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Identifying Effective Moderators of Cognitive Behavioural Trauma Treatment with Caregiver Involvement for Youth with PTSD: A Meta-Analysis

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Abstract

Children can develop posttraumatic stress disorder (PTSD) and mental health symptoms after traumatic events. This meta-analysis evaluated the influence of moderators of cognitive behavioural trauma treatment (CBTT) with caregiver involvement in traumatized children. A total of 28 studies were included, with 23 independent samples and 332 effect sizes, representing the data of 1931 children (*M* age = 11.10 years, *SD* = 2.36). Results showed a significant medium overall effect (d = 0.55, t = 2.478, p = .014), indicating CBTT with caregiver involvement was effective in treating PTSD (d = 0.70), with somewhat smaller effect sizes for internalizing, externalizing, social, cognitive and total problems ($0.35 < d > 0.48$). The positive treatment effect was robust; we found somewhat smaller effect sizes at follow-up (d = 0.49) compared to post-test (d = 0.57) assessments. Furthermore, several sample (i.e., child's age, gender, and trauma event), program (i.e., the duration of treatment, number of sessions), study (i.e., control condition, type of instrument, informant, type of sample), and publication (i.e., publication year and impact factor) characteristics moderated the treatment outcomes of the child. In summary, the results of our meta-analysis might help to improve the effectiveness of cognitive behavioural trauma treatment for youth with PTSD, and guide the development of innovative trauma interventions that involve caregivers. Implications for theory and practice are discussed.

*Keywords***:** Meta-analysis; Cognitive Behavioural Therapy; caregiver involvement; youth; Posttraumatic Stress Disorder (PTSD).

Introduction

Worldwide, substantial numbers of children are exposed to traumatic experiences during their life [1, 2]. This can be a single traumatic experience or multiple traumatic experiences, which can be prolonged and/or repetitive [3]. Childhood trauma can result in a high level of stress, which affects cognitive, psychological, social, and biological development [4-6]. Approximately 50% of trauma-exposed children develop at least one symptom of a post-traumatic stress disorder (PTSD) and 20% meet all clusters of PTSD following DSM-5 (Diagnostic and Statistical Manual of Mental Disorders), such as re-experiencing, avoidance, arousal, negative cognitions and mood state [7-9]. Therefore, it is important to offer effective treatment for children who suffer mentally and emotionally after a traumatic experience.

To date, previous meta-analyses on psychological interventions for traumatized children included a broad range of both group- and individual-based trauma interventions, with and without caregiver involvement [10-13]. The results of these studies did not specifically pertain to cognitive behavioural trauma treatment (CBTT) with caregiver involvement, but showed that caregiver involvement can increase the effects of trauma treatment. Moreover, Gutterman [10] and Harvey and Taylor [11] conducted a meta-analysis on the effects of psychotherapy for traumaized youth, showing that treatments with caregiver involvement had better outcomes than those without their involvement. Therefore the present meta-analysis focuses specifically on cognitive behavioural trauma treatment that involves caregivers. The protocol of TF-CBT developed by Cohen and Mannarino [14] is an example of an established family-based trauma treatment, which consists of eight to sixteen weekly sessions with the core principle of gradual and controlled exposure to the child's traumatic experience, designated by the acronym PRACTICE. TF-CBT provides psycho education, developing relaxation and affective coping skills, cognitive reframing, creating a trauma narrative, enhancement of future safety of the child, improving caregiver skills and conjoint

child-caregiver sessions or parallel caregiver-sessions. If the child is still struggling with maladaptive cognitions or behaviour (i.e., ongoing fears and/or avoidance of situations), the therapist can decide to provide in vivo exposure.

Additionally, this meta-analysis examines the influence of sample (e.g., child age, caregiver gender), program (e.g., the duration of treatment), study (e.g., type of instrument) and publication characteristics (e.g., impact factor) on the trauma treatment outcomes of the child [15-17]. Results of our meta-analytic study might help to improve the effectiveness of cognitive behavioural trauma treatment with caregiver involvement in clinical practice, and guide the development of innovative trauma interventions that involve caregivers.

Specific child characteristics may influence treatment outcomes. First, age can be of influence, as studies examining the effects of trauma treatment in younger children showed a smaller effect than studies with older children [10, 12, 18]. A higher level of cognitive differentiation in older children may explain this finding [12]. Second, gender may be of influence, because girls tend to report more PTSD symptoms than boys [19] and girls are overrepresented in trauma treatment studies [18]. Third, the trauma type (type I or type II) can be of influence, because children with type II trauma report significantly more symptoms than children with type I trauma, regardless of age [3, 20], and a negative relation has been found between the number of traumatic experiences and treatment success [21, 22]. This implies that children who experienced multiple traumas may require more intensive treatment for a positive treatment outcome than children who experienced only a single traumatic event. Fourth, the trauma event (e.g., sexual abuse, natural disaster, or unresolved grief or loss) can be of influence, since in particular sexually abused children are vulnerable, given the potential lack of a supportive and safe environment [18, 23]. They may benefit less from trauma treatment due to the burden of caregiver factors compared to children with a different type of trauma.

Secondly, we included trauma treatment with caregivers, so therefore it is important to know what caregiver characteristics may affect treatment outcomes. For example, Cohen and colleagues [14] assume that the involvement of caregivers in trauma treatment may increase treatment effectiveness, because caregivers can provide emotional support to the child. On the other hand, caregivers may also have a negative influence on the child's treatment outcomes, and might have a harder time to engage in their child's treatment through their own psychopathology and history of adverse childhood experiences [24-27]. Also the parents' gender can moderate the treatment outcomes as several studies have shown a somewhat stronger association between mother's PTSD/depression and the child's PTSD compared to the association between father's PTSD/depression and the child's PTSD [18, 28-31]. This meta-analysis aims to test the caregiver's age, relationship with the child (i.e., biological mother/father, foster parent), family composition (i.e., intact, single parent, blended) and caregiver's psychopathology (i.e., PTSD, depression, emotional distress and dysfunctional cognitions) as moderators.

A range of program, study design, and publication characteristics may moderate treatment outcomes. First, treatment intensity (i.e., the duration of treatment and number of sessions) could be of influence, since Deblinger, Mannarino, Cohen, Runyon, and Steer [32] showed that caregivers' stress as well as trauma-related anxiety in the child decreased more after eight than sixteen sessions (less is more). On the other hand, caregivers reported an increase in caregiver's skills after sixteen sessions, with a decrease in child externalizing behaviour [32]. Second, the type of therapist (i.e., academically trained versus non-academically trained) could influence the effectiveness of CBTT with caregiver involvement given the variety in quality of professional skills between therapists [18]. Third, type of control condition may play a role, as CBTT with caregiver involvement compared to no treatment yielded larger effect sizes than compared to active treatment (e.g., Treatment as

Usual and EMDR) [12]. Fourth, the type of informant and the type of measurement may be of influence, since the meta-analysis of Harvey and colleagues [11] showed larger effects for clinical reports than for child or caregiver reports, in which the use of standardized clinical interviews instead of questionnaires may explain the differences. Fifth, the time of measurement may moderate treatment outcomes, as the effect sizes of psychotherapies at post-treatment are generally maintained and even increase at the final follow-up assessment [11]. This meta-analysis will also test the type of sample (i.e., clinical, community), measurement occasion (i.e., post-test, follow-up), follow-up length (i.e. months), publication year of primary studies, the impact factor of the journal in which a primary study was published as a measure of study quality [33], (in)dependency of the researcher that published the study, and the continent where the study was conducted as moderators.

Although studies examining trauma treatment for children have been accumulating during the past 25 years, this meta-analysis only included experimental studies of cognitive behavioural trauma therapy in which caregivers were involved, and excluded studies on group-based and/or without caregiver involvement, because these forms deviate substantially from the family based trauma treatment in this meta-analysis. In short, this meta-analysis is the first to test the overall effect of exclusively CBTT with caregiver involvement, with the aim to examine if the overall effect is influenced by sample, program, study design, or publication characteristics.

Methods

Inclusion criteria

Quantitative studies were included in this meta-analysis that were published before October 2021, which examined the efficacy of cognitive behavioural trauma treatment with caregiver involvement in children and adolescents. Multiple criteria were used for the inclusion of studies. Study eligibility was first of all determined by the trauma-related core elements to

treat traumatized children according to the protocol of Cohen and colleagues [14] (i.e., psycho education, cognitive processing/restructuring, trauma narrative, exposure, and caregiver involvement in their child's treatment). We included studies that applied these core elements in individual and/or conjoint treatment. Studies that did not strictly follow the protocol of Cohen and colleagues [14], but still applied the trauma core elements were also included [34, 35-37].The caregivers in primary studies had to receive multiple treatment sessions, in which they support the child's recovery (e.g., role play with child, psycho education about trauma, open communication between child and caregiver). Second, the study had to provide trauma related outcomes of the child (e.g., PTSD, anxiety, depression, conduct problems) that were of interest in this meta-analysis. Third, the maximum age of the child's sample was eighteen years old. Fourth, the study had to provide sufficient statistical information to calculate effect sizes. Finally, the study should have an experimental research design with a control condition in which participants received no treatment, treatment as usual, or EMDR.

Selection of studies

The following search strategy was used to find qualified studies. Four electronic databases were searched: Ovid, PsycINFO, ERIC, and Web of Science. The search string comprised three components of key words focusing on: a) the trauma treatment, b) specific sample characteristics, and c) child outcomes. For the trauma intervention, the following keywords were used: "trauma treatment", "cognitive behavio* therapy", "CBT", "trauma-focused CBT", or "TF-CBT". For the sample characteristics, the following keywords were used: "child", "adolesc*", "youth", "young patients", "pediatric" or "sexually abused". For the child outcomes, the following keywords were used: "PTSD", "post traumatic stress", or "trauma symptoms". The keywords were searched for in specific text fields of primary studies (i.e., title, abstract, and keywords) to reduce the number of unqualified studies. In total, 1,690

potentially relevant studies were identified in the electronic databases, and another 130 relevant studies were identified via a manual search. A detailed examination of the full-article texts led to the inclusion of 28 studies (*k*), which examined 23 independent samples, and produced 332 effect sizes (*#ES*) in total (see Table 1 for a flow chart of the search procedure, and Table 2 for an overview of the included studies).

Table 1. Flow Chart CBTT with Caregiver Involvement for Traumatized Children

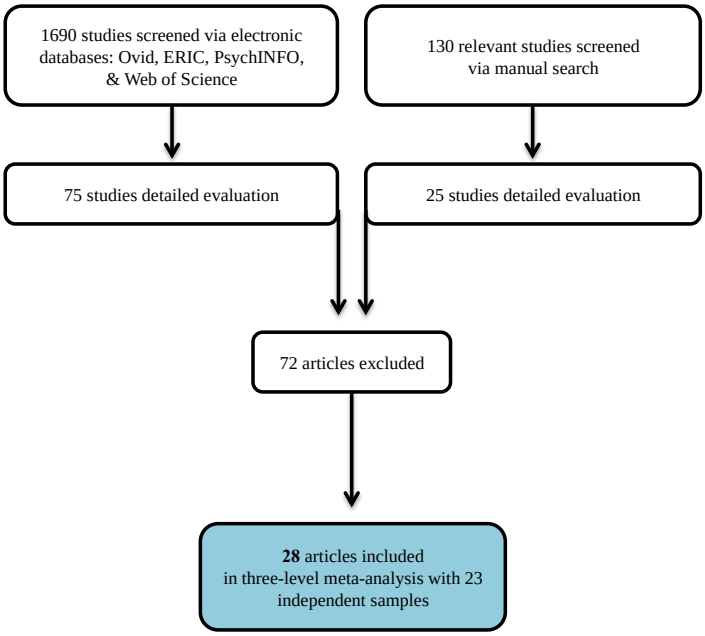

Table 2. Characteristics of Included Studies on CBTT with Caregiver Involvement

Authors	*N*	Exp. condition	Ctrl. condition	Mean age year	Trauma type sample (Type I, Type II, mixed)	Trauma measurement child
Celano et al. (1996)	32	CBTT (n = 15)	TAU (n = 17)	10.50	Not reported	CBCL, CITES-R, CGAS
Cohen et al. (1997)	43	TF-CBT (n = 28)	NST (n = 15)	5.90	Type II	CBCL, CSBI, WBR
Cohen et al. (2004)	229	TF-CBT (n = 114)	CCT (n = 115)	10.76	Type II	K-SADS-PL, CBCL, CDI, STAIC, CAPS-CA, CSBI, SQ
Cohen et al. (2005)	82	TF-CBT (n = 41)	NST (n = 41)	11.40	Mixed	CSBI, CDI, STAIC, TSC-C, CBCL
Cohen et al. (2011)	124	TF-CBT (n = 64)	CCT (n = 60)	9.64	Type 2	K-SADS-PL, RI, SCARED, CDI, CBCL, KBIT
Costantino et al. (2014)	131	TF-CBT (n = 76)	TEMAS-NNT (n = 55)	Not reported	Type I	UCLA, CDI, MASC
Damra et al. (2014)	18	TF-CBT (n = 9)	WL (n = 9)	11.30	Unknown	PTSS-C, CDI
Dawson et al. (2018)	64	TF-CBT (n = 32)	PST (n = 32)	10.87	Mixed	UCLA-PTSD RI, CDI, AESC
Deblinger et al. (1999)	50	TF-CBT (n = 25)	TAU (n = 25)	9.89	Type II	K-SADS, CDI, CBCL
Deblinger et al. (2001)	67	TF-CBT (n = 21)	ST (n = 23)	5.45	Mixed	K-SADS-E, CBCL, CSBI-3, WIST
Deblinger et al. (2006)	183	TF-CBT (n = 92)	CCT (n = 91)	Not reported	Type II	K-SADS-PL, CBCL, CDI, STAIC, CAPS-CA, SQ
De Roos et al. (2011)	52	TF-CBT (n = 26)	EMDR (n = 26)	10.10	Mixed	PROPS, CROPS, UCLA-PTSD RI, BDS, MASC, CBCL
Diehle et al. (2015)	48	TF-CBT (n = 23)	EMDR (n = 25)	12.90	Mixed	CAPS-CA, RCADS, SDQ
Goldbeck et al. (2016)	159	TF-CBT (n = 76)	WL (n = 83)	13.03	Mixed	CAPS-CA, UCLA-PTSD RI, CPTCI,

						CGAS, CDI, SCARED, CBCL, ILK
Jaberghaderi et al. (2004)	14	CBTT (n = 7)	EMDR (n = 7)	12.50	Mixed	CROPS, Rutter
Jaberghaderi et al. (2019)	139	CBTT (n = 40)	EMDR (n = 40) WL (n = 59)	10.50	Mixed	CROPS, Rutter
Jaycox et al. (2010)	118	TF-CBT (n = 60)	CBITS (n = 58)	11.60	Mixed	UCLA-PTSD, CDI
Jensen et al. (2014)	156	TF-CBT (n = 79)	TAU (n = 77)	15.10	Type II	CPSS, fCPSS, CAPS-CA, MFQ, SCARED, SDQ
Jensen et al. (2017)	99	TF-CBT (n = 44)	TAU (n = 55)	15.05	Type II	CPSS, fCPSS, CAPS-CA, MFQ, SCARED, SDQ
	75	TF-CBT (n = 36)	TAU (n = 39)	15.05		
Jensen et al. (2018)	156	TF-CBT (n = 79)	TAU (n = 77)	15.10	Type II	CPTCI, CAPS-CA, MFQ, SDQ
Kameoka et al. (2020)	30	TF-CBT (n = 14)	WL (n = 16)	13.90	Mixed trauma	K-SADS-PL, CGAS, UCLA-PTSD-RI, DSRSC, SCAS, CBCL
King et al. (2000)	24	TF-CBT (n = 12)	WL (n = 12)	11.40	Type II	ADIS-C, FT-SAC, CQ-SAC, R-CMAS, CDI, CBCL, GAF
Murray et al. (2015)	257	TF-CBT (n = 131)	TAU (n = 126)	14.02	Type II	UCLA-PTSD RI, CBCL
Pfeiffer et al. (2017)	123	TF-CBT (n = 54)	WL (n = 69)	13.04	Mixed trauma	CAPS-CA, CPTCI
Scheeringa et al. (2011)	64	TF-CBT (n = 40)	WL (n = 24)	5.30	Type II	PAPA
Schottelkorb et al. (2012)	31	TF-CBT (n = 17)	CCPT (n = 14)	9.16	Mixed trauma	UCLA-PTSD RI, PROPS
Shein-Szydlo et al. (2016)	100	TF-CBT (n = 51)	WL (n = 49)	14.89	Mixed trauma	CPTSD-RI, CPSS, BDI, BAI, STAXI
Smith et al. (2007)	24	CBTT (n = 12)	WL (n = 12)	13.89	Mixed trauma	CPSS, C-RIES, CAPS-CA, DSRS, R-CMAS, CAPS, ADIS-P

Note. *N* = total sample; Exp. = Experimental condition; Ctrl. = control condition; TF-CBT = Trauma-Focused Cognitive Behavioral Therapy; CBTT = Cognitive Behavioral Trauma Therapy; CCT = Child Centered Therapy; CCPT = Child Centered Play Therapy; NST = Non-directive Supportive Therapy; ST = Supportive Therapy; EMDR = Eye Movement Desensitization and Reprocessing; TAU = Treatment as Usual; WL = Waitlist; TEMAS-NNT = Tell-Me-A-Story Narrative Trauma Therapy; PST = Problem Solving Therapy; CBITS = Cognitive-Behavioural Intervention for Trauma in Schools; K-SADS-PL = Schedule for Affective Disorders and Schizophrenia for School-Age Children; CBCL = Child Behaviour Checklist; CDI = Child Depression Inventory; CITES-R = Children's Impact of Traumatic Events Scale-Revised; WBR = Weekly Behaviour Report; PTSS-C = Post-Traumatic Stress Symptoms in Children; AESC = Anger Expression Scale for Children; STAIC = State-Trait Anxiety Inventory for Children; SQ = Shame Questionnaire; CAPS-CA = Children's Attributions and Perceptions Scale; CSBI = Child Sexual Behaviour Inventory; RCADS = Revised Child Anxiety and Depression Scale; TSC-C = Trauma Symptom Checklist for Children; UCLA-PTSD RI = University of California at Los Angeles PTSD Reaction Index; SCARED = Screen for Child Anxiety Related Emotional Disorders; KBIT = Kaufman Brief Intelligence Test; WIST = What If Situations Test; R-CADS = Revised Child Anxiety and Depression Scale; Rutter = Rutter Teacher Scale; SDQ = Strength and Difficulties Questionnaire; PROPS = Parent Report of Post-traumatic Symptoms; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; CROPS = Child Report of Post-traumatic Symptoms; BDS = Birleson Depression Scale; MASC = Multidimensional Anxiety Scale for Children; CGAS = Children's Global Assessment Scale; CPTCI = Child Post-Traumatic Cognitions Inventory; ILK = Quality of Life Inventory for Children and Adolescents; CPSS = Child PTSD Symptom Scale; fCPSS = PTS symptoms influence on daily functioning; MFQ = Mood and Feelings Questionnaire; ADIS-C = Anxiety Disorder Interview Schedule Children; ADIS-P = Anxiety Disorder Interview Schedule Parent; FT-SAC = Fear Thermometer for Sexually Abused Children; CQ-SAC = Coping Questionnaire for Sexually Abused Children; R-CMAS = Revised Children's Manifest Anxiety Scale; GAF = Global Assessment Functioning; PAPA = Preschool Age Psychiatric Assessment; C-RIES = Children`s Revised Impact of Event Scale; DSRS = Depression Self-Rating Scale; STAXI = State Trait Anger Expression Inventory; CPTSD-RI = Child Posttraumatic Stress Disorder Reaction Index.

Coding the studies

The included studies were coded according to the guidelines of Lipsey and Wilson [38] using a coding sheet. First, the proportion of girls and the mean age of the sampled children were coded as characteristics of the sample. As for treatment outcomes, the following categories were coded: (a) PTSD (i.e., re-experience, avoidance, arousal, and negative/trauma cognitions), (b) externalizing (i.e., anger, hyperactivity, sexual deviant behaviour, and conduct problems), (c) internalizing (i.e., anxiety, depression, dissociation, shame, and emotional distress), (d) social (i.e., social competence, prosocial behaviour, social skills, peer problems, and psychosocial functioning), (e) cognitive (i.e., coping, attributions, and intelligence), (f)

total problems (i.e., general mental health and quality of life). Also, the trauma event and the trauma type in the total sample were coded (see Table 4 for details). We also aimed to code several caregiver characteristics, which were the proportion of males in the sample, the mean age, the type of relationship with the child, the family composition, and caregiver psychopathology.

As presented in detail in Table 4, several program and study design characteristics were coded. As for program characteristics, multiple operationalizations of treatment intensity and treatment duration, as well as the type of professional delivering the treatment were coded. As for study characteristics, the type of control condition, type of instrument used for assessing child (trauma) outcomes, type of informant who reported on child outcomes, the moment of assessment, follow-up length, and sample type were coded. Finally, the publication year of primary studies, the impact factor of the journal in which a primary study was published, and the continent where the study was conducted were coded.

Effect Size Calculation and Statistical Analyses

To quantify the effect of cognitive behavioural trauma treatment with caregiver involvement on children and adolescents with PTSD, we chose Cohen's *d* as the common effect size measure and calculated a *d* value for all reported effects in each included study. Some studies reported statistical information - such as proportions, odds ratio's, and means and standard deviations – and had to be transformed into *d* values. For these transformations, the formula and methods of Ferguson [39], Lipsey and Wilson [38], and Rosenthal [40] were used. A positive *d* value indicated that children receiving CBTT with caregiver involvement in the experimental condition showed lower levels of trauma related outcomes (e.g., PTSD, anxiety, depression) than children in the control condition.

The included studies were regarded as a random sample from a larger population of studies, and we therefore analyzed all effect sizes in random-effect models [41, 42]. Multiple effect sizes could often be extracted from single primary studies (or calculated using the

reported statistical information), as primary studies often reported on more than one treatment effect that was of interest in the current meta-analysis. However, a central assumption in meta-analytic research is that effect sizes are independent from each another. This assumption is violated when multiple effect sizes are extracted from single primary studies, as these effects are often based on the same participants, instruments, and/or conditions under which the effects were obtained [15]. To tackle this problem of effect size dependency, we used three-level meta-analytic models [43].

In a three-level approach to meta-analysis, three different sources of variance are modelled. Variance in effect sizes between studies is accounted for at level 3 of this model (between-study variance), variance in effect sizes extracted from the same studies is accounted for at level 2 (within-study variance), and sampling variance of the effect sizes is accounted for at level 1 [44-47]. The sampling variance cannot be estimated, as data on individual participants of studies that are included in a meta-analysis are not available. Instead, a "typical" sampling variance can be calculated using the formula of Cheung [44, pg. 2015]. The three-level meta-analytic model allows for estimating an overall effect of CBTT with caregiver involvement by interpreting the intercept of a null-model. Further, if the between-study variance and/or within-study variance significantly deviates from zero, moderator analyses can be performed by extending the model with the coded sample, study, and program characteristics as covariates. In this way, it can be determined whether and how the coded variables affect the magnitude of the estimated overall effect of CBTT with caregiver involvement.

To build the 3-level models, the statistical environment *R* (version 3.6.1, R Core Team, 2015) was used, as well as the "rma.mv" function of the metafor package [48] and the syntax as described by Assink and Wibbelink [43]. In this way, the three-level approach as described by Cheung [44] and Van den Noortgate and colleagues [46, 47] was applied to the

current meta-analysis. The Knapp-Hartung correction [49] was used to test all model coefficients, meaning that the *t* distribution (instead of the *Z* distribution) was used to test individual coefficients, and that the *F* distribution was used in the omnibus test of all model coefficients (excluding the intercept). To determine whether the between-study variance and/or the within-study variance were significant, two log-likelihood-ratio-tests were performed. In each test, the deviance of the full model was compared with the deviance of the model without the between-study or within-study variance component, respectively [43]. These log-likelihood-ratio tests were performed one-sided (as the amount of variance can only deviate from zero in the positive direction), whereas all other tests were performed two-sided. In estimating all model coefficients, the restricted maximum likelihood method was used. Prior to testing whether sample, study, and program characteristics affect the overall effect, dummy variables were created for each category of a discrete potential moderator, and potential continuous moderators were centered on their mean. In all analyses, a five percent significant level was applied.

Results

Overall effect and publication bias

This three-level meta-analysis consisted of $K = 28$ studies, with 23 independent samples, and 332 effect sizes. The overall mean effect size was $t = 2.478$, $p < .05$; $d = .55$, indicating that CBTT with caregiver involvement yielded a medium effect (See Table 3). Table 3 also reveals that we found significant within and between study heterogeneity. Although multiple electronic databases were searched for primary studies that would meet our inclusion criteria, it is possible that we may have missed studies due to publication bias. This would negatively affect the validity of our results. Therefore, we performed a trim-and-fill analysis to assess the possibility of missing data [50-51]. This analysis showed that one effect size had to be added to the right of the overall mean effect to restore the symmetry of the funnel plot (see

Appendix 1), meaning that there were no indications of publication bias. However, according to this result the estimated overall effect might be a slight underestimation of the true effect due to other forms of bias. After the imputation of this single effect size, an "adjusted" overall effect was estimated in a three-level model which yielded a *d* value of 0.60, $p = .007$, 95% CI [0.16, 1.03]. As the trim-and-fill analysis does not account for dependency in effect sizes, we also performed an adapted version of the Egger's regression test [52] in which we regressed effect sizes on standard errors [53] by testing the standard error as a covariate in a 3-level meta-regression model. The results revealed a positive and significant slope ($\beta_1 = 7.845$, 95% CI [6.304, 9.387], $p < .001$), meaning that effect size magnitude increases as the standard error increases. This implies that relatively small and negative effect sizes may be missing in the dataset that was analyzed, which – in contrast to the results of the trim-and-fill analysis - is indicative of publication bias.

Table 3. Overall Effect of CBTT with Caregiver Involvement on Child Outcomes

Outcome	*k*	*#ES*	*Mean d*	95% CI	*p*	$\sigma^2_{level\ 2}$	$\sigma^2_{level\ 3}$	% Var. Level 1	% Var. Level 2	% Var. Level 3
Youth-outcomes	23	332	0.55	0.11, 0.99	.014	0.024^{***}	1.109^{***}	4.013	2.035	93.952

Note. Child outcomes = academic, social-emotional, and psychosocial problems; *k* = number of studies; *#ES* = number of effect sizes; mean *d* = mean effect size (*d*); CI = confidence interval; $\sigma^2_{level\ 2}$ = variance between effect sizes extracted from the same study; $\sigma^2_{level\ 3}$ = variance between studies; % Var = percentage of variance distributed.

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

Moderator analyses

To explain the significant within (2.04%) and between (93.95%) study variance, moderator analyses were conducted (see Table 4). First, the results revealed that type of outcome moderated the overall effect size of CBTT with caregiver involvement, with the largest effect for PTSD symptoms (*d* = 0.70), compared to the other outcomes, ranging from *d* = 0.48 (internalizing problems) to *d* = 0.35 (social problems). The overall effect of CBTT with caregiver involvement proved not to be affected by trauma event, except for trauma caused by

medical treatment, which showed a significantly smaller effect of $d = 0.38$ compared to other sources of trauma, yielding an effect of $d = 0.59$. Furthermore, the overall treatment effect yielded smaller effect sizes for studies with higher percentages of girls, and older children. Additionally, the results on treatment intensity (i.e., number and duration of sessions) indicated that effect sizes decreased when the number of sessions (with child, parent, conjoint, and in total) increased, but that treatment effects increased when conjoint treatment sessions were of longer duration.

Five study design characteristics proved to be significant moderators of the overall effect size (i.e., control condition, type of instrument, informant, measurement moment, and type of sample). A very large, significant effect size ($d = 1.12$, $p < .001$) was found for studies in which the control group did not receive treatment, whereas small-to-medium significant effects were found for studies with a control group receiving Treatment As Usual ($d = 0.44$, $p < .05$). No significant differences in treatment effect were found in studies that compared CBTT with caregiver involvement to EMDR, implying that CBTT with caregiver involvement and EMDR seem equally effective. Clinical interviews ($d = 0.65$) yielded significantly larger effect sizes than questionnaires ($d = 0.50$), which parallel the effects for informant, showing larger effect sizes for clinicians ($d = 0.68$) than for child self-report or parent-report ($d = 0.52$, and $d = 0.46$, respectively). Post-test assessments ($d = 0.57$, $p < .05$), immediately after having finished treatment, yielded significantly larger effect sizes than follow-up assessments ($d = 0.49$). Finally, large effect sizes were found in community samples ($d = 0.80$, $p < .05$) compared to medium effect sizes in clinical samples ($d = 0.42$, $p < .10$).

Two publication characteristics significantly moderated the overall effect size (i.e., publication year and impact factor of the journal). More recently published studies yielded larger effect sizes than older studies. Also, studies published in journals with higher impact factors yielded smaller effect sizes than studies in journals with lower impact factors.

Unfortunately, caregiver characteristics could not be tested as potential moderators, because of a high degree of missing data and/or insufficient variance in caregiver characteristics.

Table 4. Moderator-analyses of CBTT with Caregiver Involvement for Traumatized Children

	k	*#ES*	B_0/ *d*	t_0	B_1	t_1	$F(df_1, df_2)$
Child Characteristics							
Outcomes							$F(5, 326) = 12.926^{***}$
PTSD	22	94	0.70	3.145^{**}			
Externalizing problems	13	43	0.43	1.905^{+}	-0.27	-5.324^{***}	
Internalizing problems	18	105	0.48	2.164^{*}	-0.22	-5.973^{***}	
Social problems	8	15	0.35	1.492	-0.35	-4.599^{***}	
Cognitive problems	3	16	0.41	1.810^{+}	-0.29	-4.714^{***}	
Total problems	13	37	0.44	1.943^{+}	-0.26	-5.431^{***}	
Trauma event							
Abuse							$F(1, 330) = 0.183$
Yes	17	267	0.61	2293^{*}			
No	6	43	0.39	0.872	-0.22	-0.428	
Domestic violence							$F(1, 330) = 2.485$
Yes	14	186	0.48	2.105^{*}			
No	10	124	0.66	2.798^{**}	0.17	1.576	
Community violence							$F(1, 330) = 0.398$
Yes	11	154	0.40	1.230			
No	12	156	0.69	2.180^{*}	0.28	0.631	
Unresolved loss							$F(1, 330) = 0.377$
Yes	10	141	0.39	1.145			
No	13	169	0.68	2.220^{*}	0.28	0.614	
Medical treatment							$F(1, 330) = 9.705^{**}$
Yes	5	81	0.38	1.662^{+}			
No	20	229	0.59	2.642^{**}	0.21	3.115^{**}	
Physical injury							$F(1, 330) = 0.079$

Yes	11	159	0.49	1.471			
No	12	151	0.62	1.926+	0.13	0.280	
Natural disaster							$F(1, 330) = 2.308$
Yes	6	80	0.68	2.836^{**}			
No	18	230	0.51	2.266^{*}	-0.17	-1.519	
Trauma Type							$F(2, 316) = 1.260$
Type I	1	6	-0.40	- 0.787			
Type II	8	135	0.45	2.480^{*}	0.85	1.571	
Mixed	12	156	0.41	2.686^{**}	0.81	1.517	
Gender (proportion of girls)	22	326	0.49	2.672^{**}	-0.02	-6.250^{***}	$F(1, 324) = 39.057^{***}$
Mean age (in years)	22	326	0.61	2.162^{*}	-0.18	-3.562^{***}	$F(1, 324) = 12.686^{**}$
Program characteristics							
Treatment intensity							
Total number of sessions	22	310	0.39	1.620	-0.03	-5.334^{***}	$F(1, 308) = 22.448^{***}$
Number of sessions - Child	20	307	0.49	1.824^{+}	-0.07	-5.592^{***}	$F(1, 305) = 31.274^{***}$
Number of sessions - Caregiver	17	275	0.28	0.897	-0.07	-5.710^{***}	$F(1, 273) = 32.602^{***}$
Number of sessions - Conjoint	10	137	1.31	2.115^{*}	-0.36	-4.754^{***}	$F(1, 135) = 22.597^{***}$
Duration of sessions - Child	18	278	0.46	1.557	0.00	0.241	$F(1, 276) = 0.058$
Duration of sessions - Caregiver	15	249	0.38	1.202	0.03	1.875^{+}	$F(1, 247) = 3.514^{+}$
Duration of sessions - Conjoint	7	114	0.86	1.086	0.03	4.862^{***}	$F(1, 112) = 23.635^{***}$
Study design characteristics							
Control condition							$F(2, 329) = 16.456^{***}$
No Treatment	*7*		1.12	5.117^{***}			
Treatment As Usual (TAU)	13		0.44	2.103^{*}	-0.69	-5.536^{***}	
EMDR	4		-0.07	-0.164	-1.19	-2.410^{*}	

Type of instrument							$F(1, 330) = 19.720^{***}$
Interview	15	77	0.67	2.992^{**}			
Questionnaire	22	233	0.50	2.246^{*}	-0.17	-4.440^{***}	
Informant							$F(2, 329) = 13.270^{***}$
Clinician	16	82	0.68	3.038^{**}			
Child	18	128	0.52	2.333^{*}	-0.16	-3.822^{***}	
Caregiver	15	100	0.46	2.055^{*}	-0.22	-4.975^{***}	
Measurement moment							$F(1, 330) = 5430^{*}$
Post	23	172	0.57	2.584^{*}			
Follow-up	12	138	0.49	2.216^{*}	-0.08	-2.330^{*}	
Follow-up length	12	151	0.68	1.340	0.00	0.323	$F(1, 149) = 0.104$
Type of sample							$F(1, 330) = 27.116^{***}$
Clinical	14	256	0.39	1.625^{+}			
Community	10	54	0.80	3.301^{**}	0.41	5.207^{***}	
Publication characteristics							
Publication year	23	332	0.46	1.998^{*}	0.04	3.531^{***}	$F(1, 330) = 12.470^{***}$
Impact factor	23	332	0.46	1.932^{+}	-0.08	-3.829^{***}	$F(1, 330) = 14.662^{***}$
Independent evaluation							$F(1, 330) = 0.334$
No	8	162	0.37	0.975			
Yes	15	148	0.65	2.291*	0.28	0.578	
Continent							$F(2, 329) = 1.190$
America	11	169	0.31	1.109			
Europe	8	118	0.54	1.728^{+}	0.23	0.754	
Other (Africa & Asia)	5	23	1.14	2.324^{*}	0.83	1.477	

Note. k = number of independent studies; *#ES* = number of effect sizes; B_0/ mean d = intercept/mean effect size (d); t_0 = t-value for mean d ; B_1 = regression coefficient or difference from intercept/reference category; t_1 = t-value for regression coefficient; $F(df_1, df_2)$ = omnibus test. $^{+}$ $p < 0.10$ (trend); * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Discussion

The main aim of this meta-analysis was twofold: (1) to grasp the overall effect of cognitive behavioural trauma treatment (CBTT) for children and adolescents with caregiver involvement, and (2) to examine whether the overall treatment effectiveness is affected by sample, program, study design, or publication characteristics. The results revealed a significant overall medium effect (d = 0.55, p = .014) indicating that children and adolescents showed less PTSD symptoms after CBTT with caregiver involvement than control conditions. This treatment effect is in line with previous meta-analyses on the effects of trauma treatment [12, 54] and comparable with mean effect sizes of psychological interventions for children and families in the last five decades [55, 56].

The moderator analyses revealed that several child, program, study design, and publication characteristics moderated the effect of CBTT with caregiver involvement. First, the effect of this treatment type is significantly and larger on PTSD symptoms (d = 0.70) than on any of the other child problems (e.g., internalizing, externalizing, social problems). This substantially larger effect on PTSD symptoms can be explained by the reasoning of Cohen and colleagues (2015), who suggested that children whose behavioural problems are triggered by trauma are likely to respond positively to the protocolled trauma treatment with caregiver involvement, and will show less behavioral symptoms thereafter than children with severe primary behavioural problems with other causes. The latter group might benefit more from (the addition of) other evidence-based treatment that addresses these difficulties [57]. This pleads for a thorough case conceptualization to determine which symptoms should be tackled first and which intervention is most suitable to do so.

Second, as the percentage of girls in samples increases, the effects of CBTT with caregiver involvement decreases. This lower treatment effect for girls can be explained by the fact that girls are more likely to experience interpersonal trauma (i.e., sexual assault and

abuse) than boys, whereby girls tend to develop more post-traumatic cognitions when they experience low social support after a traumatic event [58, 59], which may particularly have a negative effect on their wellbeing [60]. The presence of these post-traumatic cognitions may lead to higher levels of shame and self-blame [59], causing more persistent symptoms before treatment, and smaller treatment effects in girls than boys.

Third, we found that younger children benefit more from CBTT with caregiver involvement than older children. This may be explained by the more crucial role of a caregiver in treatment of younger children, because younger children rely more on the emotional support and availability of the caregiver in their regulation of emotions of distress [61, 62]. Nevertheless, this finding is in contrast with previous meta-analyses [10 12, 63], suggesting that older children benefit more from treatment, because they have a higher degree of cognitive differentiation to work through the trauma narrative component compared to younger children.

Contrary to our expectations, trauma type and trauma event did not significantly moderate treatment effectiveness. As for trauma type, our review implies that CBTT with caregiver involvement is both effective for children with a single traumatic experience (type I) or multiple traumatic experiences (type II), despite previous studies reporting that children with type II trauma show significantly more symptoms, resulting in lower treatment success [3, 20-22]. Also, the trauma event that children experienced (i.e., abuse, domestic violence, community violence, unresolved loss, physical injury and natural disaster) did not moderate treatment effectiveness, except trauma related to medical treatment. The results showed that CBTT with caregiver involvement is more effective when medical trauma is absent (d = 0.59) than present (d = 0.38). Given this result, we can conclude that CBTT with caregiver involvement is not more effective for trauma symptoms stemming from medical trauma than control conditions (i.e., no treatment, treatment as usual, and EMDR).

Further, we analyzed the role of caregivers in CBTT via treatment intensity (i.e., duration and number of sessions). We found that longer treatment sessions with both the child and a caregiver contributed to better treatment outcomes of the child. These longer sessions may create more opportunity for the caregiver to support the child in treatment than in sessions of shorter duration. Specifically, the caregiver may be able to give more recognition for the child's trauma narrative, and may help the therapist to correct the child's dysfunctional trauma cognitions. However, a higher number of treatment sessions did not contribute to more effective treatment outcomes. In fact, the effect sizes decreased when the number of sessions increased (less is more), which is in line with Deblinger and colleagues [32], who showed that eight sessions proved to be more effective than sixteen sessions in trauma treatment with caregivers.

Several study design characteristics were significant moderators. First, the type of control condition influenced treatment outcomes in such a way that CBTT with caregiver involvement was more effective than no treatment or treatment as usual for traumatized children. However there was no significant difference between CBTT with caregiver involvement and EMDR, which indicates that both treatments are equally effective interventions, yet the therapist can still make the clinical consideration to provide trauma intervention with caregiver involvement when case circumstances infer better expectations of the latter [26, 30, 64].

The use of standardized clinical interviews carried out by a clinician, produced a somewhat larger effect size than assessments of trauma symptoms by questionnaires that are filled out by the child or caregiver. The may be explained by the high degree of objectivity and validity of clinical interviews compared to questionnaires. Also previous studies showed that caregivers and children had predominantly different perceptions of the trauma symptoms and general functioning of the child after a traumatic event, whereby caregivers with psychological complaints (e.g., trauma symptoms) were found to report significantly more

trauma symptoms of their child than the child itself [65, 66]. This means that questionnaires assessing trauma symptoms have a subjective element, and therefore may be less valid than clinical interviews. Notably, several studies showed differences between child and caregiver reports of internalizing and externalizing problems in children, which means that clients' self-reports of children's psychological problems has to be interpreted with some caution [67-69]. However, child and caregiver reports of trauma symptoms may yield valuable information on the perspective of clients. We therefore argue that multiple sources for information retrieval are used in effectiveness research on trauma treatment for children.

We also found that the positive effect of CBTT with caregiver involvement was significantly larger at the post-test (d = 0.57) than at 6 to 12 months follow-up (d = 0.49), yet a positive medium effect over time did remain. This implies that the beneficial treatment effects are moderate in magnitude and stable in the first year after treatment, which is an encouraging result that is of clinical importance. The last study design characteristic showed that community samples yielded a twice as large treatment effect compared to clinical samples. We noticed that the clinical samples in the included studies were systematically derived from clinical services (e.g., psychiatric clinic, sexual assault centers, Department of Health and Community services, Child Protective Services) that target traumatized children, and that the community samples were selected from non-clinical services (e.g., elementary school, community intimate partner violence center, program for street children). Possibly in clinical samples the accumulation of (trauma-related) problems and higher degrees of comorbidity may explain smaller effects [55, 56]. Future research is suggested and discussed below.

Finally, two publication characteristics significantly moderated the overall effect size. The results imply that more recent studies produce larger treatment effects, and that treatment effects decrease as the journal impact factor increases. Generally, the quality of studies

increase over time, and it is to be expected that lower treatment effects are found in studies with a more rigorous design which are published more often in scientific journals with a higher impact factor.

Strengths and limitations

This three-level meta-analysis aimed to integrate knowledge on the effects of cognitive behavioural trauma treatment with caregiver involvement. Unfortunately, there was a substantial degree of missing data and low variance in the data related to all the caregiver characteristics (i.e., gender, age, relationship child, family composition, psychopathology), because the included studies reported hardly on these demographic characteristics. This implies that the influence of caregiver characteristics on the effect of CBTT with caregiver involvement remains unknown. Notably, the majority of included studies [e.g., 70-72] excluded caregivers with psychological problems (e.g., substance abuse, psychotic symptoms, taking antidepressant medication) from participating in treatment. This implies that this group of caregivers with their children is underrepresented in primary research, and therefore, we cannot draw inferences from our review on how this group of caregivers influences treatment effectiveness. It is thus still unknown how caregiver's psychopathology may interfere with the child's treatment outcomes. A second limitation is the potentially presence of publication bias. Although the trim-and fill analysis did not reveal indications of publication bias, the results of the Egger's test [52] did indicate that the medium overall effect size might be an overestimation of the true effect. This potential bias may have influenced the overall effect estimate and the moderator analyses results, so the results need to be interpreted with care.

Despite the absence of caregiver moderator analyses, we tested multiple child, program, study design, and publication characteristics of which several play a role in the effectiveness of cognitive behavioral trauma treatments with caregiver involvement. Our results add to the scientific and clinical knowledge, because of the substantial internal causal validity of this review that stems from the inclusion of randomized controlled trials, which

evaluated the effects of CBTT treatment with caregiver involvement that were carried out with a relatively high program integrity, and under clinically representative conditions that support external validity [56, 73]. Moreover, our results are relevant for clinical practice as it may serve as a guide for the development of effective trauma interventions that involve caregivers.

Implications

This meta-analysis provides implications for research and clinical practices. First, researchers are encouraged to carry out more rigorous designed research on trauma treatment with attention for child and caregiver characteristics. More research is needed on trauma treatment in young primary and elementary school children, since the effect of CBTT with caregiver involvement has not been studied extensively in this particular population. Also, examining the role of a child's gender is interesting, because our meta-analysis showed that girls responded less to CBTT with caregiver involvement than did boys. Second, researchers need to collect and report more detailed information on the involved caregivers in trauma treatment (e.g., age, gender, relationship child, psychopathology, and caregiver's trauma history). This will help to better understand which caregiver-child dyads will benefit most from trauma treatment with caregiver involvement. Understanding the influence of caregiver characteristics could also provide practitioners insights in how to adapt treatment so that care needs can be met in an optimal way. Third, the difference in treatment effect between sample types, with significantly larger treatment effects for community samples compared to clinical samples, needs further research. Therefore, researchers need to provide clear descriptions of samples, so it will become more transparent how these samples exactly differ, and why sample type influences the effect of trauma treatment. In addition, although the included randomized controlled trials had high internal causal validity and high program integrity, researchers need to provide more extensive descriptions about how the protocolled treatment was delivered in practice (e.g., implementation caregiver involvement), because the

protocolled treatment can differ from clinical practice and thus influence the results of meta-analytic investigations into the effectiveness of trauma treatment with caregiver involvement.

Further, this meta-analysis encourages clinicians to observe and report the quality of caregiver engagement during treatment. The way in which caregivers interact with their children may be related to child outcomes: high levels of avoidance or blame against the child is related to more internalizing and externalizing problems of their children, whereas caregiver support may decrease these problems [74]. Therefore, this meta-analysis emphasizes that a longer duration of the conjoint child-caregiver sessions may have a significant positive influence on the treatment outcome of the child. However, clinicians should be careful in considering a substantial number of treatment sessions (> 12,), as previous research has revealed that offering many treatment sessions does not contribute to the treatment effectiveness for traumatized children [55, 56]. Also, clinicians must continue to use standardized assessment instruments, such as the Child Revised Impact of Event Scale, CRIES-13 [75] and the Clinician-Administered PTSD Scale for Children and Adolescents, CAPS-CA [76] to adequately assess trauma symptoms (i.e., PTSD) of children [65, 66]. Despite indications that standardized interviews by clinicians are more valid than self-report questionnaires, the use of self-report assessment methods is not discouraged, since caregiver reports may offer very valuable information on the trauma symptoms of young children who are perhaps not able to report their own symptoms. We emphasize that multiple sources of information should be used in research on trauma treatment for children.

Conclusion

This three-level meta-analysis revealed that CBTT with caregiver involvement is effective in treating PTSD and trauma related symptoms in children and adolescents compared to control conditions, which is an encouraging finding for clinical practitioners treating children with trauma-related psychopathology. However, it is unknown to what extent

CBTT with caregiver involvement works better than other trauma interventions, and this is a key direction for future research. Increasing knowledge on the interventions that work best for children with different characteristics is crucial, so that clinicians can choose the most appropriate treatment after a thorough assessment of the child and the caregiver. When offering CBTT with caregiver involvement, clinicians should be aware of child, program and study characteristics that influence treatment effectiveness, such as, the child's age and gender, the intensity of treatment (i.e., duration of conjoint child-caregiver sessions), the type of assessment instruments, and the type of informant reporting on the symptoms. Researchers and clinicians should therefore work closely together so that implementing results of effectiveness research supports traumatized children in clinical practice. In this way, the medium effect that this review found for cognitive behavioral trauma treatment with caregiver involvement may be strengthened.

Declarations

Funding or Interest

The authors have no relevant interests or funding to disclose regarding this review.

Ethics Approval

Ethical approval is not required for this review study.

Consent to participate and publish

Not applicable for this review study.

Data or code availability statement

The datasets generated and analysed during the current study are available from the corresponding author on request.

Author's contribution statement

All authors contributed to this study. Conceptualization: Katalin Somers; Methodology: Katalin Somers, Geert-Jan Stams; Formal analysis and investigation: Katalin Somers, Geert-Jan Stams, Mark Assink; Writing – original draft preparation: Katalin Somers; Writing –

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References

[1] Saunders, BE, & Adams, ZW (2014) Epidemiology of traumatic experiences in childhood. Child Adolesc Psychiatr Clin N Am 23:167–184. https://doi.org/10.1016/j.chc.2013.12.003

[2] Stoltenborgh M, Bakermans-Kranenburg MJ, Alink LRA, Van IJzendoorn MH (2015) The prevalence of child maltreatment across the globe: review of a series of meta-analyses, Child Abus Rev 24:37-50. https://doi.org/10.1002/car.2353

[3] Kisiel LC, Fehrenbach T, Small L, Lyons SJ (2009) Assessment of complex trauma exposure, responses, and service needs among children and adolescents in child welfare. J of Child Adolesc Trauma 2:143-160. https://doi.org/10.1080/19361520903120467

[4] D'Andrea W, Ford J, Stolbach B, Spinazzola J, Van der Kolk A B (2012) Understanding interpersonal trauma in children: why we need a developmentally appropriate trauma diagnosis. Am J Orthopesychiatry 82:187-200. https://doi.org/10.1111/j.1939-0025.2012.01154.x

[5] Kisiel LC, Tehrenbach T, Torgersen E, Stolbach B, McClelland G, Griffin G, Burkman K (2014) Constellations of interpersonal trauma and symptoms in child welfare: implications for a developmental trauma framework. J Fam Violence 29:1-14. https://doi.org/10.1007/s10896-014-9603-8

[6] Nietlisbach G, Maercker A (2009) Social cognition and interpersonal impairments in trauma survivors with PTSD. J Agress Maltreat Trauma 18:382-402. http://dx.doi.org/10.1080/10926770902881489

[7] Alisic E, Zalta KA, van Wessel F, Larsen ES, Hafstad SG, Hassanpour K, Smid EG (2014) Rates of post-traumatic stress disorder in trauma-exposed children and adolescents: meta-analysis. Br J Psychiatry 204:335-340. doi: https://doi.org/10.1192/bjp.bp.113.131227

[8] American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: Author.

[9] McLaughlin KA, Koenen KC, Hill ED, Petukhova M, Sampson NA, Zaslavsky AM, Kessler RC (2013) Trauma exposure and posttraumatic stress disorder in a national sample of adolescents. J Am Acad Child Adolesc Psychiatry 52:815–830. https://doi.org/10.1016/j.jaac.2013.05.011

[10] Guttermann J, Schreiber F, Matulis S, Schwartzkopff L, Deppe J, Steil R (2016) Psychological treatments for symptoms of Posttraumatic Stress Disorder in children, adolescents, and young adults: a meta-analysis. Clin Child Fam Psychol 19:77-93. https://doi.org/10.1007/s10567-016-0202-5

[11] Harvey ST, Taylor JE (2010) A meta-analysis of the effects of psychotherapy with sexually abused children and adolescents. Clin Psychol 30:517–535. http://dx.doi.org/10.1016/j.cpr.2010.03.006

[12] Lenz SA, Hollenbaugh MK (2015) Meta-analysis of Trauma-Focused Cognitive Behavioral Therapy for treating PTSD and co-occurring depression among children and adolescents. Couns Outcome Res 6:18-32. http://dx.doi.org/10.1177/2150137815573790

[13] Morina N, Koerssen R, Pollet VT (2016) Interventions for children and adolescents with posttraumatic stress disorder: a meta-analysis of comparative outcome studies. Clin Psychol 47:41-54. https://doi.org/10.1016/j.cpr.2016.05.006

[14] Cohen JA, Mannarino PA, Deblinger E (2006) Treating trauma and traumatic grief in children and adolescents. New York, NY: The Guilford Press.

[15] Houben M, Van Den Noortgate W, Kuppens P (2015) The relation between short-term emotion dynamics and psychological well-being: a meta-analysis. Psychol Bull 141:901–930. http://dx.doi.org/10.1037/a0038822

[16] Van Den Bussche E, Van Den Noortgate W, Reynvoet B (2009) Mechanisms of masked priming: A meta-analysis. Psychol Bull 135:452–477. http://dx.doi.org/10.1037/a0015329

[17] Viechtbauer W, Cheung WLM (2010a) Outlier and influence diagnostics for meta-analysis. Res Synth Methods 1:112-125. https://doi.org/10.1002/jrsm.11

[18] Stallard P (2006) Psychological interventions for post-traumatic reactions in children and young people: a review of randomised controlled trails. Clin Psychol 26:895-911. http://dx.doi.org/10.1016/j.cpr.2005.09.005

[19] Vishnevsky T, Cann A, Calhoun GL, Tedeschi GR, Demakis JG (2010) Gender differences in self-reported posttraumatic growth: a meta-analysis. Psychol Women 34:110-120. https://doi.org/10.1111/j.1471-6402.2009.01546.x

[20] Wamser-Nanney R (2016) Examening the complex trauma definition using children's self-reports. J Child Adolesc Trauma 9:295-304. http://dx.doi.org/10.1007/s40653-016-0098-8

[21] Boyer SN, Hallion LS, Hammell CL, Button S (2009) Trauma as a predictive indicator of clinical outcome in residential treatment. Resid Treat Child Youth 26:92-104. https://doi.org/10.1080/08865710902872978

[22] Zelechoski DA, Sharma R, Beserra K, Miguel LJ, Demarco M, Spinazzola J (2013) Traumatized youth in residential treatment settings: prevalence, clinical presentation, treatment, and policy implications. J Fam Violence 28: 639-652. http://dx.doi.org/10.1007/s10896-013-9534-9

[23] Assink M, Spruit A, Schuts M, Lindauer RJL, van der Put CE, Stams GJJM (2018) The intergenerational transmission of child maltreatment: a three-level meta-analysis. Child Abuse & Negl 84:131-145. http://dx.doi.org/10.1016/j.chiabu.2018.07.037

[24] Chemtob MC, Nomura Y, Rajendran K, Yehuda R, Schwartz D, Abramovitz R (2010) Impact of maternal posttraumatic stress disorder and depression following exposure to the September 11 attacks on preschool children's behavior. Child Dev 81:1129-1141. http://dx.doi.org/10.1111/j.1467-8624.2010.01458.x

[25] Holt T, Jensen KT, Wentzel-Larsen T (2014) The change and the mediating role of parental emotional reactions and depression in the treatment of traumatized youth: result from a randomized controlled study. Child Adolesc Psychiatry Ment 8:1-13. https://doi.org/10.1186/1753-2000-8-11

[26] Martin CG, Everett Y, Skowron AE, Zalewski M (2019) The role of caregiver psychopathology in the treatment of childhood trauma with trauma-focused cognitive behavioural therapy: a systematic review. Clin Child Fam Psychol 23:273-289. http://dx.doi.org/10.1007/s10567-019-00290-4

[27] Van Toledo A, Seymour F (2013) Interventions for caregivers of children who disclose sexual abuse: a review. Clin Psychol 33:772-781. http://dx.doi.org/10.1016/j.cpr.2013.05.006

[28] Kane CJ, Murray KL, Cohen J, Dorsey S, van Wyk SS, Henderson GJ, … Bolton P (2016) Moderators of treatment response to trauma-focused cognitive behavioral therapy among youth in Zambia. J Child Psychol Psychiatry 57:1194-1202. http://dx.doi.org/10.1111/jcpp.12623

[29] Morris A, Gabert-Quillen C, Delahanty D (2012) The association between parent PTSD/depression symptoms and child PTSD symptoms: a meta-analysis. J Pediatric Psychol 37:1076-1088. http://dx.doi.org/10.1093/jpepsy/jss091

[30] Neill LE, Weems FC, Scheeringa SM (2016) CBT for child PTSD is associated with reductions in maternal depression: evidence for bidirectional effects. J of Clin Child Adolesc Psychol 0:1-11. http://dx.doi.org/10.1080/15374416.2016.1212359

[31] Tutus D, Keller F, Sachser C, Pfeiffer E, Goldbeck L (2017) Change in parental depressive symptoms in Trauma-Focused Cognitive-Behavioral Therapy: results from a randomized controlled trial. J Child Adolesc Psychopharmacology 27:22-205. http://dx.doi.org/10.1089/cap.2016.0136

[32] Deblinger E, Mannarino AP, Cohen JA, Runyon MK, Steer RA (2011) Trauma-focused cognitive behavioral therapy for children: impact of the trauma narrative and treatment length. Depress Anxiety 28:67-75. http://dx.doi.org/10.1002/da.20744

[33] Saha S, Saint S, Christakis DA (2003) Impact factor: a valid measure of journal quality. JMLA 91:42–46.

[34] Celano M, Hazzard A, Webb C, McCall C (1996) Treatment of traumagenic beliefs among sexually abused girls and their mothers: an evaluation study. J Abnorm Child Psychol 24:1-17. http://dx.doi.org/10.1007/BF01448370

[35] Jaberghaderi N, Greenwald R, Rubin A, Zand OS, Dolatabadi S (2004) A comparison of CBT and EMDR for sexually-abused Iranian girls. J Clin Psychol Psychotherapy 11:358-368. http://dx.doi.org/10.1002/cpp.395

[36] Jaberghaderi N, Rezael M, Kolivand M, Shookoohi A (2019) Effectiveness of cognitive behavioral therapy and eye movement desensitization and reprocessing in child victims of domestic violence. Iran J Psychiatry 14:67-75. http://dx.doi.org/10.18502/ijps.v14i1.425

[37] Smith P, Yule W, Perrin S, Tranah T, Dalgleish T, Clark MD (2007) Cognitive behavioral therapy for PTSD in children and adolescents: a preliminary randomized controlled trial. J Child Adolesc Psychiatry 46:1051-1061. https://doi.org/10.1097/CHI.0b013e318067e288

[38] Lipsey MW, Wilson DB (2001) Practical meta-analysis. Thousand Oaks, CA

[39] Ferguson GA (1966) Statistical Analysis in Psychology & Education. New York, NY, pp 244

[40] Rosenthal, R. (1994). Parametric measures of effect size. In: Cooper H, Hedges LV (Ed) The Handbook of Research Synthesis. New York, NY, pp 239

[41] Raudenbusch SW (2009) Analyzing effect sizes: Random-effects models. In: Cooper H, Hedges LV, Valentine JC (Ed) The handbook of research synthesis and meta-analysis, New York, NY, pp 295-315

[42] Van den Noortgate W, Onghena P (2003) Multilevel meta-analysis: A comparison with traditional meta-analytical procedures. Educ Psychol Meas 63:765–790. http://dx.doi.org/10.1177/0013164403251027

[43] Assink M, Wibbelink CJM (2016) Fitting three-level meta- analytic models in R: a step-by-step tutorial. Quant Methodes Psychol 12:154–174. http://dx.doi.org/10.20982/tqmp.12.3.p154

[44] Cheung MWL (2014) Modeling dependent effect sizes with three-level meta-analyses: A structural equation modeling approach. Psychol Methodes 19:211-229. http://dx.doi.org/10.1037/a0032968

[45] Hox J (2002) Multilevel analysis: techniques and applications. Mahwah, NJ

[46] Van den Noortgate W, López-López JA, Marin-Martinez F, Sánchez-Meca J (2013) Three-level meta-analysis of dependent effect sizes. Behavior Research Methods 45:576-594. http://dx.doi.org/10.3758/s13428-012-0261-6

[47] Van den Noortgate W, López-López JA, Marin-Martinez F, Sánchez-Meca J (2014) Meta-analysis of multiple outcomes: A multilevel approach. Behav Res Methods 47:1274-1294. http://dx.doi.org/10.3758/s13428-014-0527-2

[48] Viechtbauer W (2010b) Conducting meta-analyses in R with the metafor package. J Stat Softw 36:1-48. http://dx.doi.org/10.18637/jss.v036.i03

[49] Knapp G, Hartung J (2003) Improved tests for a random effects meta-regression with a single covariate. Stat Med, 22:2693-2710. http://dx.doi.org/10.1002/sim.1482

[50] Duval SJ, Tweedie RL (2000a) Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. Biometrics 56:455–463. http://dx.doi.org/10.1111/j.0006-341x.2000.00455.x.

[51] Duval SJ, Tweedie RL (2000b) A nonparametric "trim and fill" method of accounting for publication bias in meta-analysis. JASA 95:89–98.

[52] Egger M, Davey-Smith G, Schneider M, Minder C (1997) Bias in meta-analysis detected by a simple, graphical test. Br. Med J 315:629-634. http://dx.doi.org/10.1136/bmj.315.7109.629

[53] Sterne JAC, Gavaghan D, Egger M (2000) Publication and related bias in meta-analysis: Power of statistical tests and prevalence in the literature. J Clin Epidemiol 53:1119-1129. http://dx.doi.org/10.1016/S0895-4356(00)00242-0

[54] Cary EC, McMillen JC (2012) The data behind the dissemination: a systematic review of trauma-focused cognitive behavioural therapy for use with children and youth. Child Youth Serv Rev 34:748-757. http://dx.doi.org/10.1016/j.childyouth.2012.01.003

[55] Weisz JR, Kuppens S, Eckshtain D, Ugueto AM, Hawley KM, Jensen-Doss A (2013) Performance of evidence-based youth psychotherapies compared with usual clinical care: A multilevel meta- analysis. JAMA 70:750–761. http://dx.doi.org/10.1001/jamapsychiatry.2013.1176

[56] Weisz RJ, Ng YM, Ugueto MA, Jensen-Doss A, Marchette KSL, Weersing RV, et al (2017) What five decades of research tells us about the effects of youth psychological therapy: a multilevel meta-analysis and implications for science and practice. Am Psychol 72:79-117. http://dx.doi.org/10.1037/a0040360

[57] Cohen AJ, Mannarino, PA (2015) Trauma-focused Cognitive Behavior Therapy for traumatized children and families. Child Adolesc Psychiatr Clin of N Am 24:557-570. http://dx.doi.org/10.1016/j.chc.2015.02.005

[58] Ma X, Liu X, Hu X, Qiu C, Wang Y, Huang Y, et al (2011) Risk indicators for post-traumatic stress disorder in adolescents exposed to the 5.12 Wenchuan earthquake in China. Psychiatry Res 189:385–391. http://dx.doi.org/10.1016/j.psychres.2010.12.016

[59] Tolin DF, Foa EB (2006) Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. Psychol Bull 132:959–992. http://dx.doi.org/10.1037/0033-2909.132.6.959

[60] Rueger YS, Malecki KC, Demaray KM (2010) Relationship between multiple sources of perceived social support and psychological and academic adjustment in early adolescence: comparisons across gender. J Youth Adolesc 39:47-61. http://dx.doi.org/10.1007/s10964-008-9368-6

[61] Bosmans G (2016) Cognitive Behaviour Therapy for children and adolescents: can attachment theory contribute to its efficacy? Clin Child Fam Psychol 19:310-328. http://dx.doi.org/10.1007/s10567-016-0212-3

[62] Thompson RA (1990) Emotion and self-regulation. In: Thompson RA (Ed) Current theory and research in motivation, Vol. 36. Nebraska Symposium on Motivation, 1988: Socioemotional development. University of Nebraska Press, pp 367–467

[63] Trask VE, Walsh K, Dilillo D (2011) Treatment effects for common outcomes of child sexual abuse: a current meta-analysis. J Agress Violent Behav 16:6-19. https://doi.org/10.1016/j.avb.2010.10.001

[64] Brown JE, Cohen AJ, Mannarino PA (2020) Trauma-Focused Cognitive-Behavioral Therapy: The role of caregivers. J Affect Disord 227:39-45. https://doi.org/10.1016/j.jad.2020.07.123

[65] Ghesquiere A, Fan M-Y, Berliner L, Rivara PF, Jurkovich JG, Russo J, Zatzick FD (2008) Adolescents' and Parents' agreement on Posttraumatic Stress Disorder symptoms and functioning after adolescent injury. J Trauma Stress 21:487-491. https://doi.org/10.1002/jts.20364

[66] Shemesh E, Newcorn HJ, Rockmore L, Shneider LB, Emre S, Gelb DB, et al (2005) Comparison of parent and child reports of emotional trauma symptoms in pediatric outpatient settings. Pediatrics 115:115-582. https://doi.org/10.1542/peds.2004-2201

[67] Cuijpers P, Li J, Hofmann GS, Andersson G (2010) Self-reported versus clinician-rated symptoms of depression as outcome measures in psychotherapy research on depression: a meta-analysis. Clin Psychol Rev 30:768-778. https://doi.org/10.1016/j.cpr.2010.06.001

[68] Martin LJ, Ford BC, Dyer-Friedman J, Tang J, Huffman CL (2004) Patterns of agreement between parent and child Ratings of emotional and behavioral problems in an outpatient clinical setting: when children endorse more problems. Dev Behav Pediatr 25:150-155. https://doi.org/0196-206X/00/2503-0150

[69] Van Roy B, Groholt B, Heyerdahl S, Clench-Aas J (2010) Understanding discrepancies in parent-child reporting of emotional and behavioural problems: effects of relational and socio-demographic factors. BMC Psychiatry 10:1-12. https://doi.org/10.1186/1471-244X-10-56

[70] Cohen AJ, Mannarino PA, Knudsen K (2005) Treating sexually abused children: 1-year follow-up of a randomized controlled trial. Child Abuse Negl 29:135-145. https://doi.org/10.1016/j.chiabu.2004.12.005

[71] Jensen KT, Holt T, Ormhaug MS, Egeland K, Granly L, Hoaas CL, et al (2014) A randomized effectiveness study comparing trauma-focused cognitive behavioral therapy with therapy as usual for youth. J Clin Child Adolesc Psychol 43:356-369. https://doi.org/10.1080/15374416.2013.822307

[72] King JN, Tonge JB, Mullen P, Myerson N, Heyne D, Rollings S, et al (2000) Treating sexually abused children with posttraumatic stress symptoms: a randomized clinical trial. J Am Acad Child Adolesc Psychiatry 39:1347-1355. https://doi.org/10.1097/00004583-200011000-00008

[73] Kraemer CH, Kupfer JD (2006) Size of treatment effects and their importance to clinical research and practice. Biol Psychiatry 59:990-996. https://doi.org/10.1016/j.biopsych.2005.09.014

[74] Yasinski C, Hayes MA, Cummings AJ, McCauley T, Deblinger E, Ready CB, et al (2016) In-session caregiver behavior predicts symptom change in youth receiving Trauma-Focused Cognitive Behavioral Therapy (TF-CBT). J Consult Clin Psychol 84:1066-1077. http://dx.doi.org/10.1037/ccp0000147

[75] Perrin S, Meiser-Stedman R, Smith P (2005) The Children's Revised Impact of Event Scale (CRIES): validity as a screening instrument for PTSD. Behav Cogn Psychother 33:487-498. https://doi.org/10.1017/S1352465805002419

[76] Pynoos RS, Weathers FW, Steinberg AM, Marx BP, Layne CM, Kaloupek DG, Schnurr PP, Keane TM, Blake DD, Newman E, Nader KO, Kriegler JA (2015) Clinician-Administered PTSD Scale for DSM-5 - Child/Adolescent Version. Scale available from the National Center for PTSD at www.ptsd.va.gov.

[77] Cohen AJ, Mannarino PA (1997) A treatment study for sexually abused preschool children outcome during a one-year follow-up. J Am Acad Child Adolesc Psychiatry 36:1228-1235. https://doi.org/10.1097/00004583-199709000-00015

[78] Cohen AJ, Deblinger E, Mannarino PA, Steer AR (2004) A multisite randomized controlled trial for children with sexual abuse–related PTSD symptoms. J Am Acad Child Adolesc Psychiatry 43:393-402. https://doi.org/10.1097/00004583-200404000-00005

[79] Cohen AJ, Mannarino PA, Lyengar S (2011) Community treatment of posttraumatic stress disorder for children exposed to intimate partner violence: a randomized controlled trail. Arch Pediatr Adolescent Med 165:16-21. https://doi.org/10.1001/archpediatrics.2010.247

[80] Costantino G, Primavera HL, Malgady GR, Costantino E (2014) Culturally oriented trauma treatments for latino children post 9/11. J Child Adolesc Trauma 7:247-255. https://doi.org/10.1007/s40653-014-0031-y

[81] Damra MKJ, Nassar HY, Ghabri FMT (2014) Trauma-focused cognitive behavioral therapy: cultural adaptations for application in Jordanian culture. Couns Psychol Quarterly 27:308-323. https://doi.org/10.1080/09515070.2014.918534

[82] Dawson K, Josecelyne A, Meijer C, Steel Z, Silove D, Bryant AR (2018) A controlled trial of trauma-focused therapy versus problem-solving in Islamic children affected by civil conflict and disaster in Aceh, Indonesia. Aust N Z J Psychiatry 52:253-261. https://doi.org/10.1177/0004867417714333

[83] Deblinger E, Steer AR, Lippmann J (1999) Two-year follow-up study of cognitive behavioral therapy for sexually abused children suffering post-traumatic stress symptoms. J Child Abus Negl 23:1371-1378. https://doi.org/10.1016/s0145-2134(99)00091-5.

[84] Deblinger E, Stauffer L, Steer R (2001) Comparative efficacies of supportive and cognitive behavioral therapies for young children who have been sexually abused and their nonoffending mothers. Child Maltreat 6:332-343. https://doi.org/10.1177/1077559501006004006

[85] Deblinger E, Mannarino PA, Cohen AJ, Steer AR (2006) A follow-up study of a multisite randomized controlled trial for children with sexual abuse-related PTSD symptoms. J Am Acad Child Adolesc Psychiatry 45:1474-484. https://doi.org/10.1097/01.chi.0000240839.56114.bb

[86] de Roos C, Greenwald R, den Hollander-Gijsman M, Noorthoorn E, van Buuren S, de Jongh A (2011) A randomised comparison of cognitive behavioural therapy (CBT) and eye movement desensitisation and reprocessing (EMDR) in disaster-exposed children.Eur J Psychotraumatol 2:1-11. https://doi.org/10.3402/ejpt.v2i0.594

[87] Diehle J, Opmeer CB, Boer F, Mannarino PA, Lindauer JLR (2015) Trauma-focused cognitive behavioral therapy or eye movement desensitization and reprocessing: what works in children with posttraumatic stress symptoms? A randomized controlled trial. Eur Child Adolesc Psychiatry 24:227-236. https://doi.org/10.1007/s00787-014-0572-5

[88] Goldbeck L, Muche R, Sachser C, Tutus D, Rosner R (2016) Effectiveness of Trauma-Focused Cognitive Behavioural Therapy (TF-CBT) for children and adolescents: a randomized controlled trail in eight German mental health clinics. Psychother Psychosom 85:159-170. https://doi.org/10.1159/000442824

[89] Jaycox HL, Mannarino PA, Walker WD, Langley KA, Gegenheimer LK, Scott M, Schonlau M (2010) Children's mental health care following hurricane Katrina: a field trial of trauma-focused psychotherapies. J Trauma Stress 23:223-231. https://doi.org/10.1002/jts.20518

[90] Jensen KT, Holt T, Ormhaug MS (2017) A follow-up study from a multisite randomized controlled trail for traumatized children receiving TF-CBT. J Abnorm Child Psychol 45:1587-1597. https://doi.org/10.1007/s10802-017-0270-0

[91] Jensen KT, Holt T, Ormhaug MS, Fjermestad WK, Wentzel-Larsen T (2018) Change in post-traumatic cognitions mediates treatment effects for traumatized youth – a randomized controlled trail. J Couns Psychol 65:166-177. http://dx.doi.org/10.1037/cou0000258

[92] Kameoka S, Tanaka E, Yamamoto S, Saito A, Narisawa T, Arai Y, Nosaka S, Ichikawa K, Asukai N (2020) Effectiveness of trauma-focused cognitive behavioral therapy for Japanese children and adolescents in community settings: a multisite randomized controlled trial. Eur J Psychotraumatol 11:1767987. https://doi.org/10.1080/20008198.2020.1767987

[93] Murray KL, Skavenski S, Kane CJ, Mayeya J, Dorsey S, Cohen AJ, et al (2015) Effectiveness of Trauma-Focused Cognitive Behavioral Therapy among trauma-affected children in lusaka, Zambia a randomized clinical trial. JAMA Pediactrics 169:761-769. https://doi.org/0.1001/jamapediatrics.2015.0580

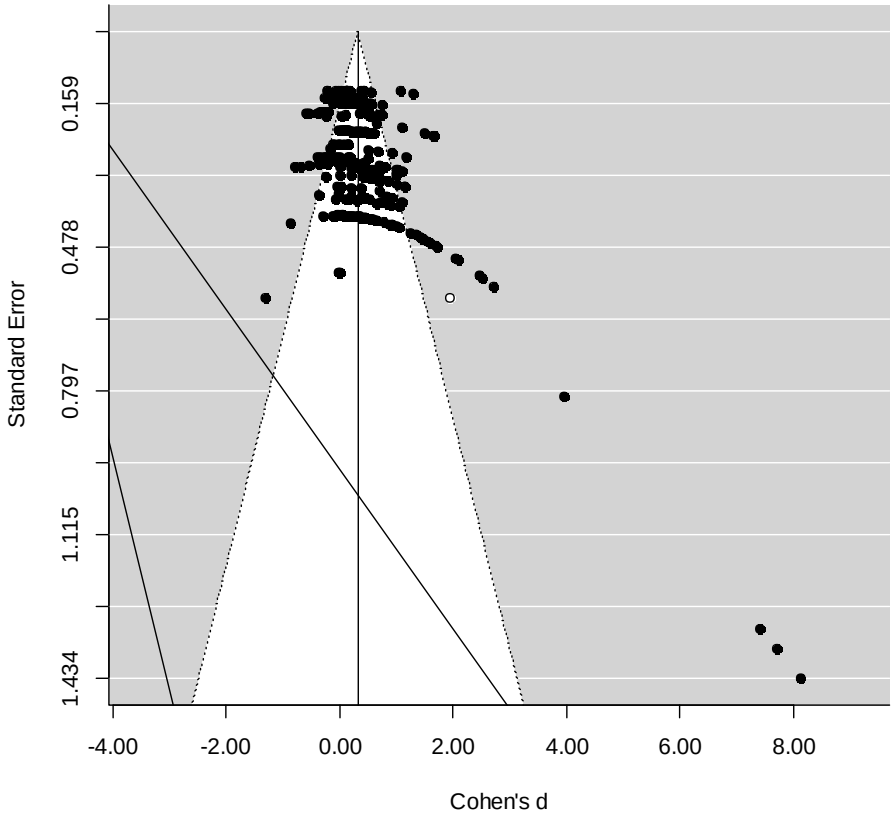
[94] Pfeiffer E, Sachser C, de Haan A, Tutus D, Goldbeck L (2017) Dysfunctional posttraumatic cognitions as a mediator of symptom reduction in trauma-focused cognitive behavioral therapy with children and adolescents: result of a randomized controlled trail. Beh Res Ther 97:178-182. http://dx.doi.org/10.1016/j.brat.2017.08.001

[95] Scheeringa SM, Weems FC, Cohen AJ, Amaya-Jackson L, Guthrie D (2011) Trauma-focused cognitive-behavioral therapy for posttraumatic stress disorder in three through six year-old children: a randomized clinical trial. J Child Psychol Psychiatry 52:853-860. https://doi.org/10.1111/j.1469-7610.2010.02354.x.

[96] Schottelkorb AA, Doumas DM, Garcia R (2012) Treatment for childhood refugee trauma: a randomized, controlled trial. Int J Play Ther 21:57-73. http://dx.doi.org/10.1037/a002743

[97] Shein-Szydlo J, Sukhodolsky GD, Kon SD, Tejeda MM, Ramirez E, Ruchkin V (2016) A randomized controlled study of cognitive-behavioral therapy for posttraumatic stress in street children in Mexico city. J Trauma Stress 29:406-414. https://doi.org/10.1002/jts.22124

Appendix 1. Funnelplot CBTT with Caregiver Involvement for Traumatized Children



Note. A contour enhanced funnel plot is presented with the standard error on the y-axis and Cohen's *d* on the x-axis. The black dots denote the effect sizes extracted from the primary studies and the white dot denote the effect size that was imputed by the trim-and-fill algorithm. The solid vertical line represents the overall mean effect of CBTT with caregiver involvement (estimated in a traditional 2-level random effects meta-analytic model). From inside to outside, the dashed lines limit the 90%, 95%, and 99% pseudo confidence interval regions.