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Cognitive Screening and Clinical Symptoms in Victims of Child Maltreatment: Evidence of Intellectual Deficit in a Brazilian Sample

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Childhood maltreatment is a serious public health issue associated with short and long-term neurobiological, cognitive, and behavioral impairments. The aim of this study was to assess global cognitive profile, prevalence of intellectual deficit, and presence of clinical symptoms in a sample of maltreated children in Brazil. In addition, the possible associations between clinical symptoms and cognitive profile were investigated. To this end, 2 groups of children aged 6 to 12 years were compared. The maltreatment group (MG) consisted of 60 children exposed to 1 or more types of maltreatment. The control group (CG) included 25 children who had not suffered maltreatment. Maltreatment assessment was made through the Juvenile Victimization Questionnaire (JVQ). The child's legal guardian answered a clinical and sociodemographic interview and the Child Behavior Checklist (CBCL). Children answered a semistructured interview and performed the following neuropsychological tasks: Wechsler Abbreviated Scale of Intelligence (WASI) matrix reasoning, WASI vocabulary, and Wechsler Intelligence Scale for Children (WISC) digit span. Significant differences were found between groups regarding clinical symptoms assessed by CBCL, except for withdrawal/depression and internalizing symptoms. More pronounced cognitive impairment was found in the MG in all tasks, with high prevalence of borderline and extremely low intelligence levels. No associations were found between most of the clinical and cognitive domains, which suggests that cognitive difficulties do not arise from posttraumatic symptoms in the MG. Therefore, in addition to psychotherapy, cognitive stimulation interventions should be used in this population.

Keywords: maltreatment, cognition, intelligence, child

Maltreatment is among the most common forms of violence against children and adolescents, and may cause severe physical and mental consequences. The World Health Organization (WHO) describes four types of maltreatment: physical abuse, sexual abuse, emotional abuse and neglect (World Health Organization [WHO], 2002). Neglect is characterized by failure in meeting the child's needs in terms of safe living, affection, education, nutrition, and hygiene, among other aspects required for a healthy development. Physical abuse includes hitting the child with hand or objects, shake, burn, or even kick the child, along with many other forms of physical violence. Emotional or psychological abuse involves ignoring the child or being verbally aggressive, and generating a fear response or feelings of impotence. Sexual abuse is defined as any act of a sexual nature perpetrated by an individual at a more advanced stage of psychosexual development against a child or adolescent who because of their developmental stage are not fully capable of understanding what is happening or consenting to it; it may involve touching, fondling, oral sex or digital, vaginal, or anal penetration, in addition to other actions that do not

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involve physical contact, such as voyeurism, harassment, exhibitionism, pornography, and sexual exploitation (WHO, 2002).

A series of meta-analyses has found a high prevalence of maltreatment around the world in self-report studies. According to these studies, 12% of participants had suffered sexual abuse in their lifetime (Stoltenborgh, Van Ijzendoorn, Euser, & Bakermans-Kranenburg, 2011), 22.6% had suffered physical abuse (Stoltenborgh, Bakermans-Kranenburg, Van Ijzendoorn, & Alink, 2013), 36.3% had suffered emotional abuse, 16.3% had faced physical neglect, and 18.4% had faced some kind of emotional neglect (Stoltenborgh, Bakermans-Kranenburg, & Van Ijzendoorn, 2013).

Maltreatment has been linked to several negative lifetime consequences, including neurobiological, cognitive, and emotional impairments (DeBellis, Woolley, & Hooper, 2013; Nanni, Uher, & Danese, 2012; Teicher, Anderson, & Polcari, 2012). In neurobiological terms, maltreatment has been associated with endocrinological changes to the hypothalamic-pituitary-adrenal (HPA) axis, with evidence of impact on the levels of cortisol, dopamine, norepinephrine, and epinephrine. Low cortisol levels have been associated with a reduction in the number of neuronal receptors and suppression of stress responses mediated by negative feedback inhibition. Such changes can modify the physiological response to situations of fear and anxiety. In addition, there is an increase in the concentration of neurotransmitters, such as dopamine or epinephrine, which is related to an intensified, chronic response to stress, even in the absence of stressors (Frodl & O'Keane, 2013; Pereda & Gallardo-Pujol, 2011). There is also evidence of structural changes, found in adolescents and adults, associated with exposure to maltreatment in childhood, including volume decreases in frontal cortex, amygdala, and hippocampus (Andersen et al., 2008; Jedd et al., 2015; Riem, Alink, Out, Van Ijzendoorn, & Bakermans-Kranenburg, 2015).

These neurobiological alterations may render the individual vulnerable to cognitive and emotional impairment, including development of psychopathologies in the long run. Concerning emotional functioning, studies with adolescents and/or adults subjected to maltreatment during childhood show increased rates of depression, dissociation, posttraumatic stress disorder (PTSD), anxiety, mood, and borderline personality disorders, and substance abuse (Cicchetti & Toth, 2005; Hammen, 2014; Hillberg, Hamilton-Giachritsis, & Dixon, 2011; Martins et al., 2011; Norman et al., 2012), among the most common findings. Difficulties forming relationships (Vasilevski & Tucker, 2015), suicide attempts, risky sexual behaviors, and eating disorders (Norman et al., 2012) also seem to be associated with maltreatment. Differently from adults, child victims of maltreatment exhibit less intense and less specific posttraumatic stress symptoms (Harpur, Polek, & Van Harmelen, 2015; Jaffee & Maikovich-Fong, 2011; Kirke-Smith, Henry, & Messer, 2014). In many cases, these children do not meet the diagnostic criteria for PTSD, making maltreatment more difficult to detect (D'Andrea, Ford, Stolbach, Spinazzola, & Van der Kolk, 2012).

Knowledge regarding the impact of maltreatment on cognitive functioning is also more consolidated in adults, with evidences of maltreatment's long-term effects (Caldwell, Krug, Carter, & Minzenberg, 2014; Lysaker, Meyer, Evans, & Marks, 2001; Navalta, Polcari, Webster, Boghossian, & Teicher, 2006). In childhood, deficits are often reported in association with maltreatment, but the findings are contradictory (Irigaray et al., 2013). For example, some studies have detected evidence of long-term deficit in working memory, long-term memory, and short-term memory (STM) in child victims of maltreatment (Gould et al., 2012; Majer, Nater, Lin, Capuron, & Reeves, 2010; Vasilevski & Tucker, 2015), whereas other investigations have not detected any differences between study groups and controls (Mothes et al., 2015; Pears & Fisher, 2005). Even though more robust findings are available regarding deficits in global intelligence, with maltreated children presenting lower IQ scores than the general population (Coohey, Renner, Hua, Zhang, & Whitney, 2011; DeBellis et al., 2013; Harpur et al., 2015; Kirke-Smith et al., 2014; Vasilevski & Tucker, 2015), the percentage of children with borderline or extremely low IQ among those who suffer maltreatment is not reported in most studies. This prevents an analysis of the magnitude of the impact of maltreatment on intelligence.

Given the need for further investigations about the relationship between child maltreatment and cognitive and emotional deficits, the

aim of the present article was to screen global cognitive profile, prevalence of intellectual deficit, and presence of clinical symptoms in a sample of maltreated children in Brazil. In addition, possible associations between clinical symptoms and cognitive profile were investigated.

Method

Participants

This study included 85 participants aged 6 to 12 years. A maltreatment group (MG) was set up with 60 children exposed to one or more situations of maltreatment. Of these, 30 children were recruited at an outpatient clinic (Center for Studies and Research on Trauma and Stress, NEPTE/Pontifical Catholic University of Rio Grande do Sul, PUCRS); and 30 additional children were selected from the clinic's patient database. The control group (CG) included 25 children who were not exposed to maltreatment, recruited from schools in the city of Porto Alegre. The type of school (public or private) was controlled to reflect the percentage of children in public and private schools in the MG, so as to prevent this aspect from becoming an intervening factor. Exclusion criteria were history of neurological disorders, motor disorders preventing the child from answering the instruments, uncorrected visual problems, and use of drugs with strong effects on the central nervous system, such as benzodiazepines and antipsychotics.

Of the children in the MG, 19 (11.4%) were living in shelters or institutions at the time of the study; 51 children (85%) had been maltreated within the family, 8 (13.5%) outside the family, and 1 (1.5%) both within and outside the family. Concerning types of maltreatment, 40 (67%) had suffered multiple types of abuse, whereas 20 (33%) had been subjected to only one type of violence, of which the most common was sexual abuse ($n = 18$; 30%).

Procedures

The study was approved by the Ethics Committee of PUCRS (document number 845.745). A consent form was signed for all children's legal guardians. The evaluation was made through two different interviews: one with the legal guardian, which would commonly last 1 hr; and another one with the child, lasting approximately 50 min. The legal guardian who answered the instruments could not be involved in the child's maltreatment. In the case of children living in shelters, the person who had more information about the child's past was interviewed. The evaluation, in MG, was carried out at NEPTE's facilty. The control group was evaluated in public schools, in an appropriated room.

Instruments

At first, the child's legal guardian answered a clinical and sociodemographic interview. In this interview, information for sociodemographic status was based on criteria of the Brazilian Institute of Geography and Statistics (IBGE); and other important types of information such as age and psychiatric history were assessed. The presence of maltreatment was investigated through the Juvenile Victimization Questionnaire (JVQ; Hamby, Finkelhor, Turner, & Kracke, 2011), based on WHO's criteria for maltreatment. The adult also answered the Child Behavior Checklist (CBCL; Achenbach, 1991; Bordin, Mari, & Caeiro, 1995), an instrument that investigates child's behavior and psychological symptoms.

Children also answered a semistructured interview and JVQ. They performed the following neuropsychological tasks: for IQ, the Wechsler Abbreviated Scale of Intelligence (WASI) subtests matrix reasoning and vocabulary (Wechsler, 2014; Yates et al., 2006) was applied. Vocabulary also aimed to evaluate long term semantic memory and crystallized intelligence; while matrix reasoning also evaluated visual perception, logical and spatial reasoning and fluid intelligence. Wechsler Intelligence Scale for Children (WISC) digit span subtest (Rueda, Noronha, Sisto, Santos, & Castro, 2013; Wechsler, 1991, 2003) was also applied, aiming to evaluate working memory and nonverbal short time memory. Regarding the digit span subtest, taking into account that part of the sample was collected before the change from WISC–III to WISC–IV, two versions were used (always with total score of part 1 + part 2). The results were subjected to the quoted statistical analyses, showing that there was no difference

between groups regarding the different versions of the instrument.

Statistical Analysis

Descriptive and inferential statistics were calculated. Pearson's χ^2 square test was used to compare the groups regarding categorical variables. Student's t test was used to compare continuous variables. The association between clinical symptom variables in CBCL scores and cognitive domains was investigated based on partial correlations with control for group (MG or CG) using Pearson's coefficient of correlation. All analyses were performed using the Statistical Package for the Social Sciences (SPSS—v. 17.0). Significance was established at 5% ($p < 0.05$). Cohen's model was used to determine effect size.

Results

Regarding sociodemographic variables (see Table 1), there was no difference between the groups in terms of sex ($\chi^2(1) = 1.74$, $p = 0.18$), age ($t(83) = 0.31$, $p = 0.71$), and socioeconomic status ($t(81) = 1.23$, $p = 0.21$). Nevertheless, significant differences were observed in terms of years of schooling (not considering grade retention; CG [mean = 4.04 years, SD = 1.20]; MG [mean = 3.30, SD = 1.46], $t(83) = 2.22$, $p = 0.02$). In terms of medication use, only one child in the MG had used carbamazepine in the past, but was not using it at the time of the study. One child in the CG was in use of Ritalin, but did not take the medication on the day of the evaluation.

Groups were compared regarding CBCL scores (see Table 2). Significant differences were found between MG and CG in all symptoms, except for "withdrawn/depressed." Also, the difference between the groups regarding "internalizing problems" did not reach significance ($t(37) = 1.96$, $p = 0.05$).

Groups were also compared regarding the total CBCL score, considering the classification into normal, borderline, and clinical scores. Thus, in the MG, 28 children (46.6%) obtained a clinical score, 11 (18.33%) obtained a borderline score, and 21 (35%) were classified as normal. In the CG, 7 children (28%) were classified in the clinical range, 2 (8%) in the borderline range, and 16 (64%) in the normal range. Considering the borderline and clinical ranges as at risk for the onset of disorders, normal CBCL scores were compared using Pearson's χ^2 test with the combined borderline and clinical ranges. This analysis revealed a statistical difference between groups (Pearson's $\chi^2(1) = 6.03$, $p = 0.01$).

IQ distribution (Wechsler, 2014) in MG was as follows: extremely low in 12 children (20%), borderline in 14 (23.3%), low average in 19 (31.66%), average in 12 (20%), and high average in 1 (1.6%). Thus, in MG, almost half of the sample (26 children, 43.33%) had an IQ ranging from borderline to extremely low, which indicates a high level of intellectual difficulty. In the CG, the following distribution was observed: extremely low IQ in 1 child (4%), borderline in 3 (12%), low average in 3 (12%), average in 13 (52%), high average in 3 (12%), and superior in 2 (8%). A comparison between groups considering average or above average IQ versus borderline or clinical IQ using Pearson's χ^2 test revealed a significant difference between MG and CG ($\chi^2(1) = 8.41$, $p < 0.01$).

Cognitive assessment revealed significant differences between groups in all variables (i.e., short and long-term memory, working memory, logical reasoning, and intelligence), with the largest effect size detected for IQ ($t(83) = -5.5$, $p < 0.001$, $d = -1{,}20$; Table 3). Because

Table 1
Socio-Demographic Data

Variable	Control group mean (*SD*) or *n*(f/m)	Maltreatment group mean (*SD*) or n(f/m)	t/x^2	p
Age	9.53 (1.53)	9.64 (1.07)	−.31	.71
Sex	26/34	7/18	1.74	.18
Years of study	4.04 (1.20)	3.30 (1.46)	−2.22	.02*

Note. f = female; m = male.
* $p < .050$.

Table 2
CBCL Scores in Maltreated and Control Children

Symptom	Control group mean (*SD*)	Maltreatment group mean (*SD*)	*t*	*p*	Effect size (Cohen's *d*)
Anxious/depressed	58.32 (8.48)	62.30 (7.29)	−2.18	.030	.48
Withdrawn/depressed	58.32 (8.48)	61.22 (9.52)	.53	.590	−.16
Somatic complaints	56.36 (6.49)	60.55 (8.65)	−2.17	.030	.47
Social problems	57.56 (7.48)	61.73 (8.80)	−2.07	.040	.45
Thought problems	55.60 (7.60)	60.38 (9.10)	−2.48	.010	.68
Attention problems	56.44 (6.37)	64.03 (9.87)	−4.21	.000	1.01
Rule-breaking	55.68 (5.98)	60.68 (9.41)	−2.93	.005	.70
Posttraumatic symptoms	59.68 (8.56)	64.75 (9.22)	−2.35	.020	.51
Aggressive behavior	56.24 (6.55)	64.32 (11.56)	−4.06	.000	.93
Internalizing problems	58.28 (11.15)	62.75 (8.84)	−1.96	.050	.43
Externalizing problems	53.88 (9.05)	61.95 (11.70)	−3.08	.003	.32
Total CBCL score	55.52 (10.66)	63.85 (9.62)	−3.53	.001	.77

Note. CBCL = Child Behavior Checklist. Effect size (Cohen's *d*): small (.20–.50); medium (.50–.80); and large (≥.80).

WISC–III—digit span subtest was used in part of the MG, the two MG subsamples (WISC–III vs. WISC–IV) were compared. No difference was detected between the MG subsamples regarding performance in the two versions of the WISC ($t(58) = 0.19$, $p = 0.84$).

To evaluate possible associations between the clinical and cognitive profiles of the sample, partial correlation analyses were performed with controlling for group (MG or CG). As shown in Table 4, correlations were observed between most CBLC symptoms and short-term/working memory (digit span subtest). A significant negative association was found between rule-breaking and IQ. The "withdrawn/depressed" symptom was also negatively associated with IQ and matrix reasoning. There was no association between posttraumatic symptoms and any of the cognitive constructs. Similarly, no association was observed between internalizing symptoms, externalizing symptoms, or total problem score with intelligence, long-term memory, or spatial reasoning. Therefore, globally, there were few associations between cognitive variables and clinical syntomatology variables.

Discussion

In the present sample of children, only schooling was significantly different between the groups, with fewer years of schooling in the MG versus the CG. This finding agrees with the literature showing the maltreated children are more likely to suffer what some investigators have dubbed educational maltreatment (e.g., Pears, Kim, & Fisher, 2008), referring to the failure in making sure the child attends school at an appropriate age. In addition, children who suffer abuse, especially mixed types of abuse and neglect, perform worse at school, with lower grades, more complaints from teachers, and more retention as compared to their peers,

Table 3
Cognitive Characteristics of the Study Groups

Scale	Control group mean (*SD*)	Maltreatment group mean (*SD*)	*t*	*p*	Effect size (Cohen's *d*)
WISC–IV–digit span	8.40 (2.67)	6.95 (3.22)	2.13	.037	.58
Vocabulary (WASI)	50.96 (9.01)	38.53 (9.80)	5.09	.000	1.11
Matrix reasoning (WASI)	50.60 (9.01)	39.58 (11.25)	4.34	.000	.95
IQ (WASI)	101.68 (16.46)	80.97 (15.51)	5.50	.000	1.20

Note. WASI = Wechsler Abbreviated Scale of Intelligence; WISC = Wechsler Intelligence Scale for Children. Effect size (Cohen's *d*): small (.20–.50); medium (.50–.80); and large (≥.80).

Table 4
Association Between Symptomatology (CBCL) and Cognitive Measures

Controlled for group (n = 85)	WISC–IV–digit span	Vocabulary (WASI)	Matrix reasoning (WASI)	IQ (WASI)
Anxious/depressed	−.240*	.054	−.076	−.052
Withdrawn/depressed	−.397***	−.134	−.229*	−.259*
Somatic complaints	−.011	.154	.047	.130
Social problems	−.285**	−.113	−.120	−.158
Thought problems	−.138	−.025	−.053	−.064
Attention problems	−.217*	−.056	−.062	−.105
Rule-breaking	−.274*	−.122	−.143	.218*
Posttraumatic symptoms	−.199	.008	−.080	−.088
Aggressive behavior	−.284**	.028	−.099	−.097
Internalizing problems	−.232*	−.034	−.106	−.109
Externalizing problems	−.248*	−.031	−.159	−.162
Total CBCL score	−.268*	−.021	−.122	−.126

Note. CBCL = Child Behavior Checklist; WASI = Wechsler Abbreviated Scale of Intelligence; WISC = Wechsler Intelligence Scale for Children.
* $p < .050$. ** $p < .010$. *** $p < .00167$.

even after control for sex and socioeconomic level (Boden, Horwood, & Fergusson, 2007; Kendall-Tackett & Eckenrode, 1996; Perzow et al., 2013). We also found evidence of short-term deficits in the MG, with significant differences between groups in terms of clinical symptoms and cognitive (intelligence) processes, STM, long-term memory, and spatial reasoning. However, no significant associations were found between symptom intensity and cognitive functions.

In the present study, maltreated children had more total symptoms, externalizing symptoms, and scored higher in all other CBCL scales except for withdrawn/depressed and internalizing symptoms. Several studies have shown an association between maltreatment in childhood and various mental disorders during life, such as anxiety and mood disorders, PTSD, and substance abuse, among others (Dunn, McLaughlin, Slopen, Rosand, & Smoller, 2013; MacMillan et al., 2001; Maniglio, 2010, 2011). The present results suggest that consequences of maltreatment may already appear during childhood, supporting preliminary studies showing more symptoms of depression, anxiety, PTSD, as well as more intense internalizing and externalizing symptoms in children who were victims of maltreatment (Augusti & Melinder, 2013; DeBellis et al., 2013).

Even though the MG had more intense posttraumatic symptoms, the effect size was larger for aggressive symptoms and attention problems. This supports the current view that PTSD in children involves a broader range of symptoms, including mood changes, anxiety, and disruptive disorders, which are not specific of PTSD. This is further corroborated by the fact that less than one-fourth of children being treated for posttraumatic symptoms meet the diagnostic criteria for PTSD (D'Andrea et al., 2012).

Significant differences were found between groups in all measured cognitive domains. Regarding intelligence, a large effect size was also observed. In addition, worse performance was observed in the MG, with almost half the sample presenting borderline or extremely low IQs. However, it is important underline that the measurement utilized in this study, that is, the abbreviated version of WASI, only suggest the existence of intellectual deficits in children victims of abuse. New studies, using more robust intelligence evaluation scales, are necessary.

Recent studies have shown that maltreated children have lower IQ and more difficulty in learning than children who did not face this type of experience, especially when abuse was severe and repeated (Coohey et al., 2011; DeBellis et al., 2013; Jaffee & Maikovich-Fong, 2011; Kirke-Smith et al., 2014; Majer et al., 2010; Vasilevski & Tucker, 2015). In a study by Jaffee and Maikovich-Fong (2011), risk factors such as the presence of parental psychiatric disorders and low schooling mediated the intensity of symptoms in children. However, the

same was not observed for IQ, which was impaired regardless of parental factors, suggesting that maltreatment has a unique effect, which is independent of posttraumatic symptoms, on intelligence scores (Jaffee & Maikovich-Fong, 2011).

The association between intellectual deficit and maltreatment may be described from both directions. In one hand, maltreatment may lead to neurobiological damage, as already described in the present study, causing intellectual decline. On the other hand, there is strong evidence that major intellectual deficit is a risk factor for maltreatment (Horner-Johnson & Drum, 2006; Stalker & McArthur, 2012). Even though the present study did not aim to evaluate the presence of intellectual deficit, which would require measurement of other variables in addition to IQ, it seems fair to presume that children in our sample with extremely low intellectual capacity were in a situation of vulnerability for maltreatment.

In this sense, an important epidemiological study concerning the relationship between physical or intellectual deficits and maltreatment has reported a threefold higher chance of maltreatment in children with any kind of deficit (Sullivan & Knutson, 2000). These children also have a higher chance (63%) of suffering multiple types of maltreatment as compared to children without any deficit (54.9%). In addition to more types of maltreatment, children with intellectual deficit have more risk of suffering multiple maltreatment episodes (71%) versus one single episode (29%)—that is, children with some kind of deficit are at higher risk of repeatedly suffering multiple types of maltreatment. To support this data, a recent longitudinal study examining parenting in families of children with different degrees of intelligence found worse family interactions, with more expression of negative affect and punitive behaviors by parents in the group of children with borderline versus the group with average or superior IQ (Fenning, Baker, Baker, & Crnic, 2007). Thus, literature provides evidence of an association between intellectual impairment and situations of maltreatment, as observed in the present study.

Regarding memory, differences were found between groups in terms of both short and long-term memory and working memory. STM and working memory are primarily linked to the adequate functioning of the prefrontal cortex, while long-term memory depends on hippocampal regions. There is evidence of important alterations in these brain regions associated with maltreatment (Andersen et al., 2008; Riem et al., 2015). Such findings are supported by the impact of cortisol dysregulation on hippocampal structure and function, and also by the deleterious effects of increased levels of neurotransmitters such as dopamine on the frontal cortex (Frodl & O'Keane, 2013). Studies in animals have shown that stressor events such as separation of rat offspring from the mother during initial developmental stages produce important synaptic changes in the hippocampus during adult life (Andersen & Teicher, 2004), which may lead to memory deficits.

Several studies with PTSD adults have shown compromise of distinct memory systems (Moradi et al., 2008; Paulson et al., 2015; Schweizer & Dalgleish, 2011; Vasterling et al., 2002). Thus, the long-term effects of different stressors on memory are well known. Like us, Augusti and Melinder (2013) and Kirke-Smith et al. (2014) detected impairments in short-term and working memory in maltreated children. In relation to long-term memory, Yasik, Saigh, Oberfield, and Halamandaris (2007) found significant deficits in maltreated children with PTSD when compared with controls who did not suffer maltreatment. Thus, previous findings, even if incipient, suggest that maltreatment produces impairment in both short-term and long-term memory still during childhood.

Regarding visual perception and spatial reasoning, evaluated by the matrix reasoning test, the present study found significant differences between groups, with worse performance by MG. The results regarding this ability are still controversial. Bücker et al. (2012), using the WISC–III—cubes subtest (Wechsler, 1991), did not find differences between a group of institutionalized children who had suffered severe maltreatment and controls regarding visual-spatial processing. Similarly, no difference was found between maltreated children and controls in a study by Viezel and colleagues (2015) regarding the WISC–V—perceptual organization index (Wechsler, 2014), including the block design, picture concepts, and picture completion subtests. However, other authors, in agreement with the present study, did find a difference between the groups in visual-spatial

processing. Pears and Fisher (2005), evaluating institutionalized children at risk of having been maltreated, found deficits in visual-spatial processing with the NEPSY instrument (Korkman, Kirk, & Kemp, 1998) when compared to controls. Similarly, DeBellis et al. (2013), using the Rey Complex Figure test (Rey, 1999), found significant differences between maltreated children with PTSD, maltreated children without PTSD, and controls. Those studies used various instruments and samples with different maltreatment profiles, which could explain the divergent results. Thus, even though an association between maltreatment and visual-constructive ability has not been established, the present data support a decrease in this ability in children suffering multiple types of maltreatment.

Regarding possible associations between clinical symptoms and cognitive deficits, no associations were found with most of the cognitive domains assessed. A significant association was detected only between the digit span subtest and internalizing and externalizing symptoms, attention and social problems; this might suggest an association between more general symptoms and decrease in short-term/working memory. These findings are in agreement with a broad range of findings regarding the association of mood/anxiety disorders and working memory (Snyder, 2013; Stout, Shackman, Johnson, & Larson, 2015). However, the digit span subtest was not significantly associated with posttraumatic symptoms.

A negative association was detected between IQ and rule-breaking. IQ and matrix reasoning were also negatively associated with withdrawn/depressed symptoms. However, no additional associations were observed between total symptoms, internalizing or externalizing symptoms, and posttraumatic symptoms with cognitive domains. Thus, even though the present analysis is limited to conclusions about associations, and cannot determine cause and effect, the present data suggest that posttraumatic symptoms do not play an important role in intellectual or cognitive impairment in this sample. Even if counterintuitive, these data corroborate a series of recent studies showing a dissociation between clinical and cognitive deficits in victims of maltreatment (Augusti & Melinder, 2013; DeBellis et al., 2013; Kirke-Smith et al., 2014). This dissociation suggests that clinical interventions targeting clinical symptoms in victims of maltreatment will not necessarily produce cognitive improvement, which raises the need for more specific cognitive interventions.

The present study has limitations. The inclusion of children with several types of maltreatment prevented an analysis about the association of specific types of maltreatment with specific behavioral problems and cognitive deficits. In addition, the inclusion of institutionalized children prevented us from obtaining data about variables such as the onset, severity, and chronicity of maltreatment for that part of the sample. Thus, future studies should try to address these issues. Another limitation of the study was the manner of evaluating clinical symptoms in children, that is, based on an instrument administered only to guardians/caregivers, which may have resulted in underestimation or overestimation of some symptoms. Again, future studies should use instruments for both caregivers and children.

In conclusion, based on the present findings, we suggest the implementation of a cognitive stimulation program associated with psychotherapy to treat victims of maltreatment with neuropsychological deficit. Because cognitive deficits were not associated with posttraumatic symptoms, there is no evidence that psychotherapy will lead to improvement in cognition if a specific intervention is not added. Thus, the implementation of programs directed to children with intellectual impairment, involving both intelligence stimulation and preventive measures with guidance for the family and health care/education professionals is recommended.

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