



Negative Posttraumatic Cognitions in 4- to 8-year-old Children following Maltreatment

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Abstract

Purpose Research has shown that children and adolescents suffering from posttraumatic stress often have negative posttraumatic cognitions such as negative appraisals of the trauma sequel that increase mental health problems. However, little is known about posttraumatic cognitions in young children. The aim of this study was to investigate negative posttraumatic cognitions in 4- to 8-year-old children following maltreatment. We also examined their association with child age and well-being as well as caregiver psychopathology.

Methods The study includes $N = 112$ caregiver-child dyads with children's mean age of $M = 6.2$ ($SD = 1.1$) years. Children had experienced physical abuse, emotional abuse, neglect, sexual victimization, and/or domestic violence prior to participation. Posttraumatic cognitions were assessed using a short child interview including four items adapted from the Child Posttraumatic Cognitions Inventory (CPTCI; Meiser-Stedman et al in *Journal of Child Psychology and Psychiatry*, 50(4), 432–440, 2009).

Results Completion of the interview about posttraumatic cognitions was independent from child's age. Higher levels of negative posttraumatic cognitions were significantly associated with a higher cumulative maltreatment score ($r = .35$) and higher scores of posttraumatic stress symptoms ($r = .39$). There was no significant correlation with parent variables.

Conclusion These findings indicate that posttraumatic cognitions might be an important diagnostic and treatment target for 4- to 8-year-old children.

Keywords Posttraumatic cognitions · Young children · Maltreatment · PTSD

Cognitive models of posttraumatic stress disorder (PTSD) acknowledge that negative cognitions about a traumatic event, about the reaction of others and about the own reaction play an important role for the development and maintenance of PTSD symptoms following maltreatment (Ehlers & Clark, 2000; Foa & Rothbaum, 1998). Negative posttraumatic cognitions were first introduced describing trauma

outcomes in adults. However, there is substantial evidence indicating that children and adolescents can also develop negative posttraumatic cognitions (e.g., Ehlers et al., 2003; Meiser-Stedman et al., 2009). The current study focuses particularly on negative posttraumatic cognitions in 4- to 8-year-old children who have been so far a neglected population in the investigation of posttraumatic cognitions.

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Cognitive PTSD models

Cognitive models of PTSD include as important factor for the development of symptoms the way how individuals interpret their experience and how they incorporate this experience in their self and world view (Ehlers & Clark, 2000; Foa & Rothbaum, 1998). In their cognitive theory, Ehlers and Clark (2000) describe negative cognitions as excessively negative appraisals of the trauma and/or its sequel. In the context of maltreatment, victims might experience anger, guilt and

shame, see themselves as deserving maltreatment or thinking that their reaction shows something negative about themselves. The inability to see the experience and its sequel as time-limited could lead to a sense of persistent current threat that is associated with symptoms of re-experiencing, arousal, and emotional distress even in the absence of actual threat (Ehlers & Clark, 2000).

In 6- to 18-year-old children, two types of dysfunctional posttraumatic cognitions have been recognized based on empirical data – the sense of being permanently damaged after the traumatic event and of being a fragile person in a dangerous world (de Haan et al., 2016; Meiser-Stedman et al., 2009, 2019).

In their theoretical model about stressor-related negative cognitions of preschool children in the context of the COVID-19 pandemic, Vasileva et al. (2021a) suggested that preschoolers might experience similar negative cognitions as older children and adults (such as worries that changes might be permanent and perceived vulnerability) that might lead to child-specific symptoms. In the preschooler-specific theoretical model, child stressor-related negative cognitions might be influenced by young children's misunderstandings about the event as well as by the parents' reaction. Parents' own reaction to the event might directly (e.g., through verbal interpretation cues, model learning) or indirectly (e.g., through increased stress and preoccupation) affect child cognitive processing.

Studies on Negative Posttraumatic Cognitions in Older Children

Findings from the increasing number of studies about cognitive processes in 7- to 18-year-old children could inform research with younger children and help identify relevant outcomes and predictors. In a recent study, posttraumatic cognitions have been found to explain a large proportion of the variance of PTSD 2 to 4 weeks and 2 months post-trauma (Meiser-Stedman et al., 2019). A large positive correlation between negative posttraumatic cognitions and PTSD symptoms was detected in a meta-analysis of 11 studies incorporating 1,578 children and adolescents exposed to different potentially traumatic events (Mitchell et al., 2017). Negative posttraumatic cognitions following maltreatment were also found to be associated with children's further internalizing or externalizing emotional and behavior problems (de Haan et al., 2017; Leeson & Nixon, 2011). Furthermore, a cumulative maltreatment effect was found on child negative cognitions (de Haan et al., 2017).

Studies on Negative Posttraumatic Cognitions in Young Children

Salmon and Bryant (2002) questioned whether young children are able to develop and report negative posttraumatic

cognitions because of their still developing cognitive abilities. Two studies with children younger than 8 years have thus far systematically investigated child negative cognitions related to marital conflicts (Ablow et al., 2009; Miller et al., 2012). Ablow et al. (2009) conducted an age-adapted interview using puppets with $N=96$ children from the general population at age 5 and again at age 6. The interview assessed self-blame, perceived emotional distress due to the marital conflict, and the perception of involvement in the conflict. Child appraisals of the conflict, specifically self-blame and perceived emotional distress, mediated the relationship between the severity of the marital conflict and teacher-reported internalizing and externalizing symptoms. In the other study, Miller et al. (2012) interviewed $N=116$ 4- to 6-year-old children from families with a history of intimate partner violence between their parents using age-adapted questions about family conflicts derived from a questionnaire for older children. The interview included questions about conflict properties, self-blame, perceived threat, and coping efficacy. There was no association between children's posttraumatic cognitions and child PTSD symptoms or maternal depression and PTSD symptoms. Despite inconsistent results, these studies are important as they indicated that preschool children were able to report reliable and consistent information about their cognitions regarding marital conflicts in interviews. However, both studies assessed cognitions specific to marital conflicts so that findings about a child's ability to report negative cognitions may not be generalized to child maltreatment.

The Current Study

Despite the increasing knowledge about negative posttraumatic cognitions as an important predictor for child mental health outcomes in general, still very little is known about posttraumatic cognitions in children who are 8 years old or younger. The goal of the current study is to give initial insights into negative posttraumatic cognitions in 4- to 8-year-old children following maltreatment using secondary analysis of available data. As such, this is the first study to investigate maltreatment-related cognitions in children who are younger than 8 years. We used maltreatment specific predictors and outcomes specific for this age group. We included child functioning along with child mental health outcomes as this was recommended when assessing psychopathology in young children (Vasileva et al., 2021b). First, we explored the ability of young children to report negative posttraumatic cognitions in the context of maltreatment. Second, we examined if negative posttraumatic cognitions differed by type of maltreatment and if they were associated with a cumulative maltreatment score. Third, building upon evidence from studies with 7- to 18-year-old children and adolescents, we tested the hypotheses that child negative

posttraumatic cognitions are associated with a) poor child mental health and poor functioning as well as b) parental negative response to child trauma and poor parental mental health. These initial findings can help to better understanding young children's cognitive processes which might be important for the formulation of diagnostic criteria and the selection of treatment goals.

Methods

Participants and Procedure

This publication is a secondary analysis of already collected data from a study aiming at the evaluation of services for young victims of maltreatment (Ganser et al., 2017; Witt et al., 2016). The approach was approved by the local ethics committees at each of the four study centres (Application #122/12). Data collection took place between 2012 and 2015 at four study centres in three German states (Baden-Wuerttemberg, Lower Saxony and North Rhine-Westphalia). No additional data was collected for this analysis. Children (4–17 years old) with a history of maltreatment and their caregivers were referred by child welfare agencies, schools, women's shelters and similar institutions to the study centres. History of maltreatment was reported by the accompanying caregivers and the staff of local child welfare and medical services, so that maltreatment was not necessarily substantiated in court. Requirements for participation were

safe living conditions at the time of assessment and the participation of a non-abusing caregiver. Potential participants were contacted by local coordinators, informed about the study, and invited to participate. All children and their caregivers ($N=375$) gave their consent to participate before any assessment. Participants received an incentive of 20 Euros. Assessment with children and their caregivers took place at baseline, 6- and 12-months follow-up. At baseline, caregivers were asked about sociodemographic variables and history of child maltreatment while children were interviewed for posttraumatic cognitions. If children did not want to answer the questions alone, the caregiver stayed in the room with them. Only biological parents answered questions about their own mental health.

The present study is based on a subsample of $N=112$ caregiver-child dyads with children who were 4 to 8 years old assessed at baseline ($M=6.2$, $SD=1.1$). Self-report by children was assessed with an interview as recommended previously (Curvis et al., 2014). Table 1 gives an overview of demographic characteristics of the sample. There were slightly more male children ($n=68$, 60.7%). In total, 73 (65.2%) children were accompanied by their biological parents.

Child-reported Posttraumatic Cognitions

Posttraumatic cognitions in children aged 8 years or younger were assessed using a short interview that was adapted for this study from the Child Posttraumatic Cognitions Inventory

Table 1 Sample characteristics ($N=112$)

Characteristic	$M (SD) / n (%)^a$	
Age in years: $M (SD)$	6.2	(1.1)
Gender—Male: $n (%)$	68	(60.7)
Migration background: $n (%)$	62	(55.4)
Residence: $n (%)$		
	With biological parent(s)	71 (63.9)
	Adoptive/Foster family	20 (18.0)
	Out-of-home care	13 (11.7)
	Other	7 (6.3)
Caregiver present at interview: $n (%)$		
	Biological parent(s)	73 (65.2)
	Adoptive or foster parent(s)	18 (16.1)
	Other	21 (18.7)
Therapeutic services because of emotional, behavior, or developmental problems: $n (%)$		
	Counseling	17 (15.2)
	Psychiatric treatment	14 (12.5)
	Psychotherapy	6 (5.4)
	Other	17 (15.2)

^aPresented is valid percentage

(CPTCI; Meiser-Stedman et al., 2009). The CPTCI is a measure for children and adolescents between 6 and 18 years of age that includes 25 items from two subscales: 1) sense of being permanently damaged after the traumatic event, and 2) being a fragile person in a dangerous world (Meiser-Stedman et al., 2009). The CPTCI has not been used with children younger than 6 years; in previous studies, no specific results were provided for children younger than 8 years. The German version of the questionnaire showed good internal consistency (subscales: Cronbach's $\alpha=0.91$ and $\alpha=0.86$, respectively) and good construct validity as indicated by positive correlations with children's symptoms of PTSD, depression, and anxiety following maltreatment (de Haan et al., 2016). In the current study, two marker items of each of the two subscales of the original version were chosen and adapted for children of the age of 8 years or younger. Marker items were items that showed the highest factor loadings of the original version of the CPTCI according to Meiser-Stedman et al. (2009). Three members of the research team with clinical experience (two were in postgraduate training and one had completed training to become a child and adolescent psychotherapist) chose the wording of the items in an open discussion so that young children would be able to easily understand the questions. The goal was to have a short measure that would not overwhelm the children. The items were formulated as questions and very complex sentences were reformulated in separate ones (Item 2). This resulted in two questions for Item 2 but the score for this item referred to the answer of the second question ("Are you scared to do something like this?"). The interview included 4 questions that could be answered on a 3-point Likert scale (1 = *never*, 2 = *sometimes*, and 3 = *always*). The items and the introduction that was read to the participants are presented in Box 1.

Box 1. Items and introduction for the assessment of posttraumatic cognitions in children aged 8 years and younger

Now we would like to know which feelings or thoughts you have since ... (event).
People react differently to frightening events. There are no right and no wrong answers.

Subscale *Sense of being permanently damaged after the traumatic event*:

1. Do you think that something is wrong with you since the frightening event?
2. Did you get so angry that you broke something or hurt someone? Are you scared to do something like this?

Subscale *Being a fragile person in a dangerous world*:

3. Do you think that you have to be really careful because otherwise something bad could happen?
4. Do you think that anyone can hurt you?

For the current analyses, a sum of scores was calculated ranging between 4 and 12 with higher scores indicating more

negative posttraumatic cognitions. Since the short interview was adapted for the purposes of the current study, we analyzed the inter-correlation of the items and their internal consistency. There were weak to moderate significant correlations between the items showing that they were associated but did not assess identical aspects of posttraumatic cognitions (Supplementary Table 1). Each item correlated moderately to highly with the total score ($r=0.66$ to $r=0.73$). Cronbach's Alpha for the total score was acceptable considering that it consisted of four items only ($\alpha=0.66$).

Caregiver-reported Measures

Child's maltreatment history. Maltreatment history was assessed using the Juvenile Victimization Questionnaire (JVQ). The original version of this instrument (JVQ) showed good psychometric properties in a sample of 2- to 17-year-old children and adolescents (test–retest reliability of $r_{tt}=0.95$, internal consistency of Cronbach's $\alpha=0.80$; Finkelhor et al., 2005). The present study used an adapted German version of the JVQ, that was administered as a structured interview to determine lifetime exposure to maltreatment (Averdijk et al., 2011). The revised 24-item version assesses lifetime exposure, and includes items from modules B (child maltreatment), D (sexual victimization), and E (witnessing and indirect victimization). Caregivers were asked about the five categories of maltreatment: physical abuse, emotional abuse, neglect, sexual victimization, and exposure to domestic violence. Based on the answers, each subtype of maltreatment was rated dichotomously as being present or absent. To calculate a cumulative maltreatment score the number of types of maltreatment that the child had experienced were summed up.

Child's Psychopathology. Psychopathology was assessed using the German version of the Schedule of Affective Disorders and Schizophrenia for School-Age Children (K-SADS-PL, Delmo et al., 1998), a semi-structured clinical interview with the caregivers that assesses lifetime and present episodes of the most common psychiatric disorders in children and adolescents – depression, anxiety disorders, obsessive compulsive disorder, conduct disorder, attention deficit hyperactivity disorder, PTSD, elimination disorders, eating disorders, tic disorders. This instrument was used to determine the presence of diagnoses according to the ICD-10 and DSM-IV criteria. The instrument showed good external validity, good to excellent inter-rater reliability (consensus 93%–100%), and good test–retest reliability ($r_{tt}>0.60$; Delmo et al., 1998). Interviews were conducted by trained and supervised interviewers. To ensure quality, the first two assessments conducted by each interviewer were videotaped and feedback was provided.

Child's PTSD symptoms. PTSD symptoms including re-experiencing, avoidance and hyperarousal were assessed

using the German translation of the caregiver report versions of the UCLA PTSD Reaction Index for DSM-IV (UCLA PTSD-RI; Steinberg et al., 2004). Caregivers estimated the frequency of the occurrence of PTSD symptoms during the past month on a 5-point Likert scale. This instrument was initially designed for 7- to 18-year-old children. We used the UCLA PTSD-RI total score with higher scores indicating more severe PTSD symptoms. Cronbach's alpha for the total score in the current sample was $\alpha=0.89$.

Child's emotional and behavior problems. Emotional and behavior problems were assessed using the caregiver version of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001). The SDQ consists of 25 items measuring five dimensions: emotional problems, conduct problems, hyperactivity/inattention, peer problems, and prosocial behavior. Caregivers answer items on a 3-point Likert scale with higher scores indicating more problems except for the prosocial behavior scale. A total problem score was calculated on basis of the four problem-oriented subscales ranging from 0 (no problems) to 40 (maximum problems). The SDQ has shown acceptable levels of validity in several studies and is frequently used for children and adolescents up to the age of 18 years (Vostanis, 2006). In the present study, Cronbach's alpha for the problem score was $\alpha=0.87$.

Child's health and well-being. Child health and well-being was assessed using the proxy version of the KIDSCREEN-10 Index (Ravens-Sieberer et al., 2010), which is the short version of the KIDSCREEN-52. This instrument assesses global health-related quality of life over the past week with scores ranging from 10 to 50. It showed good psychometric properties in a sample of 8- to 18-year-old children (Cronbach's $\alpha=0.78$; test-retest reliability $r_{tt}=0.67$; Ravens-Sieberer et al., 2010). In the present study, Cronbach's alpha was $\alpha=0.76$.

Child's general functioning. The Children's Global Assessment Scale for children between 4 and 16 years of age (C-GAS; Shaffer et al., 1983) was used to assess child general function. It is a widely used measure that assesses the level of psychosocial functioning of children using a continuous scale that ranges from 1 to 100. The scale showed good psychometric properties (inter-rater reliability $r=0.83$ to $r=0.91$, test-retest reliability $r_{tt}=0.85$; Shaffer et al., 1983). When the full assessment for a child was completed, the level of psychosocial functioning of the participating child was rated by the interviewer.

Parental emotional reactions to the experience of the child. Parental emotional reactions were assessed using the Parents Emotional Reactions Questionnaire (PERQ-D; Cohen & Mannarino, 1996). The questionnaire consists of 15 items and examines reactions such as fear and anger on a 5-point Likert scale. Higher total scores indicate more intensive emotional reaction of the caregiver. The instrument showed good internal consistency ($\alpha=0.87$) and test-retest reliability in

previous research ($r_{tt}=0.91$; Cohen & Mannarino, 1996). The wording of the questionnaire was adapted for our purposes and modified to capture parental response to maltreatment. In the current study, the measure showed very good internal consistency ($\alpha=0.95$).

Parental PTSD symptoms. The Posttraumatic Stress Diagnostic Scale is a self-report questionnaire consisting of 49 items (Foa, 1995). It assesses the PTSD diagnostic criteria according to DSM-IV or ICD-10 and allows quantifying the severity of PTSD symptoms of re-experience, avoidance and hyperarousal. Internal consistency for the total symptom scale was good ($\alpha=0.92$ to $\alpha=0.97$; Coffey et al., 1998, Foa, 1995). Criterion and construct validity have been demonstrated in several studies (e.g., Coffey et al., 1998) and the test-retest reliability was good ($r_{tt}=0.74$; Foa, 1995). In the current study, an authorized German translation was applied, which also showed satisfactory psychometric properties in a previous study (Griesel et al., 2006). Internal consistency in the current sample was $\alpha=0.94$.

Parental mental health. The short version of the Patients Health Questionnaire (Spitzer et al., 1999) is a self-report questionnaire that covers depressive and panic symptoms according to DSM-IV as well as psychosocial functioning. For the present study, we used the short version and the scale on somatic complaints from the complete version (total of 28 items). A German validation study showed good internal consistency for the depression and somatic scales and association with PHQ-D and SKID, so that the authors assumed good validity of the instrument to detect mental disorders (Gräfe et al., 2004). In the current study, internal consistency was $\alpha=0.91$ for the depression scale and $\alpha=0.83$ for the somatic scale.

Statistical analysis

Analyses were conducted using IBM SPSS 24. The ability of children to report negative posttraumatic cognitions was estimated by analyzing the completion of the scale assessing posttraumatic cognitions (i.e., number of missing values was expected to be low if children were able to answer the questions). Furthermore, we analyzed potential response bias that often occurs when rating unfamiliar constructs. Specific patterns of answers were determined (all values missing: yes/no; all values identical: yes/no). We tested if there were specific patterns of answers depending on child variables using chi square and *t* tests. Differences in the number of missing values in the scale and in the severity of negative posttraumatic cognitions depending on maltreatment type and diagnosis (no, PTSD, other) were tested with *t* tests or analysis of variance with Tukey correction of differences. Because there were few children with a PTSD diagnosis (ICD-10: $n=16$; DSM-IV: $n=9$), analysis of variance was also tested with the

nonparametric Kruskal-Wallis test. We calculated Pearson's correlations between the number of missing values as well as severity of negative posttraumatic cognitions and child variables (age, cumulative maltreatment score, PTSD symptoms, emotional and behavior problems, general functioning, and well-being). For children who were accompanied by their biological parents, Pearson's correlations were calculated for the association between negative posttraumatic cognitions and parental emotions and cognitions about the experience of the child, own posttraumatic stress symptoms, and mental health symptoms. All analyses including severity of negative posttraumatic cognitions were conducted with a subsample of children who completed all four items assessing this construct (see Supplementary Figure 1 for overview of sample selection for each analysis). Considering the theoretical framework, posttraumatic cognitions could be seen as the predictor for child outcomes. Hence, we calculated separate correlations with the same predictor and different outcomes. We adjusted the family-wise error rate with the Holm-Bonferroni method.

Results

Child Ability to Report Posttraumatic Cognitions

There were $n = 87$ (77.7%) children who answered all four questions about negative posttraumatic cognitions. The mean number of missing values, which was used as indicator of the completion of the scale, was $M = 0.59$ ($SD = 1.24$). Overall 24 children rated all items with the same value – 23 children rated all items with *never* and three children rated all items with *always*.

The number of missing values in the items assessing posttraumatic cognitions did not differ depending on maltreatment type (Table 2), cumulative maltreatment score, age, PTSD symptoms, general functioning, or well-being (Table 3). However, mean number of missing values was significantly higher for children with a PTSD diagnosis according to ICD-10 compared to children without any diagnosis (Table 2). Using the DSM-IV criteria, mean number of missing values was higher for children with a diagnosis except PTSD compared to children without any diagnosis; children with a PTSD diagnosis according to DSM-IV did not differ from children without any diagnosis or with different diagnoses. The number of missing values on items assessing posttraumatic cognitions significantly correlated with higher scores of child emotional and behavioral problems (Table 3). We also tested patterns of all variables missing or all values identical to control for response bias and found no associations with child age,

mental health symptoms, well-being, or functioning (all $p > 0.05$).

Child Posttraumatic Cognitions and Type of Maltreatment

The sum of scores in items assessing negative posttraumatic cognitions ranged from 4 (all items rated with *never*) to 12 (all items rated with *always*). Children reported an average score of $M = 6.29$ ($SD = 4.60$). Severity of negative posttraumatic cognitions was higher when caregivers reported physical or sexual abuse of their children compared to cases when no such experiences were reported. There were no differences in the severity of negative posttraumatic cognitions depending on emotional abuse, neglect, and domestic violence (Table 2). Child posttraumatic cognitions correlated significantly with the cumulative maltreatment score (Table 3).

Child Posttraumatic Cognitions and Child Mental Health and Functioning

Negative posttraumatic cognitions differed depending on diagnoses according to ICD-10, $F(2, 84) = 3.58$, $p = 0.032$, but not according to DSM-IV, $F(2, 84) = 0.70$, $p = 0.500$. As shown in Table 2, severity of negative posttraumatic cognitions was higher for children with a PTSD diagnosis compared to children without any diagnosis according to the ICD-10 criteria; children with other diagnoses showed posttraumatic cognitions that did not differ from these of children with a PTSD diagnosis or from children without any diagnosis. The findings were similar when using the non-parametric Kruskal-Wallis test (ICD-10: $H = 6.45$, $p = 0.040$; DSM-IV: $H = 1.60$, $p = 0.449$).

Severity of negative posttraumatic cognitions significantly correlated with higher child PTSD symptoms (Table 3). Global functioning and health as well as well-being did not correlate significantly after the Holm-Bonferroni adjustment. There was no age effect on the total score of negative posttraumatic cognitions (Fig. 1).

Child Posttraumatic Cognitions and Parents' Response to Child Trauma and Mental Health

Child negative posttraumatic cognitions did not correlate significantly with any of the parental variables: parental emotions and cognitions about the experience of the child ($n = 68$, $r = 0.15$, $p = 0.240$), parents' own PTSD symptoms ($n = 53$, $r = -0.08$, $p = 0.559$), and parents' depression ($n = 69$, $r = -0.004$, $p = 0.977$), somatic symptoms ($n = 69$, $r = 0.02$, $p = 0.895$), and panic symptoms ($n = 69$, $r = 0.07$, $p = 0.570$).

Table 2 Relationship between posttraumatic cognitions, number of missing values in posttraumatic cognitions, potentially traumatic experiences, and psychiatric disorders

Variable	Value	PC total score (n = 87)				Number of missing values in PC (N = 112)			
		n	M	SD	t/F	n	M	SD	t/F
Physical abuse	No	33	5.36	1.54	-3.32**	45	0.69	1.38	0.66
	yes	54	6.85	2.28		67	0.52	1.25	
Sexual abuse	No	60	5.95	2.04	-2.24*	78	0.59	1.29	0.01
	yes	27	7.04	2.21		34	0.59	1.33	
Emotional abuse	No	51	6.02	2.03	-1.39	63	0.51	1.22	-0.75
	yes	36	6.67	2.27		49	0.69	1.40	
Neglect	No	35	6.11	2.32	-0.62	44	0.52	1.21	-0.45
	yes	52	6.40	2.03		68	0.63	1.35	
Domestic violence	No	35	6.11	2.32	-0.62	44	0.52	1.21	-0.44
	yes	52	6.40	2.03		68	0.63	1.36	
ICD-diagnosis	No	36	5.61 ^a	1.66	3.58*	38	0.13 ^a	0.66	4.61*
	PTSD	16	7.13 ^b	2.28		26	1.08 ^b	1.67	
	other	35	6.60 ^{a,b}	2.36		48	0.69 ^{a,b}	1.36	
DSM-IV diagnosis	No	50	6.06	2.07	0.70	56	0.27 ^a	0.92	3.68*
	PTSD	9	6.78	2.33		15	0.80 ^{a,b}	1.37	
	other	28	6.54	2.24		41	0.95 ^b	1.60	

M = mean, n = sample size, PTSD = posttraumatic stress disorder, PC = posttraumatic cognitions, SD = standard deviation

^{a,b} Different subscripts denote significant differences between groups in post hoc pairwise comparisons with Tukey correction

* $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

The aim of this study was to give first insights about negative posttraumatic cognitions in 4- to 8-year-old children following maltreatment. Most children (77.7%) in the sample answered all questions about posttraumatic cognitions. Negative posttraumatic cognitions were associated with child PTSD symptoms. We did not find a relationship between child negative posttraumatic cognitions and parental variables.

The findings of the present study support previous results about the role of negative posttraumatic cognitions in the way young children cope with marital conflicts (Ablow et al., 2009; Miller et al., 2012) and expand our knowledge of negative posttraumatic cognitions in the

context of child maltreatment. The findings could be interpreted in the context of cognitive theories of PTSD that were initially developed for adults (e.g., Ehlers & Clark, 2000). Furthermore, they support the translation of cognitive theories into treatment strategies not only following incidental traumatic events (as proposed by Goodall et al., 2017) but also following maltreatment.

Although most children answered all of the questions and there were no systematic response behaviors found, it remains unclear if children understood the questions and if they were able to self-report on their own posttraumatic cognitions. The skills of young children to give reliable information in trauma-related interviews have been criticized previously (e.g., Scheeringa, 2011). Further qualitative and quantitative research can help estimating the feasibility

Table 3 Correlations between posttraumatic cognitions, number of missing values in posttraumatic cognitions, and child variables

	Age	Cumulative maltreatment score	PTSD symptoms	Emotional and behavior problems	General functioning	Health and well-being
Number of missing values in PC (N = 112)	.04	.03	.19	.26*	-.14	-.19
PC total score (n = 87)	.03	.35**	.39**	.18	-.22	-.22

PTSD = posttraumatic stress disorder, PC = Posttraumatic cognitions

* $p < .05$, ** $p < .01$, *** $p < .001$, *p*-Values were adjusted with the Holm-Bonferroni procedure

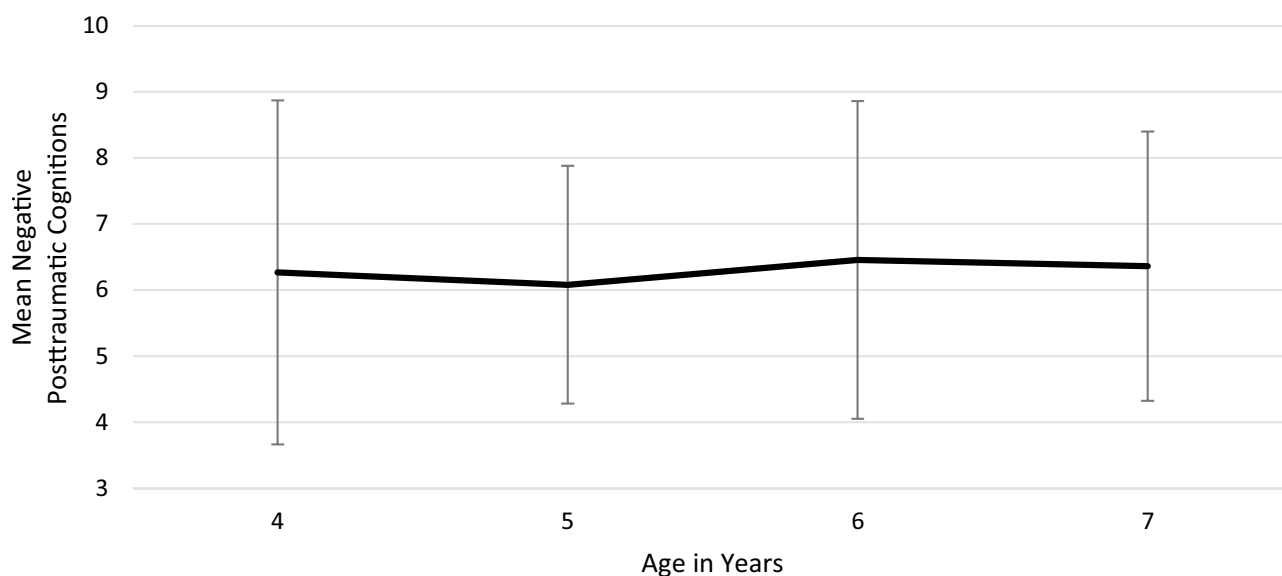


Fig. 1 Mean negative posttraumatic cognitions and their standard deviation at each age ($n = 87$)

of such instruments to assess self-reported posttraumatic cognitions in young children. For example, trauma narratives of young children can be qualitatively investigated for posttraumatic cognitions. Furthermore, a more comprehensive assessment tool needs to be developed for this age group. Young children's self-report can also be compared to parent report.

The ability of children to answer questions about posttraumatic cognitions was independent from children's age and PTSD symptoms. However, children with more caregiver-reported emotional and behavior problems tended to leave more questions unanswered. These findings suggest that not child's age but child's high emotional distress could cause difficulties when estimating own posttraumatic cognitions. This could mean that assessment based on multiple sources would be necessary especially when children are showing high emotional distress. It could be further investigated if this association is evident in older samples as well. In the context of the lack of age effect on posttraumatic cognitions in the current study, it could be discussed if cognitive symptoms are valuable aspects of the PTSD diagnosis of young children. Current diagnostic criteria for children who are 6 years old or younger do not include negative alterations in cognitions after a traumatic event (American Psychiatric Association, 2013). These symptoms were found to be central for a PTSD diagnosis in 7- to 17-year-old children (Bartels et al., 2019). Future research should analyze if cognitive symptoms might be relevant for 4- to 6-year-old children as well.

Contrary to expectations, we did not find a relation between child negative posttraumatic cognitions and parental reaction to the traumatic event that were reported in previous studies with older children and adolescents

(e.g., Hiller et al., 2017). Investigating the impact of self-reported caregiver variables on trauma outcomes in preschool children led to contradictory or non-significant results in previous studies of trauma outcomes in preschool children (Levendosky et al., 2003; Vasileva & Petermann, 2017). One explanation for the non-significant relationship can be that self-reported measures lack objectivity. It is also possible that some parents who show high distress and mental health problems related to child trauma compensate with adaptive parenting to overcome the negative trauma outcomes of their children (Levendosky et al., 2003). Furthermore, parental variables might influence types of cognitions (e.g., self-blame or shame) that were not assessed with the current measure or might influence child mental health directly (e.g., via model learning or less responsive reaction to the child) and not indirectly via child cognitions.

Limitations

There are several limitations of this study. Negative posttraumatic cognitions were assessed with only four questions, which were adapted from a questionnaire for older children. This procedure could have neglected types of negative posttraumatic cognitions that might be specific for this early age. For example, previous studies with preschool children assessed self-blame (Ablow et al., 2009; Miller et al., 2012). Item 2 in the measure of posttraumatic cognitions included two following questions which might have confused children and lead to biased answers by assessing externalising behavior instead of the appraisal of this behavior. We also used measures to assess child PTSD symptoms, health and well-being

that are not yet validated for this age group. The diagnostic interview allowed testing PTSD according to ICD-10 and DSM-IV but not according to the preschool subtype in DSM-5. Some children in the sample were receiving therapeutic services because of their mental health symptoms. Hence, these services could already have influenced some children's negative posttraumatic cognitions and PTSD symptoms. Furthermore, the relatively small sample size might have provided insufficient power for detecting small effects.

Conclusion

The present study is the first to systematically investigate negative posttraumatic cognitions in 4- to 8-year-old children in the context of child maltreatment without limiting children's experiences to marital conflicts. Our results show that negative posttraumatic cognitions might be an important variable explaining the development and maintenance of young children's PTSD. While these findings are based on secondary analysis using a very short interview, they can inform future studies and could draw attention to the role of posttraumatic cognitions in young children coping with trauma. There are implications for diagnostics and interventions for young children that could be drawn from the current findings. First, they suggest that negative alterations in cognitions can be identified in children of 8 years and younger. Second, they support the implementation of interventions for young children that target negative posttraumatic cognitions (e.g., Goodall et al., 2017).

Future studies are needed to investigate negative posttraumatic cognitions with more specific age-adapted or parent-report measures. Research is also needed to determine the role of parents in the development of negative posttraumatic cognitions in young children. Parental behavior and responsiveness are seen as important factors for the way children, especially at an early age, cope with trauma (Salmon & Bryant, 2002). Nonetheless, our study and a previous one (Ablow et al., 2009) could not support the association between child posttraumatic cognitions and parents' variables. We still need a better understanding of the child-parent interaction following child maltreatment.

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Declarations

Conflict of interest None.

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