Do psychological treatments for PTSD in children and young people reduce trauma-related appraisals? A systematic review and meta-analysis

Charlotte Smith [a], Catherine Ford [a], George Baldwin [a], Tine K. Jensen [b], Thanos Karatzias [c], Marianne Skogbrott Birkeland [d], Richard Meiser-Stedman [a,*]

[a] Department of Clinical Psychology and Psychological Therapies, Norwich Medical School, Faculty of Medicine and Health Sciences, University of East Anglia, Norwich, UK
[b] Department of Psychology, University of Oslo, Norway
[c] School of Health and Social Care, Edinburgh Napier University, Edinburgh, UK
[d] Norwegian Center for Violence and Traumatic Stress Studies, Norway

A B S T R A C T

Research is increasingly highlighting the role of negative trauma-related appraisals in child and adolescent post-traumatic stress disorder (PTSD). The cognitive model of PTSD claims that an essential mechanism of treatment is a reduction in these appraisals. The current systematic review with meta-analysis investigated the extent to which psychological treatments for PTSD reduce negative trauma-related appraisals in children and adolescents. Four databases (PsycINFO, Medline Complete, CINAHL Complete and PTSDpubs) were searched on the 11–12th December 2022. The Risk of Bias 2 (ROB-2) tool was used to assess for risk of bias. Thirteen studies were included in this review, comprising 937 child and adolescent participants. Using a random effects model to perform the meta-analysis, a medium pooled effect size for the effect of current treatments on trauma-related appraisals was found ($g = -.67$, 95% CI [-.86, -.48]). There was only a moderate level of heterogeneity between studies ($I^2 = 44.4\%$), increasing the confidence with which these findings can be interpreted. These results indicate that psychological treatments for child and adolescent PTSD significantly reduce negative trauma-related appraisals. However, it is important to note that no trial included in the review was categorised as having low risk of bias.

1. Introduction

Decades of research highlight the fundamental importance of negative trauma-related appraisals in PTSD (Brown et al., 2019). A wide range of different types of trauma-related appraisals have been documented and assessed; the Post-Traumatic Cognitions Inventory (Foa et al., 1999), the most widely studied measure of trauma-related appraisals, addresses self-related appraisals (e.g. "I have permanently changed for the worse", "I can't stop bad things from happening to me", "My reactions since the event meant that I am going crazy"), world-related appraisals (e.g. "People are not what they seem", "People can't be trusted") and self-blame appraisals ("Someone else would not have gotten into this situation", "The event happened because of the way I acted"). The extent of these appraisals is pivotal in determining whether, and to what extent, post-traumatic stress is experienced (Gomez de La Cuesta et al., 2019; Meiser-Stedman et al., 2019). Research suggests that appraisals predict subsequent PTSD-related

psychopathology (see Brown et al., 2019; McLean et al., 2015; O'Donnell et al., 2007). Indeed, whether an individual forms these appraisals following trauma has been identified as more influential in terms of subsequent (PTSD-related) distress than other key characteristics, such as the nature of the trauma experienced (e.g., the number of traumatic events and whether these were interpersonal in nature; Kube et al., 2023; Martin et al., 2013, Srinivas et al., 2015). Successfully addressing trauma-related appraisals has also been proposed as key in preventing relapse following successful PTSD treatment (Scher et al., 2017).

Now considered fundamental to PTSD, trauma-related appraisals are incorporated within diagnostic criteria for PTSD (Woud et al., 2019). 'Negative alterations in cognitions and mood' are included in the diagnostic criteria for PTSD within the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). Trauma-related appraisals have also been added to the ICD-11 criteria for complex PTSD (CPTSD) via the 'disturbances in self organisation' section (World Health Organisation, 2019). The rationale for this is that

more severe and complex forms of PTSD (i.e., complex PTSD) are typically associated with pronounced disturbances in identity and self-concept (Karatzias, Hyland, et al., 2019; Ponnamperuma & Nicolson, 2015). This signifies an important development in the conceptualization of PTSD, extending the focus from the traditional three-symptom clusters (i.e. hyperarousal, avoidance, re-experiencing) to the important cognitive and affective shifts in the perception of the world, self and future that occur in the condition (Brown et al., 2019).

The Ehlers and Clark (2000) cognitive model of PTSD holds that negative trauma-related appraisals are not only a symptom of PTSD but also the core mechanism through which PTSD develops and is maintained (Brown et al., 2019; Woud et al., 2019). It is proposed that this occurs in part through appraisals triggering the individual to feel unsafe, and therefore driving them to engage in a range of behaviours to reduce this perceived danger which unintentionally perpetuate the distress (Ehlers & Clark, 2000). It is held that PTSD-related treatment gains during therapy will occur in large part due to shifts in these negative trauma-related appraisals (Dunmore et al., 2001; Ehlers et al., 2005). Trauma-focused cognitive behavioural therapy (TF-CBT) in its various forms (e.g. Cognitive Therapy for PTSD [CT-PTSD]) privileges the process of identifying these appraisals, evaluating them, and revising them (Cohen et al., 2016; Smith et al., 2014). A fundamental aim of this type of therapy is to develop cognitive appraisals of the trauma that are balanced, functional and flexible (Dalgleish et al., 2005). The cognitive model proposes that the successful treatment of PTSD is largely dependent upon the extent to which they shift appraisals (Ehlers & Clark, 2000).

The various forms of TF-CBT have indeed demonstrated successful outcomes in the treatment of both adult populations and child and adolescent populations with PTSD (Hoppen et al., 2023, 2024). As a result, TF-CBT is considered the 'gold standard' treatment for PTSD worldwide (Bisson et al., 2019). Given the critical role that trauma-related cognitions play in the aetiology of PTSD, and the centrality of negative appraisal relating to the self in CPTSD, it is important to establish the extent to which psychological therapies like TF-CBT successfully reduce negative trauma-related appraisals.

To date no reviews of the child and adolescent PTSD literature has considered this question. In the adult literature, several reviews have been undertaken. In the most recent such review, Banz et al. (2022) conducted a meta-analysis investigating whether PTSD treatments lead to reductions in negative self-cognitions in adults. They reported a medium-large pooled effect size for the effect of current psychological treatments on negative self-concept, a finding that was consistent with previous meta-analyses in this population (Coventry et al., 2020; Diehle et al., 2014; Karatzias et al., 2019).

The child and adolescent literature on psychological treatments for PTSD and the impact of psychological treatment on trauma-related appraisals has advanced considerably in recent years (Brown et al., 2019). Multiple studies of children and adolescents exposed to single-event trauma (such as road traffic collisions or assaults) have suggested that existing treatments for PTSD reduce negative appraisals in this age group (Woud et al., 2019). However, it is also important to acknowledge the existence of research that does not show this (e.g. Kangaslampi et al., 2016). To date, there has been no systematic and comprehensive review of the literature in this area to clarify whether, and to what extent, current treatments reduce appraisals in child and adolescent PTSD treatment. In addition to confirming that psychological therapies can successfully reduce a mechanism proposed to underpin the onset and maintenance of PTSD (Ehlers & Clark, 2000), establishing whether trauma-related appraisals are reduced by such treatments could also have relevance for our (currently very limited) understanding of the treatment of conditions like CPTSD (where negative self-concept is a central symptom) in children and adolescents. Moreover, it may be relevant for other psychiatric disorders in trauma-exposed children and adolescents where negative appraisals related to the self, the world and others are implicated (e.g. conditions frequently comorbid with PTSD

such as depression; Kilpatrick et al., 2003; Zhang et al., 2022). We recognise that there is now some potential for confusion around how to conceptualise trauma-related appraisals, with some accounts suggesting that they have *causal* role in the aetiology of PTSD (e.g. Ehlers & Clark, 2000), while other diagnostic frameworks (both DSM-5 PTSD and ICD-11 CPTSD) consider them as *symptoms of disorder*. This issue is theoretically and clinically important and warrants further commentary, but for the purposes of the present review we focus on appraisals simply in terms of whether they can be reduced through psychological therapies in this age group.

In summary, the present study aims to address this gap in research, by conducting a systematic review with meta-analysis to investigate whether, and to what extent, the current range of treatments for child and adolescent PTSD reduce negative trauma-related appraisals in comparison to (active and passive) control conditions.

2. Methods

2.1. Protocol registration

This review was registered on the PROSPERO database on December 9, 2022 (CRD42022342743).

2.2. Primary outcome

The primary outcome was the pooled effect size of the comparison of post-treatment measures of negative trauma-related appraisals between psychological treatments for child and adolescent PTSD and control conditions.

2.3. Eligibility criteria

Studies were required to meet the following inclusion criteria.

1. The mean age of the sample was equal to or under 18 years of age.
2. The sample had a clinical diagnosis of PTSD OR met the cut off for full or partial PTSD on a PTSD questionnaire at the point of entry, or demonstrate symptoms in at least two of the ICD/DSM PTSD symptom clusters.
3. The study included a psychological treatment for PTSD.
4. The study involved a control condition: waiting list, no treatment, treatment as usual, an active or attentional control group (e.g. supportive counselling).
5. The study assessed trauma-related appraisals as one of its outcomes (e.g. the Child Post-Traumatic Cognitions Inventory [CPTCI]).
6. The study included a quantitative measure of trauma-related appraisals at post-intervention.
7. The study was a randomized controlled trial.
8. The study was published in a peer-reviewed journal article.

2.4. Search Strategy and study selection

Four electronic bibliographic databases (PsycINFO, Medline Complete, CINAHL Complete and PTSDpubs) were searched on the 11–12th December 2022 (going back to database inception) by the first author using the following search terms.

1. (child* OR adolescen* OR "young person" OR teen* OR "young adult" or "young-adult" OR juvenile* OR youth OR pediatric OR paediatric OR boy* OR girl* OR pupil* OR student*) AND
2. (PTSD or posttrauma* or "post-trauma*" OR "post trauma*" OR "traumatic stress") AND
3. (RCT OR "randomi* control* trial" OR "random* clinical trial" OR "random* trial" OR "controlled clinical trial" OR "random* allocated" OR "random* assign*" OR randomly OR randomized OR trial) AND

4. (treatment OR therap* OR intervention OR psychotherap* OR EMDR OR CBT OR TF-CT OR TFCT OR TFCBT OR TF-CBT OR "eye movement" OR "narrative exposure")

The first three were searched via one integrated search using the EBSCO platform. The PTSD pubs search was carried out separately. The results were limited to 'academic journals' (PTSD pubs) or 'peer-reviewed journals' (the integrated EBSCO search). No further limitations to the search results were applied. Additional records were identified from reviews of child and adolescent PTSD research in the previous five years and articles citing the paper documenting the development of the CPTCI (Meiser-Stedman et al., 2009) using the Google Scholar 'cited by' function.

After removing duplicates, article titles and abstracts of the articles were screened by the first author and articles that were clearly unsuitable/ineligible were excluded. For the remaining articles, the full text was sourced and screened using the full eligibility criteria by the first author. For those papers that were ineligible, the reason for exclusion was recorded. Non-English papers were translated into English using Google Translate. This is considered an acceptable practice for the function of screening papers for literature reviews (Jackson et al., 2019).

When screening articles, if there was uncertainty regarding whether a paper met eligibility criteria, the wider research team was consulted on this, and a shared decision was made. Finally, all thirteen papers were reviewed for eligibility by a graduate-level researcher (GB), who confirmed that all 13 papers met criteria.

2.5. Data extraction

Data extraction was completed by two authors (CS, RMS), with complete agreement on the extracted data established. The following data were extracted: study characteristics (e.g. study authors, year of publication), sample characteristics (e.g. % female, mean age) and condition characteristics (e.g. the nature of the treatment and control groups, mean treatment length). Post-treatment means on measures of appraisals, standard deviations and sample sizes were extracted for each (control and treatment) condition. If multiple measures of appraisals were used, results for the most widely used measure across studies were extracted (an approach taken by Bhattacharya et al., 2023). Each study was coded for type of control (active or passive) and use of the full or short form of the CPTCI. When coding for the former, each condition was assessed on a case-by-case basis, considering the level of intervention provided; control conditions were deemed "passive" if they involved a waiting list, no treatment or treatment as usual where no therapist attention was provided, while any control condition that included some care or treatment with a therapist (but would not be considered a bone fide therapy) was classed as "active" (e.g. supporting counselling, child-centred therapy, treatment as usual with clinician contact).

When required statistics were not included in reports, they were calculated where possible (e.g. where standard error was reported, this was transformed into standard deviation, and where Cohen's *d* was provided this was transformed into Hedges' *g*). For one paper (Smith et al., 2007) an effect size was derived by converting the relevant standardised regression coefficient from a mediation analysis to a Cohen's d. For one paper (Najavits et al., 2006) results were only provided for the one of the three subscales of the appraisals measure used (the World Assumptions Scale) where there was a significant between groups difference found (i.e. data were not available for the two non-significant subscales). In this case an effect size for the overall scale was derived by calculating an effect size for each of the missing sub-scales based on the given sample size and a p-value of .5. For papers that provided only subscale means, these were pooled to give an overall figure (Cohen et al., 2004; Dildar & Kausar, 2019).

2.6. Risk of bias

The ROB-2 tool (Sterne et al., 2019) was used to assess risk of bias. The ROB-2 is the recommended tool to assess the risk of bias in randomized trials included in Cochrane Reviews. This assessment was completed independently by two researchers (CS, GB). The researchers then met to compare ratings. Where discrepancies in ratings were identified, these were discussed until a consensus was reached.

2.7. Analysis

Meta-analysis was conducted using the metafor package (Viechtbauer, 2010) in R version 4.2.2. A random effects model was used to produce pooled effect size estimates, using restricted maximum likelihood (REML) estimation to measure heterogeneity. The primary outcome of interest was the pooled between-groups effect size, calculated using Hedges' *g* (based on a random-effects model). Guidelines provided by Cohen were used to interpret the effect size (Cohen, 1977). On most measures a lower score signified a greater shift in (weakening of) negative trauma-related appraisals. One exception to this was the World Assumptions Scale used by Najavits et al. (2006). This was transformed to be consistent with the direction of the other measures.

Cochran's Q and the I^2 statistic were used to assess for heterogeneity and interpreted using the guidelines of Higgins et al. (2003). Prediction intervals were calculated to provide estimates of future effects that may be seen in subsequent studies. Publication bias was assessed using Egger's test for asymmetry, and by visual inspection of the funnel plot. The trim and fill method was used (Duval & Tweedie, 2000) to estimate the number of missing studies in this review, and provide an approximate adjustment of the results to account for these. This allows for an assessment of the extent to which possible missing studies may have biased the results.

One RCT included two treatment arms (eye movement desensitization therapy; EMDR and cognitive behavioural writing therapy; CBWT). The main meta-analysis was run using results from the EMDR treatment arm as this is the more widely used treatment approach in the field. A sensitivity analysis was run using results from the CBWT arm to confirm that this did not significantly impact the results. One RCT (McLean et al., 2015) reported only 3-month follow up data in the published article. The authors were not successful in retrieving the post-treatment means from this trial and so the 3-month post-treatment data was used. A second sensitivity analysis was run, removing this result, to check that this factor did not significantly affect the overall result. A third sensitivity analysis was run to confirm that studies at high risk of bias did not significantly impact the results. Studies at high risk of bias were removed, to examine the effect of this on the overall result.

Two moderator analyses were run, using a mixed effects meta-regression model. The first examined whether there was a moderating effect for the type of control condition used (i.e. active or passive). The second examined whether there was a moderating effect for the type of appraisal measure used (i.e. full or short form of the CPTCI vs other).

3. Results

3.1. Included Studies

A PRISMA flowchart of the review process is provided in Fig. 1. In total, 3309 articles were screened for inclusion. The full text was sourced for 1535 of these. During the review process, one paper was identified that met all eligibility criteria except for providing data on trauma-related appraisals (Rossouw et al., 2018). However, it was stated by the authors that data on appraisals were collected to be published in a subsequent article. The authors provided these data on request and the paper was therefore included in the review. Thirteen studies were therefore identified as meeting eligibility criteria and were included in this review.
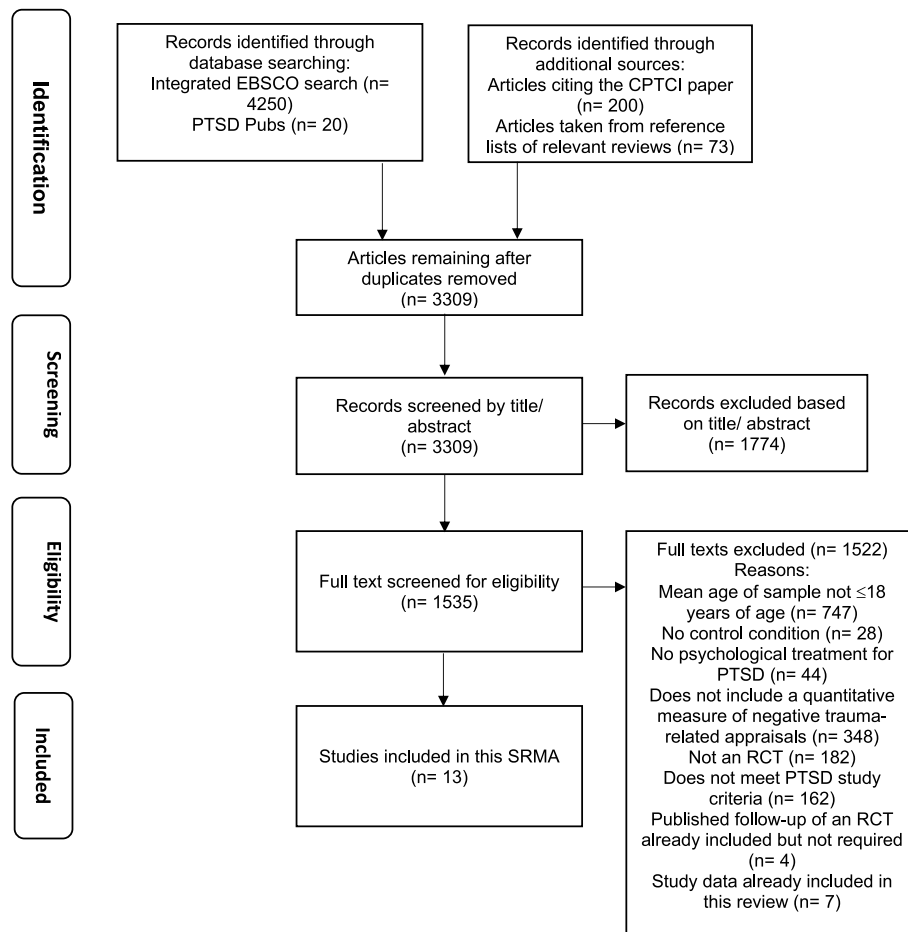
Fig. 1. Prisma flowchart of the review process.

3.2. Study characteristics

The characteristics of the 13 RCTs included in the review are shown in Table 1. Across studies, there were 14 treatment conditions and 13 control conditions (de Roos et al., 2017, included two treatment arms; CBWT and EMDR). In the main-meta-analysis, 937 children and adolescents were included, with 479 in the treatment condition. The mean number of participants in each study is 72 (range 23–183). Based on the eleven studies that provided a mean age of the sample, the overall mean age was 14.1 ($SD = 1.5$). The sample was predominantly female (70% of the overall sample). With respect to trial inclusion criteria, the majority of trials used a structured interview based on DSM-IV PTSD, but with subsyndromal criteria; for full details, see Supplementary Table 1.

The most common treatment provided were forms of TF-CBT (e.g. prolonged exposure for adolescence; PE-A, CT-PTSD, TF-CBT) (8 studies). Eight studies used a passive control condition (e.g. waiting list), and five studies used an active control condition (e.g. child-centred therapy, supportive counselling). Two trials used a "treatment as usual" (TAU) condition. In one of these trials (Jensen et al., 2018) TAU involved psychotherapy and so the trial was classed as an active control trial. In the other trial (Najavits et al., 2006) the control condition involved usual care which would also be available to participants in the experimental condition and did not involve additional therapist contact; as such, this was classed as a passive control condition trial. One trial (Ford et al., 2012) used an "enhanced treatment as usual" (ETAU) condition, that involved a form of psychotherapy of similar duration to the experimental condition; this was therefore categorised as an active control condition trial.

Most studies assessed negative trauma-related appraisals using the CPTCI (8 studies) or the PTCI (2 studies). One study used the World Assumptions Scale, one study used the child post-trauma attitudes scale, and one study used the children's perceptions and attributions scale.

3.3. Risk of bias

Using the ROB-2 tool, seven studies were identified as having high risk of bias, with the six remaining studies being identified as raising some concerns (see Table 2). Examining ratings within each domain, most studies ($k = 9$) were identified as having low risk of bias during the randomisation process and in terms of missing outcome data. Most studies ($k = 7$) were reported as having some concerns related to the risk of bias in the selection of the reported result. This was mostly because a pre-specified analytic plan could not be sourced for these studies. All studies were identified as raising some concerns regarding bias resulting from deviations from the intended intervention. This is primarily because, due to the nature of the studies, it was not possible to blind the participant nor the therapist to the condition they had received. This was paired with a lack of comment in the papers on whether any deviations from the treatment protocol had occurred in the RCT. All studies were also rated as having some concerns regarding bias related to the measurement of the outcome. This is primarily because appraisals were assessed using a subjective child and adolescent self-report measure and therefore scores may have been influenced by knowledge of the assigned condition.

Table 1
Study characteristics of the 13 included trials.

Study ID	Location	N	Treatment	Control	Control type	Appraisal measure	Timing of appraisal measure completion	Mean Age (SD, range where available)[a]	% Female	Majority Ethnicity
Cohen (2004)	USA	229	TF-CBT	CCT	Active	CAPS	12 weeks	10.76 (8–14 years 11 months)	79	60% Caucasian
de Roos (2017)	Netherlands	103	EMDR, CBWT	WL	Passive	CPTCI	6 weeks	13.06 (2.92, 8–18)	57.3	28.2% immigrant
Dildar (2019)	India	60	TRT (G)	WL	Passive	CPTCI	10 days	14.27 (.98)	100	Not provided
Ford (2012)	America	59	TARGET	ETAU	Active	PTCI	4 months	14.70 (1.2, 13–17)	100	59% Latino or mixed race
Goldbeck (2016)	Germany	159	TF-CBT	WL	Passive	CPTCI	2 months	13.03 (2.8)	71	89.9% German native
Jensen (2018)	Norway	156	TF-CBT	TAU	Active	CPTCI	35 weeks	15.1 (10–18)	79.5	73.7% Norwegian
Khubsing (2020)	India	23	Group EMDR (G)	WL	Passive	CPTCI	3 days	EMDR 13.55 (2.42) WL 14.50 (2.61)	0	Not provided
McLean (2015)	USA	61	PE-A	CCT	Active	C-PTAS	6 months	15.30 (1.5, 13–18)	100	55.7% Black
Meiser-Stedman (2017)	UK	29	CT-PTSD	WL	Passive	CPTCI	10 weeks	13.3 (2.5, 8–17)	72.4	86.2% White British
Najavits (2006)	USA	32	Seeking safety	TAU	Passive	WAS	3 months	16.06 (1.22)	100	78.8 % Caucasian
Pfeiffer (2018)	Germany	99	Mein Weg (G)	UC	Passive	CPTCI-S	2 months	Mein Weg 17.00 (1.11) UC 16.92 (.76)	7.07	45.5% from Afghanistan
Rossouw (2018)	South Africa	63	PE-A	Supportive counselling	Active	PTCI	7–14 weeks	15.35 (13–18)	87.3	69.8% mixed parentage
Smith (2007)	UK	24	CBT	WL	Passive	CPTCI	10 weeks	13.89	50	45.8% White British

Note: TF-CBT = trauma-focused cognitive-behavioural therapy, CCT = child-centred therapy, CAPS= Children's attributions and perceptions scale, EMDR = eye movement desensitization and reprocessing therapy, CBWT = cognitive behavioural writing therapy, WL = wait list control, CPTCI= CPTCI= child posttraumatic cognitions inventory, TRT = teaching recovery techniques, ETAU = enhanced treatment as usual, TAU = treatment as usual, PE-A = prolonged exposure therapy for adolescents, US = usual care, CBT = cognitive behavioural therapy, WAS = world assumptions scale, PTCI = post-traumatic cognitions inventory, C-PTAS = child post-trauma attitudes scale.

[a] Where pooled age was not provided, statistics are provided for each condition. (G) Indicates a group-based intervention.

Table 2
Risk of bias 2 ratings for each study and each domain.

Study ID	Randomisation process	Deviations from the intended intervention	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall risk
Cohen (2004)	Some	Some	Some	Some	Some	High
de Roos (2017)	Low	Some	Low	Some	Some	Some
Dildar (2019)	Some	Some	Low	Some	Some	High
Ford (2012)	Low	Some	Some	Some	Some	High
Goldbeck (2016)	Low	Some	Low	Some	Low	Some
Jensen (2018)	Some	Some	Some	Some	Some	High
Khubsing (2020)	Some	Some	Low	Some	Some	High
McLean (2015)	Low	Some	Low	Some	High	High
Meiser-Stedman (2017)	Low	Some	Low	Some	Low	Some
Najavits (2006)	Low	Some	Low	Some	High	High
Pfeiffer (2018)	Low	Some	Low	Some	Low	Some
Rossouw (2018)	Low	Some	Some	Some	Low	Some
Smith (2007)	Low	Some	Low	Some	Some	Some

Note: Studies that had at four or five domains that were considered as having 'some' concerns regarding bias were judged as having an overall high risk of bias.

3.4. The impact of child and adolescent PTSD interventions on negative trauma-related appraisals

Negative trauma-related appraisals were less strongly endorsed following treatment compared to control conditions, with a medium-sized effect ($g = -.67$, 95% CI -.86, -.48, $k = 13$, $p < .0001$; see Table 2). A forest plot is provided in Fig. 2. The I^2 statistic indicated a moderate level of heterogeneity ($I^2 = 44.4\%$). The prediction interval (-1.15, $-.20$) did not cross zero, suggesting that future trials should expect to observe an effect in favour of the treatment condition.

3.5. Sensitivity analyses

A sensitivity analysis was used to assess the impact on the results of including the 3-month post-treatment means provided by de Roos et al. (2017; see Table 2). Removing this study from the analysis, had a minimal impact on the pooled effect size ($g = -.68$, 95% CI -.89, -.47, $p < .0001$) and the effect remained significant. A second sensitivity analysis assessed the impact of substituting the EMDR condition used in the main meta-analysis with the CBWT condition in the RCT conducted by de Roos et al. (2017). This also demonstrated minimal effect on the overall effect size ($g = -.66$, 95% CI -.85, -.47, $p < .0001$) and also remained significant. A third sensitivity analysis was run, removing the

Study

SMD [95% CI]

Cohen et al. (2004)   -0.70 [-1.00, -0.40]

de Roos et al. (2017)   -0.67 [-1.23, -0.10]

Dildar & Kausar (2019)   -1.23 [-1.78, -0.68]

Ford et al. (2012)   -0.10 [-0.69, 0.49]

Goldbeck et al. (2016)   -0.25 [-0.56, 0.07]

Jensen et al. (2018)   -0.59 [-0.97, -0.21]

Khubsing et al. (2020)   -0.85 [-1.70, 0.00]

McLean et al. (2015)   -0.92 [-1.45, -0.39]

Meiser-Stedman et al. (2017)   -1.04 [-1.86, -0.22]

Najavits et al. (2006)   -0.94 [-1.66, -0.22]

Pfeiffer et al. 2018   -0.46 [-0.85, -0.06]

Rossouw et al. (2018)   -0.55 [-1.11, 0.01]

Smith et al. (2007)   -1.61 [-2.53, -0.69]

RE Model   -0.67 [-0.86, -0.48]

-3.00   -2.00   -1.00   0.00   1.00
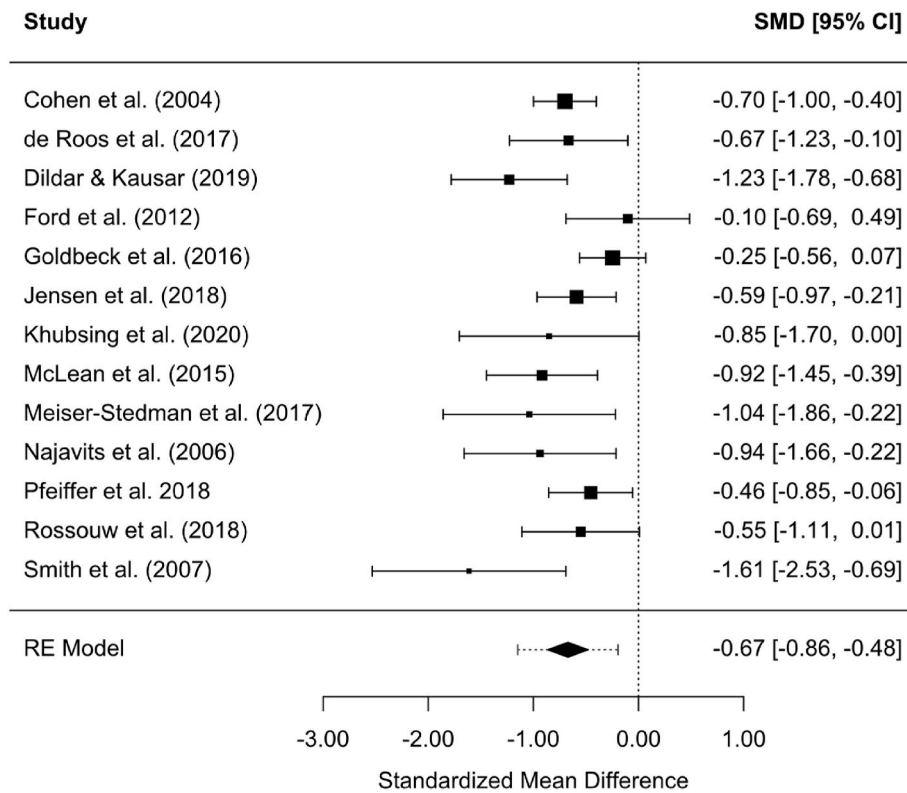
Standardized Mean Difference

Fig. 2. Forest plot showing the post-treatment effect sizes and 95% confidence intervals for the 13 included studies.

studies at high risk of bias. This had a minimal impact on the pooled effect size ($g = -.60$, 95% CI -.91, -.30, $p < .0001$).

Further sensitivity analyses were conducted to investigate the impact of how we handled missing sub-scale data in the Najavits et al. (2006) study. A more conservative approach, where the missing sub-scales were assumed to have an effect size of zero, yielded a pooled effect size very similar to our main result ($g = -.66$, 95% CI [-.85, -.47]). The most liberal approach, where the missing sub-scales were assumed to have effect sizes as large as the only significant sub-scale, yielded a larger effect size ($g = -.78$, 95% CI [-1.04, -.51]) that was characterised by greater heterogeneity. Nevertheless, this would still be classed as a medium effect size.

It is possible that our results may have been skewed by baseline differences, i.e. the possibility that the psychological therapy conditions comprised youth with lower appraisal scores at baseline. No trials investigated change scores, which might have accounted for this issue. We therefore inspected baseline scores on the appraisal measures reported in each trial; baseline appraisal data was available for 10 studies, and interestingly did show a small but significant effect at baseline in favour of psychological therapies (i.e. the appraisal scores were lower in the experimental conditions; Hedges' $g = -.21$, 95% CI -.40, -.02, $p = .03$). However, this effect was driven by only two studies (Cohen et al., 2004; Khubsing et al., 2020); when each was removed in turn through a "leave one out" analysis, the pooled effect at baseline was no longer significant (removing Cohen et al., 2004, $g = -.11$, 95% CI -.26, .05; removing Khubsing et al., 2020, $g = -.17$, 95% CI -.35, .01). More importantly, when these two trials were removed from the overall meta-analysis of post-treatment appraisal scores, the effect was largely unchanged ($g = -.67$, 95% CI -.90, -.44), suggesting that baseline differences were unlikely to be responsible for the between groups difference that we found at post-treatment.

3.6. Moderator and subgroup analyses

No significant moderating effect was found for the nature of the

Table 3
Results of the meta-analysis, moderator/subgroup analyses and sensitivity analyses.

Analysis	k	N	g	95% CI	95% PI	Cochran's Q (p value)	I^2, %
Main meta-analysis							
Main results[a]	13	937	−.67	−.86, −.48	−1.15, −.20	21.8 (.039)	44.4
Moderator and subgroup analyses							
Active vs. passive conditions (moderator p = .46)							
Active arms only	5	454	−.62	−.81, −.43	−.81, −.43	4.6 (.335)	.0
Passive arms only	8	483	−.78	−1.10, −.46	−1.51, −.05	17.3 (.016)	58.5
CPTCI vs. other (moderator p = .77)							
CPTCI only	8	564	−.73	−1.02, −.43	−1.39, −.06	16.5 (.021)	58.8
Non-CPTCI only	5	373	−.66	−.87, −.45	−.87, −.45	5.2 (.272)	.0
Sensitivity analyses							
de Roos 2017 CBWT condition included	13	936	−.66	−.85, −.47	−1.14, −.19	21.9 (.038)	44.3
McClean 2015 removed	12	876	−.65	−.85, −.45	−1.14, −.16	20.5 (.038)	45.5
High risk of bias studies removed	6	418	−.60	−.91, −.30	−1.19, −.02	10.2 (.071)	48.3
Individual format trials only	10	755	−.63	−.84, −.43	−1.08, −.19	16.1 (.065)	39.8

Note.
[a] de Roos 2017 EMDR treatment condition included. All effects p < .0001.

control group (whether it was active or passive) or type of measure used (CPTCI or other; see Table 3). We were not able to evaluate whether treatment format moderated our results (as planned in our protocol) as there were insufficient group trials (k = 3); however, a sensitivity analysis focusing on individual treatment format trials (k = 10) yielded a very similar effect size.

3.7. Publication bias

The funnel plot was visually inspected for asymmetry to assess publication bias and a degree of asymmetry was identified. The Egger's test was significant (p = .027), indicating the presence of publication bias. A trim and fill procedure (Duval & Tweedie, 2000) estimated that approximately four studies were missing from the review. When estimates for these four missing studies were included (k = 17), the pooled effect size reduced to g = −.54 (95% CI -.75, −.33, p < .001), i.e. a significant medium-sized effect remained.

4. Discussion

This meta-analysis found that psychological treatments for child and adolescent PTSD reduced negative trauma-related appraisals, with an overall medium effect size reported. This closely parallels findings in the adult PTSD literature (Banz et al., 2022). Banz and colleagues reported a similar pooled effect size (g = −.67) in their meta-analysis investigating the impact of psychological treatments on negative self-cognitions in adults. Whilst the present findings were slightly affected by the nature of the control condition, showing a stronger effect when compared with passive controls, no significant moderating effect was found. These findings suggest that despite differences in treatments, all include a component or components which successfully reduce negative trauma-related appraisals. There was only a moderate level of heterogeneity between studies, which increases the confidence with which these results can be interpreted. Although a trim and fill test (Duval & Tweedie, 2000) estimated that four studies were missing from this review, when estimates for these were added, the pooled effect sized reduced only slightly and the effect remained significant.

The review's findings were robust to the exclusion of high risk of bias studies. While this may in part be attributed to the nature of the risk of bias instrument used here, which is probably more attuned to drug trials, nevertheless it is important to note that no studies were rated as low risk of bias and that this may have influenced the effect size obtained.

It was not possible to conduct a moderator analysis exploring the potential moderating effect of therapy type on the outcome (i.e. cognitive-based vs. other treatment types). This is due to the lack of studies available, and subsequently, the small k that would be in each subgroup. It would prove useful to include this in future reviews, once more data is available.

These findings may have implications for treating related conditions. The finding that current psychological treatments for PTSD reduce trauma-related appraisals in children and adolescents is promising for the treatment of children with more 'complex' PTSD (e.g. those that fulfil criteria for CPTSD or have experienced multiple traumatic events). Indeed, several of the trials included in this review included youth who might be considered at high risk of developing CPTSD (e.g. youth who have been sexually abused or enslaved, refugees). Negative trauma-related appraisals have been identified as particularly strong in this subgroup (Karatzias, Hyland, et al., 2019; Kube et al., 2023; Ponnamperuma & Nicolson, 2015). This meta-analysis adds support for the potential appropriateness of existing treatments for this subgroup. Nevertheless, the study of CPTSD treatment in its early stages, particularly in youth, and further work in this area is clearly warranted.

4.1. Strengths, limitations, and future recommendations for research

One strength of this review is the inclusive definition of negative

trauma-related appraisals adopted, which permitted assessment of the impact of treatments on a wide range of appraisals, including those centred on the self, the world, others, and the future. This contrasts to the more restricted approach adopted by Banz et al. (2022), who limited their review to negative self-cognitions. The findings were therefore able to evidence the breadth of cognitive appraisals successfully targeted by current child PTSD treatments. Another strength is that we did not restrict included articles to those written in English. This does not seem to be standard practice in such reviews (e.g. see Brown et al., 2019). It is also worth noting that this meta-analysis, whilst being based on only 13 studies, included a large sample size of 937 children.

One limitation of this review is that the sample is largely biased towards adolescent females from Western countries, limiting the generalizability of our findings. This reflects a general trend in the wider PTSD literature (Martin et al., 2013). Gender differences have been noted in research on appraisals, whereby females tend to form stronger negative trauma-related appraisals than males (de Haan et al., 2017; Martin et al., 2013) and this may have influenced the present results. Bernardi et al. (2018) have also discussed the ways in which the formation of trauma-related appraisals are affected by culture and have questioned whether research on trauma-related appraisals conducted with Western samples can be applied to non-Western samples. In addition to this, young children were underrepresented in this review, with the youngest participant being eight years old. This may in large part reflect the methodological challenges involved in assessing trauma-related cognitions in very young children. However, it is important to note this as a limitation in terms of the generalizability of the findings. It remains largely unknown whether current treatments for child PTSD reduce negative appraisals in very young children.

Methodologically this systematic review was weakened by the reliance on a single researcher to conduct the title and abstract screening, and full text review phases of the systematic review, due to resource limitations. Moreover, the lack of change score data raises the possibility that the between groups difference we observed can be attributed to baseline differences. While our sensitivity analyses suggested that this was unlikely, we can not completely rule out this possibility. Further meta-analyses that involve individual participant data (Riley et al., 2013) may help to clarity this; unfortunately, this far more time-consuming approach was beyond the scope of the present review.

In terms of recommendations for future research, it became clear during the process of screening that the collection of data on trauma-related appraisals is not routine practice in treatment trials for child and adolescent PTSD. To the extent that greater research into this area could lead to significant advances in understanding the impact of psychological therapies on appraisals, and clarify the active mechanisms of treatment (an area which is currently underdeveloped; Kindt et al., 2007), it is recommended that such measures be routinely incorporated into future trials; indeed, these findings also support the use of such measures in routine clinical practice.

As noted above, it is unclear which elements of psychological therapies for PTSD in children and adolescents lead to improvement in appraisals, e.g. general training is understanding the links between thoughts, feelings and behaviours, cognitive restructuring of trauma-specific appraisals, the development of a coherent trauma narrative, or some other aspect of therapy. Understanding what component or components underpin shifts in trauma-related appraisals may be helpful for further treatment refinement. We recommend that future studies include follow-up timepoints where they assess trauma-related appraisals. There were insufficient data available to complete analyses on follow up data. This means that at present, it is uncertain whether the impact of treatment on trauma-related appraisals persists over the long term. Ascertaining whether this is the case would provide a further contribution to the validity of the cognitive model of PTSD; if it is found that at follow up the negative trauma-related appraisals resurface, but that people remain well, this would call into question the cognitive-specificity hypothesis. Finally, in light of recent findings in adults that time since trauma may

weaken the ability of psychological therapies to ameliorate trauma-related appraisals (Cole et al., 2024), we suggest that this factor warrants attention, particularly when considering the needs of children and adolescents with extended periods of trauma exposure.

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Data availability statement

The data is available on request.

CRediT authorship contribution statement

Charlotte Smith: Writing – review & editing, Writing – original draft, Software, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Catherine Ford:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **George Baldwin:** Writing – review & editing, Methodology, Investigation, Data curation. **Tine K. Jensen:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Thanos Karatzias:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Marianne Skogbrott Birkeland:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Richard Meiser-Stedman:** Writing – review & editing, Writing – original draft, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

Richard Meiser-Stedman receives fees for teaching on the treatment of PTSD in children and adolescents.

Data availability

The data was extracted from published trials.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.brat.2024.104621.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Banz, L., Stefanovic, M., von Boeselager, M., Schafer, I., Lotzin, A., Kleim, B., & Ehring, T. (2022). Effects of current treatment for trauma survivors with posttraumatic stress disorder on reducing a negative self-concept: A systematic review and meta-analysis. *European Journal of Psychotraumatology, 13*, 1–12. https://doi.org/10.1080/20008066.2022.2122528

Bernardi, J., Engelbrecht, A., & Jobson, L. (2018). The impact of culture on cognitive appraisals: Implications for the development, maintenance, and treatment of posttraumatic stress disorder. *Clinical Psychologist, 23*(2), 91–102. https://doi.org/10.1111/cp.12161

Bhattacharya, S., Kennedy, M., Miguel, C., Tröger, A., Hofmann, S. G., & Cuijpers, P. (2023). Effect of psychotherapy for adult depression on self-esteem: A systematic review and meta-analysis. *Journal of Affective Disorders, 325*, 572–581. https://doi.org/10.1016/j.jad.2023.01.047

Brown, L. A., Belli, G. M., Asnaani, A., & Foa, E. B. (2019). A review of the role of negative cognitions about oneself, others, and the world in the treatment of PTSD. *Cognitive Therapy and Research, 43*, 143–173. https://doi.org/10.1007/s10608-018-9938-1

Cohen, J. (1977). *Statistical power for the behavioural sciences.* Academic Press.

Cohen, J. A., Deblinger, E., Mannarino, A. P., & Steer, R. (2004). A multisite, randomized controlled trial for children with abuse-related PTSD symptoms. *Journal of the American Academy of Child & Adolescent Psychiatry, 43*(4), 393–402. https://doi.org/10.1097/00004583-200404000-0005

Cohen, J. A., Mannarino, A. P., & Deblinger, E. (2016). *Treating trauma and traumatic grief in children and adolescents* (2nd ed.). Guilford Publications.

Cole, T. A., Reuman, L., Lee, D. J., Shotwell Tabke, C., Marx, B. P., & Sloan, D. M. (2024). The effect of time since index trauma on trauma-related beliefs. *Psychological Trauma: Theory, Research, Practice, and Policy, 16*(2), 331–339. https://doi.org/10.1037/tra0001249

Coventry, P. A., Meader, N., Melton, H., Temple, M., Dale, H., Wright, K., Cloitre, M., Karatzias, T., Bisson, J., & Roberts, N. P. (2020). Psychological and pharmacological interventions for posttraumatic stress disorder and comorbid mental health problems following complex traumatic events: Systematic review and component network meta-analysis. *PLoS Medicine, 17*(8), Article e1003262. https://doi.org/10.1371/journal.pmed.1003262

Dalgeish, T., Meiser-Stedman, R., & Smith, P. (2005). Cognitive aspects of posttraumatic stress reactions and their treatment in children and adolescents: An empirical review and some recommendations. *Behavioural and Cognitive Psychotherapy, 33*, 459–486. https://doi.org/10.1017/S1352465805002389

de Haan, A., Ganser, H. G., Munzer, A., Witt, A., & Goldbeck, L. (2017). Dysfunctional maltreatment-related cognitions in children and adolescents. *Child and Adolescent Psychiatry and Mental Health, 31*, 1–11. https://doi.org/10.1186/s13034-017-0168-1

de Roos, C., van der Oord, S., Zijlstra, B., Lucassen, S., Perrin, S., Emmelkamp, P., & de Jongh, A. (2017). Comparison of eye movement desensitization and reprocessing therapy, cognitive behavioural writing therapy, and wait-list in pediatric posttraumatic stress disorder following single-incident trauma: A multicenter randomized clinical trial. *Journal of Child Psychology and Psychiatry, 58*(11), 1219–1228. https://doi.org/10.1111/jcpp.12768

Diehle, J., Schmitt, K., Daams, J. G., Boer, F., & Lindauer, R. J. (2014). Effects of psychotherapy on trauma-related cognitions in posttraumatic stress disorder: A meta-analysis. *Journal of Traumatic Stress, 27*, 257–264. https://doi.org/10.1002/jts.21924

Dildar, S., & Kausar, R. (2019). Efficacy of teaching recovery techniques on psychological functioning of flood affected girls in Pakistan. *International Journal of Research in Informative Science Application and Techniques, 3*(3), 193348–193357. https://doi.org/10.46828/ijrisat.v3i3.70

Dunmore, E., Clark, D. M., & Ehlers, A. (2001). A prospective investigation of the role of cognitive factors in persistent posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 39*, 1063–1084. https://doi.org/10.1016/S0005-7967(00)00088-7

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot–based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56*(2), 455–463. https://doi.org/10.1111/j.0006-341X.2000.00455.x

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*, 319–345. https://doi.org/10.1016/S0005-7967(99)00123-0

Ehlers, A., Clark, D. M., Hackmann, A., McManus, F., & Fennell, M. (2005). Cognitive therapy for post-traumatic stress disorder: Development and evaluation. *Behaviour Research and Therapy, 43*, 413–431. https://doi.org/10.1016/j.brat.2004.03.006

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The posttraumatic cognitions inventory (PTCI): Development and validation. *Psychological Assessment, 11*, 303–314. https://doi.org/10.1037/1040-3590.11.3.303

Ford, J. D., Steinberg, K. L., Hawke, J., Levine, J., & Zhang, W. (2012). Randomized trial comparison of emotion regulation and relational psychotherapies for PTSD with girls involved in delinquency. *Journal of Clinical Child and Adolescent Psychology, 41*(1), 27–37. https://doi.org/10.1080/15374416.2012.632343

Goldbeck, L., Muche, R., Sachser, C., Tutus, D., & Rosner, R. (2016). Effectiveness of trauma-focused cognitive behavioural therapy for children and adolescents: A randomized controlled trial in eight German mental health clinics. *Psychotherapy and Psychosomatics, 85*, 159–170. https://doi.org/10.1159/000442824

Gomez De La Cuesta, G., Schweizer, S., Diehle, J., Young, J., & Meiser-Stedman, R. (2019). The relationship between maladaptive appraisals and posttraumatic stress disorder: A meta-analysis. *European Journal of Psychotraumatology, 10*, 1–15. https://doi.org/10.1080/20008198.2019.1620084

Higgins, J. P. T., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *BMJ, 327*, 557–560. https://doi.org/10.1136/bmj.327.7414.557

Hoppen, T. H., Meiser-Stedman, R., Jensen, T. K., Birkeland, M. S., & Morina, N. (2023). Efficacy of psychological interventions for post-traumatic stress disorder in children and adolescents exposed to single versus multiple traumas: meta-analysis of randomised controlled trials. *British Journal of Psychiatry, 222*(5), 196–203. https://doi.org/10.1192/bjp.2023.24

Hoppen, T. H., Meiser-Stedman, R., Kip, A., Birkeland, M. S., & Morina, N. (2024). The efficacy of psychological interventions for adult post-traumatic stress disorder following exposure to single versus multiple traumatic events: A meta-analysis of randomised controlled trials. *The Lancet Psychiatry, 11*(2), 112–122. https://doi.org/10.1016/S2215-0366(23)00373-5

Jackson, J. L., Kuriyama, A., Anton, A., Choi, A., Fournier, J.-P., Geier, A.-K., Jacquerioz, F., Kogan, D., Scholcoff, C., & Sun, R. (2019). The accuracy of google translate for abstracting data from non-English-language trials for systematic reviews. *Annals of Internal Medicine, 171*(9), 677–679. https://doi.org/10.7326/M19-0891

Jensen, T. K., Holt, T., Ormhaug, S. M., & Fjermestad, K. W. (2018). Change in post-traumatic cognitions mediates treatment effects for traumatized youth- a randomized controlled trial. *Journal of Consulting Psychology, 65*(2), 166–177. https://doi.org/10.1037/cou0000258

Kangaslampi, S., Punamaki, R.-L., Qouta, S. M., Diab, M., & Peltonen, K. (2016). Psychosocial group intervention among war-affected children: An analysis of changes in posttraumatic cognitions. *Journal of Traumatic Stress, 29*(6), 546–555. https://doi.org/10.1002/jts.22149

Karatzias, T., Hyland, P., Bradley, A., Cloitre, M., Roberts, N. P., Bisson, J. I., & Shevlin, M. (2019). Risk factors and comorbidity of ICD-11 PTSD and complex PTSD: Findings from a trauma-exposed population based sample of adults in the United Kingdom. *Depression and Anxiety, 36*(9), 887–894. https://doi.org/10.1002/da.22934

Karatzias, T., Murphy, P., Cloitre, M., Bisson, J., Roberts, N., Shevlin, M., Hyland, P., Maercker, A., Ben-Ezra, M., & Coventry, P. (2019). Psychological interventions for ICD-11 complex PTSD symptoms: Systematic review and meta-analysis. *Psychological Medicine, 49*, 1761–1775. https://doi.org/10.1017/S0033291719000436

Khubsing, R. S. I., Daemen, I. K. S., Hendricks, L., van Emmerik, A. A. P., Shapiro, E., & Dekker, J. J. M. (2020). An EMDR group therapy for traumatized former child slaves in India: A pilot randomized controlled trial. *The International Journal of Indian Psychology, 8*(3), 722–731. https://doi.org/10.25215/0803.082

Kilpatrick, D. G., Ruggiero, K. J., Acierno, R., Saunders, B. E., Resnick, H. S., & Best, C. L. (2003). Violence and risk of PTSD, major depression, substance abuse/dependence, and comorbidity: Results from the national survey of adolescents. *Journal of Consulting and Clinical Psychology, 71*(4), 692. https://doi.org/10.1037/0022-006x.71.4.692

Kindt, M., Buck, N., Arntz, A., & Soeter, M. (2007). Perceptual and conceptual processing as predictors of treatment outcome in PTSD. *Journal of Behavior Therapy and Experimental Psychiatry, 38*(4), 491–506. https://doi.org/10.1016/j.jbtep.2007.10.00

Kube, T., Elssner, A. C., & Herzog, P. (2023). The relationship between multiple traumatic events and the severity of posttraumatic stress disorder symptoms-evidence for a cognitive link. *European Journal of Psychotraumatology, 14*(1), Article 2165025. https://doi.org/10.1080/20008066.2023.2165025

Martin, C. G., Cromer, L. D., DePrince, A. P., & Freyd, J. J. (2013). The role of cumulative trauma, betrayal, and appraisals in understanding trauma symptomatology. *Psychological trauma, 52*(2), 110–118. https://doi.org/10.1037/a0025686

McLean, C. P., Yeh, R., Rosenfield, D., & Foa, E. B. (2015). Changes in negative cognitions mediate PTSD symptom reductions during client-centered therapy and prolonged exposure for adolescents. *Behaviour Research and Therapy, 68*, 64–69. https://doi.org/10.1016/j.brat.2015.03.008

Meiser-Stedman, R., McKinnon, A., Dixon, C., Boyle, A., Smith, P., & Dalgeish, T. (2019). A core role for cognitive processes in the acute onset and maintenance of post-traumatic stress in children and adolescents. *Journal of Child Psychology and Psychiatry, 60*(8), 875–884. https://doi.org/10.1111/jcpp.13054

Meiser-Stedman, R., Smith, P., Bryant, R., Salmon, K., Yule, W., Dalgeish, T., & Nixon, R. D. V. (2009). Development and validation of the child post-traumatic cognitions inventory (CPTCI). *Journal of Child Psychology and Psychiatry, 50*(4), 432–440. https://doi.org/10.1111/j.1469-7610.2008.01995.x

Meiser-Stedman, R., Smith, P., McKinnon, A., Dixon, C., Trickey, D., Elhers, A., Clark, D. M., Boyle, A., Watson, P., Goodyer, I., & Dalgeish, T. (2017). Cognitive therapy as an early treatment for post-traumatic stress disorder in children and adolescents: A randomized controlled trial addressing preliminary efficacy and mechanisms of action. *Journal of Child Psychology and Psychiatry, 58*(5), 623–633. https://doi.org/10.1111/jcpp.12673

Najavits, L. M., Gallop, R. J., & Weiss, R. D. (2006). Seeking safety therapy for adolescent girls with PTSD and substance use disorder: A randomized controlled trial. *The Journal of Behavioral Health Services & Research, 33*, 453–463.

O'Donnell, M. L., Elliott, P., Wolfgang, B. J., & Creamer, M. (2007). Posttraumatic appraisals in the development and persistence of posttraumatic stress symptoms. *Journal of Traumatic Stress, 20*(2), 173–182. https://doi.org/10.1002/jts.20198

Pfeiffer, E., Sachser, C., Rohlmann, F., & Goldbeck, L. (2018). Effectiveness of a trauma-focused group intervention for young refugees: A randomized controlled trial. *Journal of Child Psychology and Psychiatry, 59*(11), 1171–1179. https://doi.org/10.1111/jcpp.12908

Ponnamperuma, T., & Nicolson, N. A. (2015). Negative trauma appraisals and PTSD symptoms Sri Lankan adolescents. *Journal of Abnormal Child Psychology, 44*, 245–255. https://doi.org/10.1007/s10802-015-9985-y

Riley, R. D., Kauser, I., Bland, M., Thijs, L., Staessen, J. A., Wang, J., Gueyffier, F., & Deeks, J. J. (2013). Meta-analysis of randomised trials with a continuous outcome according to baseline imbalance and availability of individual participant data. *Statistics in Medicine, 32*, 2747–2766. https://doi.org/10.1002/sim.5726

Rossouw, J., Yadin, E., Alexander, D., & Seedat, S. (2018). Prolonged exposure therapy and supportive counselling for post-traumatic stress disorder in adolescents: Task-shifting randomised controlled trial. *The British Journal of Psychiatry, 213*(4), 587–594. https://doi.org/10.1192/bjp.2018.130

Scher, C. D., Suvak, M. K., & Resick, P. A. (2017). Trauma cognitions are related to symptoms up to 10 years after cognitive behavioural treatment for posttraumatic stress disorder. *Psychological Trauma: Theory, Research, Practice and Policy, 9*(6), 750–757. https://doi.org/10.1037/tra0000258

Smith, P., Perrin, S., Yule, W., & Clark, D. M. (2014). *Post traumatic stress disorder: Cognitive therapy with children and young people.* Routledge.

Smith, P., Yule, W., Perrin, S., Tranah, T., Dalgeish, T., & Clark, D. M. (2007). Cognitive-behavioural therapy for PTSD in children and adolescents: A preliminary randomized controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry, 46*, 1051–1061. https://doi.org/10.1097/CHI.0b013e318067e288

Srinivas, T., DePrince, A., & Chu, A. T. (2015). Links between posttrauma appraisals and trauma-related distress in adolescent females from the child welfare system. *Child Abuse & Neglect, 47*, 14–23. https://doi.org/10.1016/j.chiabu.2015.05.011

Sterne, J. A., Savovic, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., Cates, C. J., Cheng, H.-Y., Corbett, M. S., Eldridge, S. M., Emberson, J. R., Hernan, M. A., Hopewell, S., Hrobjartsson, A., Junqueira, D. R., Juni, P., Kirkham, J. J., Lasserson, T., Li, T., & Higgins, J. P. T. (2019). RoB 2: A revised tool for assessing risk of bias in randomised trials. *BMJ, 366*, Article 14989. https://doi.org/10.1136/bmj.l4898

Viechtbauer, W. (2010). Conducting meta-analyses in R with the *metafor* package. *Journal of Statistical Software, 36*(3), 1–48. https://doi.org/10.18637/jss.v036.i03

World Health Organization. (2019). *International statistical classification of diseases and related Health problems* (11th ed.) https://icd.who.int/.

Woud, M. L., Kleim, B., & Cwik, J. C. (2019). Editorial for the special issue on negative appraisals in trauma: Current status and future directions for research. *Cognitive Therapy and Research, 43*, 139–142. https://doi.org/10.1007/s10608-018-09992-5

Zhang, J., Meiser-Stedman, R., Jones, B., Smith, P., Dalgeish, T., Boyle, A., Edwards, A., Subramanyam, D., Dixon, C., Sinclaire-Harding, L., Schweizer, S., Newby, J., & McKinnon, A. (2022). Trajectory of post-traumatic stress and depression among children and adolescents following single-incident trauma. *European Journal of Psychotraumatology, 13*(1), Article 2037906. https://doi.org/10.1080/20008198.2022.2037906