080/10926771.2015.1043065

Published online: 22 Jun 2015.

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Journal of Aggression, Maltreatment & Trauma, 24:863–875, 2015
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ISSN: 1092-6771 print/1545-083X online
DOI: 10.1080/10926771.2015.1043065

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Psychometric Properties of the Child Posttraumatic Cognitions Inventory in a Sample of Brazilian Children

BEATRIZ O. M. LOBO and ALICE E. BRUNNET
Department of Psychology, Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil

KIMBERLY K. ECKER
Department of Psychology, Federal University of Health Sciences of Porto Alegre, Porto Alegre, Brazil

LUIZIANA S. SCHAEFER and ADRIANE X. ARTECHE
Department of Psychology, Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil

GUSTAVO GAUER
Department of Developmental and Personality Psychology, Institute of Psychology, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

CHRISTIAN H. KRISTENSEN
Department of Psychology, Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil

Cognitive models of trauma propose that maladaptive cognitions in children and adolescents are causally implicated in the unfolding and maintenance of posttraumatic response. The objective of this study was to evaluate the psychometric properties of the Child Posttraumatic Cognitions Inventory (CPTCI). The sample included 131 children and adolescents. The psychometric properties of the CPTCI were examined, including reliability and convergent validity. The results showed high internal consistency for both CPTCI total scale (α = .90) and its subscales (CPTCI–PC α = .88 and CPTCI–SW α = .79) and a 2-component solution explaining

Received 7 July 2014; revised 7 January 2015; accepted 12 January 2015.
Address correspondence to Beatriz O. M. Lobo, Pontifical Catholic University of Rio Grande do Sul, Building 11, Room 915, 6681 Ipiranga Avenue, Partenon, Porto Alegre/RS, Brazil, CEP: 90619-900. E-mail: beatrizlobo.m@gmail.com

37.63% of the variance of CPTCI. Convergent validity evidence was obtained through correlations with the Trauma Symptom Checklist for Children and Children's Depression Inventory. Findings suggest that CPTCI instruments are reliable and had adequate evidence of validity.

KEYWORDS adolescence, appraisals, childhood, cognitive processing, posttraumatic symptoms, PTSD, psychometric properties

Exposure to traumatic events in children and adolescents is associated with psychological reactions such as anxiety, depression, behavioral problems, and posttraumatic stress disorder (PTSD), and the most commonly studied reaction is PTSD (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). The establishment of a PTSD diagnosis requires a history of exposure to a traumatic event and symptoms of intrusion, avoidance, altered mood and cognition, and alterations in arousal and reactivity (American Psychiatric Association, 2013). Traumatic experiences are a necessary, but not sufficient condition alone to fulfill criteria for PTSD, with few factors involved in the development and maintenance of PTSD (Meiser-Stedman, Dalgleish, Glucksman, Yule, & Smith, 2009). A meta-analysis of risk factors in childhood and adolescence showed that individual (e.g., comorbid psychological disorders, psychological variables, low IQ), social (e.g., social support, poor family functioning), and trauma factors (e.g., trauma nature, perceived life threat) play an important role in the development of PTSD (Trickey et al., 2012).

Cognitive models of trauma in adults propose that the individual's appraisal of a traumatic event and its impact mediates posttraumatic adjustment, playing a causal role in the maintenance and exacerbation of initial stress reactions and trauma-related psychopathology (Ehlers & Clark, 2000; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). These appraisals include overgeneralization of danger, global negative thoughts about the self and the world, and self-blaming emotions (Foa et al., 1999).

It is suggested that such appraisals would maintain and increase the levels of anxiety as well as motivate the use of maladaptive coping strategies, such as thought suppression and avoidance, rumination, and dissociation (Ehlers & Clark, 2000). Foa and Rothbaum (2001) suggested two main types of appraisal that mediate the development of PTSD: the idea that the world is a completely dangerous place and the view of oneself as incompetent.

A number of studies have found that this model can also be applied for children, postulating that cognitive processing of traumatic events mediates the development and maintenance of posttraumatic symptoms and PTSD (Ehlers, Mayou, & Bryant, 2003; Leeson & Nixon, 2011; Meiser-Stedman, Smith, et al., 2009; Palosaari, Punamäki, Diab, & Qouta, 2013; Salmon, Sinclair, & Bryant, 2007). In school-age children and adolescents, maladaptive

cognitions are causally implicated in the unfolding and maintenance of the posttraumatic response over time (Meiser-Stedman, Dalgleish, et al., 2009).

Instruments for the accurate and efficient evaluation of posttraumatic symptoms and cognitions in children are required to design an appropriate intervention, considering that reduction in maladaptive appraisals is causally implicated in recovery from posttraumatic symptoms following cognitive-behavioral therapy (Cohen, Berliner, & Mannarino, 2010; Meiser-Stedman, Dalgleish, et al., 2009). Some instruments available in the literature aim to evaluate cognitive processing in children and adolescents, including the Children's Automatic Thoughts Scale (Schniering & Rapee, 2002) and the revised version of the Children's Attributional Style Questionnaire (Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998). Although these instruments are important to assess children's cognitive processing, they might not be sufficient to evaluate trauma-specific appraisals. The Child Posttraumatic Cognitions Inventory (CPTCI; Meiser-Stedman, Smith, et al., 2009) is an adaptation for children and adolescents of the Posttraumatic Cognitions Inventory (PTCI; Foa et al., 1999); the Brazilian version by Sbardelloto, Schaefer, Justo, Lobo, & Kristensen, 2013) aimed to evaluate negative posttraumatic cognitions in adults.

The CPTCI is a 25-item scale for assessing negative appraisals in children and adolescents, aged 6 to 17 years old, following a traumatic event. It has two meaningful components: "Permanent and disturbing change" and "My life has been destroyed by the frightening event." The CPTCI is intended both to inform research on a potentially significant mechanism in the development of PTSD in children and adolescents and to provide a clinically useful tool for the assessment and prediction of the disorder (Meiser-Stedman, Smith, et al., 2009).

The translation and cross-cultural adaptation of the CPTCI to Brazilian Portuguese was based on guidelines proposed by the International Test Commission (Beaton, Bombardier, Guillemin, & Ferraz, 2000; Gjersing, Caplehorn, & Clausen, 2010; Hernández-Nieto, 2002; International Test Commission, 2010) in a previous work (Lobo et al., 2014). The Brazilian Portuguese version of the CPTCI maintained the same meanings of the original English version and had evidence of an elevated content validity. This study investigated the psychometric properties of the Brazilian Portuguese version of the CPTCI.

METHOD

The sample was composed of 131 children and adolescents (58% girls and 42% boys) aged 7 to 17 years (M = 11.3 years, SD = 2.8) with at least 2 years of schooling, recruited in Porto Alegre, Brazil. The children and their parents were taking part in a larger study focusing on a forensic evaluation of symptoms of children who were possible victims of sexual abuse, and were

selected from three different sources: the state agency responsible for the forensic assessment of physical and psychological maltreatment of children, an outpatient university facility for the assessment and treatment of PTSD and trauma-related disorders, and a center for family therapy. Exclusion criteria were presence of psychotic symptoms or low IQ assessed through the Child Behavior Checklist and the Raven's Progressive Matrices, respectively.

Most of the sample (73%) had experienced at least one traumatic event: 67.6% had suffered multiple and recurrent traumatic experiences and 4.7% had suffered a single traumatic exposure; 47.2% had suffered sexual abuse, 18.9% physical abuse, 18.9% emotional abuse, and 9.9% physical or emotional neglect. Nine percent had suffered nonmaltreatment traumatic experiences (i.e., assaults, violent crimes, motor vehicle accidents, physical aggressions).

Socioeconomic status data were based on Brazilian Economic Classification Criteria (Associação Brasileira de Empresas de Pesquisa, 2008): 70.7% were in the low socioeconomic class (E, D, C), 27.7% of participants were in the middle class (B), and 1.6% of participants were from an upper class background (A). The majority of the children (92%) attended state schools and on average children had 5 years (SD = 2.5) of education. Forty-five percent had learning problems, as informed by parents, and 40.3% had already failed at least 1 year at school. The majority (45.6%) of mothers had studied up to elementary school (0–4 years), 37.6% up to incomplete high school (5–10 years), and 16.8% completed high school or had further education (11 years or more).

Seventeen percent of the participants were taking at least one psychiatric medication (40% stimulants, 32% antidepressants, 16% mood stabilizers, 8% anxiolytics, and 4% antipsychotics). The developmental data showed that 85% of the children had normal psychomotor development; 66.4% of the participants were born after unplanned pregnancies. Sixty-nine percent of the mothers had problems during pregnancy and among these, 91.6% reported emotional issues; 61% of the parents were divorced.

Instruments

Child Posttraumatic Cognitions Inventory

The CPTCI (Meiser-Stedman, Smith, et al., 2009) is a self-report scale with 25 items, which aims at assessing negative posttraumatic appraisals in children and adolescents aged 6 to 17 years old on a Likert scale ranging from 1 (*don't agree at all*) to 4 (*agree a lot*). The CPTCI includes two components: sense of "permanent and disturbing change" and sense of being a "fragile person in a scary world." The measure was developed with a sample of 570 children and adolescents between 6 and 17 years old. The first sample (S1) was composed of 223 children and adolescents, participating in a cross-sectional community study, who did not suffer a traumatic event. The second sample (S2) included

138 children and adolescents who were victims of a traumatic event, and the third sample (S3) was made up of 209 children and adolescents admitted to a hospital following injury. According to the original study, the scale has good internal consistency for total CPTCI and its subscales (Cronbach's α values between .86 and .96), test–retest reliability (CPTCI–PC, $r = .78$, $p < .0001$; CPTCI–SW, $r = .70$, $p < .0001$), and convergent validity evidence, examined by correlations of each subscale and total score with self-report measures of posttraumatic stress (all rs > .5) and depressive symptoms (all rs > .6). Discriminant validity was assessed by comparing children and adolescents with and without PTSD, and participants with posttraumatic symptoms scored higher on CPTCI subscales and total score than non-PTSD subsamples (Meiser-Stedman, Smith, et al., 2009).

Trauma Symptom Checklist for Children

The Trauma Symptom Checklist for Children (TSCC; Briere, 1996) is a self-report measure that aims to measure a broad range of posttraumatic and associated psychological symptoms in children and adolescents aged 8 to 16 years who have experienced traumatic events. The TSCC has 54 items rated on a 4-point Likert scale ranging from 0 (*never*) to 3 (*almost all of the time*). The TSCC has two validity scales (Underresponse and Hyperresponse), six clinical scales (Anxiety, Depression, Anger, Posttraumatic Stress, Dissociation, and Sexual Concerns, with Dissociation and Sexual Concerns containing two subscales each [Overt Dissociation, Fantasy Dissociation, Sexual Preoccupation and Sexual Distress, respectively]), and eight critical items that might suggest problems or issues that require immediate attention (e.g., potential self-injury, suicidal intention, desire to harm others, fears of men, fears of women, and fear of being killed). The TSCC can be administered individually or in a group and takes approximately 5 to 10 min. It was standardized in both clinical and nonclinical samples ($N = 3{,}008$), and has demonstrated adequate reliability (α = .82–.89), with validity evidence for the six clinical scales and correlations between scales ranging from $r = .19$ to $r = .96$.

Children's Depression Inventory

The Children's Depression Inventory (CDI; Kovacs, 1992, 2003; Brazilian version by Gouveia, Barbosa, Almeida, & Gaião, 1995) is a self-report instrument adapted from the Beck Depression Inventory for adults. The goal of the CDI is to detect presence and severity of depressive disorders in children and adolescents aged 7 to 17 years. It consists of 27 items covering affective, cognitive, somatic, and behavioral symptoms. Participants must choose, among three statements, the one that best describes their feelings during the past 2 weeks. Standardization of the CDI was based on 1,266 children from different state schools from Florida, with Cronbach's α = .86 (Kovacs, 2003). The Brazilian version of the CDI was based on

a sample of 305 Brazilian children and adolescents aged 8 to 15 years and the Cronbach's α was .81 (Gouveia et al., 1995).

Procedure

The study was approved by the Human Research Committee of the Pontifical Catholic University of Rio Grande do Sul. We obtained formal assent from children and adolescents and written informed consent from all caregivers. Semistructured interviews and questionnaires were administered in two sessions with an estimated duration of 1 hr, 30 min each. In the first session, the semistructured interviews and the Raven's Progressive Matrices Test were administered. In the second session the TSCC, CPTCI, and CDI were administered. A third session was scheduled to provide feedback and referrals to specialist services, when necessary.

Data Analysis

Internal consistency was examined using Cronbach's alpha coefficient. The convergent validity was established by examining the correlation coefficient (Pearson's *r*) among CPTCI, TSCC, and CDI. Gender and age effects were calculated through the Student's *t* test and univariate analysis of variance. Analyses were parametric and two-tailed, with the levels of significance set at .05 and .001 using the SPSS 17 software.

The factor structure of the CPTCI was extracted by performing both exploratory factor analyses (EFA) and confirmatory factor analyses (CFA). EFA was performed using principal component analysis (PCA) with Varimax rotation (a rotation method that minimizes the number of variables with high loadings on each factor). To evaluate sampling adequacy for performing a satisfactory factor analysis, the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) and Bartlett's tests also were calculated. CFA was conducted using AMOS 17 (Arbuckle & Wothke, 1999). Model fit was assessed using chi-square statistics, comparative fit index (CFI), the Tucker–Lewis Index (TLI), and the root mean square error of approximation (RMSEA). CFI and TLI values greater than .90 and .95, respectively, reflected an acceptable and excellent fit to the data. RMSEA values less than .05 and .08 reflected close and reasonable fit (Marsh, Hau, & Wen, 2004). Missing values were replaced by the series' average.

RESULTS

CFA suggested that the model did not fit the data well, $\chi^2(2) = 504.14$, $p = .001$, CFI = .79, TLI = .75, RMSEA = .07; 90% confidence interval (CI) [.06, .08]. In spite of this, the examination of factor loadings did not indicate exclusion of any item (all items < .30). Given this poor fit, a PCA was undertaken. The

KMO test and Bartlett's sphericity test coefficients were within the acceptable values (KMO = .85), χ^2 (300) = 1240.20, $p < .001$), showing that the sample size was adequate for the analysis. Based on eigenvalues > 1.5 and factorial loads in the rotated matrix > .30, a two-component solution emerged explaining 37.63% of the variance of CPTCI. The first factor accounted for 22.77% of variance, and the second component accounted for an additional 14.86% of variance. The first component corresponded to "permanent and disturbing change" (CPTCI–PC; Items 2, 4, 6, 7, 8, 13, 14, 16, 19, 20, 21, 22, 23, 24) and the second component corresponded to "fragile person in a scary world" (CPTCI–SW; Items 1, 3, 5, 9, 10, 11, 12, 15, 17, 18, 25). Both CPTCI total scale (α = .90) and its subscales (CPTCI–PC α = .88; CPTCI–SW α = .79) had high internal consistency. Inspection of the component loadings (Table 1) revealed a component structure similar to the original CPTCI structure. Only

TABLE 1 Component Loadings of CPTCI Items

	Components	
Items	CPTCI–PC	CPTCI–SW
13. My reactions since the bad situation show that I am never going to overcome it.	**.72**	–.03
20. I feel that I'm a different person since the bad situation.	**.71**	.20
14. I used to be a happy person but now I am always sad.	**.72**	.17
23. Something terrible will happen if I do not try to control my thoughts about the bad situation.	**.70**	.29
19. My life was destroyed by the bad situation.	**.67**	.23
21. My reactions since the bad situation show that I must be going crazy.	**.60**	.21
24. The bad situation changed me forever.	**.60**	.25
16. I'm never going to have the same feelings that I had before.	**.59**	.25
4. My reactions since the bad situation mean that I have changed for the worse.	**.53**	.12
6. My reactions since the bad situation means that something is hardly wrong with me.	**.52**	.36
8. Not being able to get over all my fears means that I am a failure.	**.51**	.25
7. I'm not a good person.	**.47**	.15
2. Everyone makes me sad.	**.45**	.25
22. Good things are never going to happen to me anymore.	**.38**	.33
11. I'm not able to prevent bad things happening to me.	.38	**.38**
25. I need to be very careful because something bad can happen.	.13	**.71**
12. I need to take care with danger all the time	–.03	**.68**
9. Even things without importance bother me.	.06	**.66**
5. I don't trust people.	.26	**.59**
1. Anyone could hurt me.	.34	**.50**
15. Bad things always happen.	.27	**.44**
18. Life is not fair.	.24	**.41**
10. I don't know what to do when things get tough.	.37	**.40**
17. I'm scared that I'll get so angry that I'll break something or hurt someone.	.23	**.35**
3. I am a coward.	.27	**.34**

Note. The pattern coefficients ≥ .30 are shown in bold. CPTCI = Child Posttraumatic Cognitions Inventory; PC = permanent and disturbing change; SW = fragile person in a scary world.

TABLE 2 Correlations Between CPTCI, TSCC, and CDI

Scales	CPTCI total score	CPTCI–PC	CPTCI–SW
TSCC Anxiety	.47**	.40**	.47**
TSCC Depression	.69**	.68**	.55**
TSCC Anger	.49**	.43**	.46**
TSCC Posttraumatic Stress	.55**	.50**	.50**
TSCC Dissociation	.43**	.34**	.45**
TSCC Overt Dissociation	.38**	.30**	.42**
TSCC Fantasy Dissociation	.15	.15	.13
TSCC Sexual Concerns	.29**	.24**	.29**
TSCC Sexual Preoccupation	.13	.11	.13
TSCC Sexual Distress	.36**	.29**	.39**
CDI	.56**	.56**	.43**

Note. CPTCI = Child Posttraumatic Cognitions Inventory; PC = correspond to a sense of permanent and disturbing change (e.g., "My life has been destroyed by the frightening event"); SW = correspond to a sense of being a "fragile person in a scary world" (e.g., "I don't trust people"); TSCC = Trauma Symptom Checklist for Children; CDI = Child Depression Inventory. *$p < .05$. **$p < .001$.

Items 2, 7, 17, and 24 did not have their highest loadings on the same factor on CPTCI in the original structure, and Items 11 and 22 had their factorial loadings on both components.

Significant correlations were found between CPTCI subscales ($r = .62$, $p < .001$) and between CPTCI total score and each subscale (CPTCI–PC 1, $r = .93$, $p < .001$; CPTCI–SW, $r = .86$, $p < .001$). Also, significant correlations were found between CPTCI (total and subscales) and TSCC clinical scales, and also between CPTCI and CDI, indicating adequate evidences of convergent validity (Table 2).

No gender differences were found on total CPTCI, $t(129) = -1.74$, $p = .084$, $r = .15$; and its subscales, CPTCI–PC, $t(129) = -1.49$, $p = .138$, $r = .13$; CPTCI–SW, $t(129) = -1.69$, $p = .92$, $r = .15$. Similarly, no age-related differences were observed for either CPTCI total score, $F(2, 123) = .05$, $p = .95$, $n^2 = .00$, or its subscales, CPTCI–SW, $F(2, 123) = .45$, $p = .96$, $n^2 = .00$; CPTCI–PC, $F(2, 123) = .22$, $p = .80$, $n^2 = .00$.

DISCUSSION

The main purpose of this study was to analyze the psychometric properties of the CPTCI in a Brazilian clinical sample. The CFA results indicated that the model did not fit the data well: $\chi^2(2) = 504.14$, $p = .001$, CFI = .79, TLI = .75, RMSEA = .07; 90% CI [.06, .08]. Therefore, the PCA was conducted to verify the psychometric properties of the CPTCI. The sample presented a good fit (KMO = .85), $\chi^2(300) = 1240.20$, $p < .001$, and the PCA was able to identify a two-component solution that explained 37.63% of the total variance. Concerning the reliability of the results, both the total scale and its subscales had high internal consistency ($\alpha = .70–.90$), indicating significant global

homogeneity of the instrument, as well as good interdependence between the items. In the original study, Cronbach's alphas for the CPTCI–PC were between .91 and .93 and for the CPTCI–SW, values were 86 to .88 (Meiser-Stedman, Smith, et al., 2009).

The replication of the dimensional structure of the scale using PCA indicated a two-factor solution for the scale that jointly explained 37.63% of the observed variance. This finding was similar to that obtained by the authors in the original analysis of the scale (Meiser-Stedman, Smith, et al., 2009), with a two-component solution accounting for 58.5% of the variance. All but four items (2, 7, 17, and 24) had their highest loadings on the same factor to which they had been assigned in the original CPTCI (all > .30) and two items (11 and 22) had their factorial loadings on both components. Inspection of frequency distribution revealed a floor effect of Item 22, but the same pattern was not observed on Item 11.

In line with Meiser-Stedman, Smith, et al. (2009) and contrary to the structure observed in the PTCI (with three components obtaining negative appraisals regarding self, world and self-blame; Foa et al., 1999), the subscales reflect cognitions about an individual's sense of self and future (CPTCI–PC subscale) and ongoing physical threat and personal weakness (CPTCI–SW subscale). These results are consistent with previous literature regarding the application of the cognitive model of PTSD (e.g., Ehlers & Clark, 2000) to children and adolescents (Meiser-Stedman, Dalgleish, et al., 2009; Palosaari et al., 2013).

Despite the similarity with the original structure of the CPTCI, CFA showed that the original model fit poorly with the collected data, and inspection of factor loadings did not indicate exclusion of any item. These results could be explained by the sample composition's divergences between this study and the original study. The original CPTCI's sample was made up of community and single-exposed youth assessed within the first month post-trauma. In contrast, most of our sample was exposed to chronic and multiple traumatic events. Cultural aspects such as high rates of violence, maltreatment, and social inequality contributed to the differences between the samples regarding the types of trauma, once our sample was more exposed to multiple and interpersonal traumatic events. Research has shown that youth exposed to multiple and interpersonal traumatic events present more varied traumatic stress symptoms in comparison with individuals who suffered single-event exposure (Briere, Kaltman, & Green, 2008; Hodges et al., 2013; Jonkman, Verlinden, Bolle, Boer, & Lindauer, 2013). These differences are implicated and could indicate that CPTCI presents in a different way in the Brazilian context, but there is a lack of studies reporting CPTCI adaptation in other samples and cultural contexts.

The significant correlations between CPTCI and its subscales with TSCC clinical scales indicate a strong association between PTSD symptoms, trauma-related symptoms, and negative posttraumatic appraisals, which emphasize convergent validity. Studies have shown that, as predicted by adult's PTSD cognitive

theory (Dalgleish, 2004; Ehlers & Clark, 2000), maladaptive appraisals concerning a trauma and its impact significantly mediate the association between early symptoms and later posttraumatic distress in youth (Bryant, Salmon, Sinclair, & Davidson, 2007; Ehlers et al., 2003; Ellis, Nixon, & Williamson, 2009; Meiser-Stedman, Dalgleish, et al., 2009; Stallard, 2003). The finding that CPTCI was significantly correlated with a measure of depressive symptoms indicates good convergent validity. Correlations between CPTCI and depressive symptoms were reported in a few studies, showing that negative appraisals are related to both trauma-related symptoms and depression (Bryant et al., 2007; Ehlers et al., 2003; Ellis et al., 2009; Leeson & Nixon, 2011; Meiser-Stedman, 2002; Salmon & Bryant, 2002; Stallard & Smith, 2007). The absence of age effects is in line with the original study, which postulates that the metacognitive process is implicated in the occurrence of anxiety disorders even in young children (Meiser-Stedman, Dalgleish, et al., 2009).

Concerning the clinical contributions of CPTCI, this measure can be useful for assessing posttraumatic stress symptoms among children and adolescents and can contribute to research on psychological mechanisms involved in the maintenance of PTSD symptoms of the young Brazilian population. More instruments are needed to evaluate posttraumatic symptoms and cognitions in children and recommend appropriate interventions. Several studies have shown that reduction in maladaptive appraisals is implicated in recovery from the posttraumatic symptoms following CBT (Bryant et al., 2007; Nixon, Sterk, & Pearce, 2012; Smith et al., 2007).

Limitations of this study include the small sample size and sample characteristics (i.e., nonclinical, heterogeneity regarding trauma exposure), which imply a limited generality of the findings. Additionally, some aspects of psychometric properties, such as test–retest reliability, divergent validity, and criteria validity were not examined. Future studies focusing on the previously mentioned validation process aspects and on the adequacy of the CPTCI factorial structure in a nonclinical or homogeneous sample are needed. Also, in future studies, a comparison between the CPTCI and instruments that assess cognitive processing in children and adolescents, such as the previously mentioned Children's Automatic Thoughts Scale (Schniering & Rapee, 2002) and Childhood Attributions Style Questionnaire–Revised (Thompson et al., 1998), can be suggested to assess the CPTCI's ability to measure specific posttraumatic cognitions, instead of the cognitive process. In conclusion, the CPTCI has preliminary adequate evidence of psychometric properties to assess posttraumatic appraisals in the Brazilian population.

FUNDING

This research was supported in part by grants from the National Center of Scientific and Technology Development (CNPq, Brazil).

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