

This is the peer reviewed version of the following article: “Meiser-Stedman R, Allen L, Ashford PA, et al. A pragmatic randomized controlled trial of cognitive therapy for post-traumatic stress disorder in children and adolescents exposed to multiple traumatic stressors: the DECRYPT trial. *World Psychiatry*. 2025;24(3):422-434.”, which has been published in final form at <https://onlinelibrary.wiley.com/doi/10.1002/wps.21355>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions. This article may not be enhanced, enriched or otherwise transformed into a derivative work, without express permission from Wiley or by statutory rights under applicable legislation. Copyright notices must not be removed, obscured or modified. The article must be linked to Wiley’s version of record on Wiley Online Library and any embedding, framing or otherwise making available the article or pages thereof by third parties from platforms, services and websites other than Wiley Online Library must be prohibited.

A pragmatic randomized controlled trial of cognitive therapy for post-traumatic stress disorder in children and adolescents exposed to multiple traumatic stressors: the DECRYPT trial

Richard Meiser-Stedman¹, Leila Allen¹, Polly-Anna Ashford², Ella Beeson³, Sarah Byford⁴, Andrea Danese⁵⁻⁷, Annie Farr⁸, Jack Finn¹, Ben Goodall⁹, Lauren Grainger¹, Matthew Hammond², Rebecca Harmston⁸, Ayla Humphrey¹⁰, Dorothy King¹¹, Katie Lofthouse¹, Gerwyn Mahoney-Davies¹², Sarah Miles^{7,11}, Jessica Moore¹, Nicola Morant¹³, Sarah Robertson¹, Lee Shepstone², Erika Sims², Paul Stallard¹⁴, Annie Swanepoel⁹, David Trickey¹⁵, Katie Trigg¹, Ramesh Vishwakarma², Jon Wilson¹⁶, Tim Dalgleish^{17,9}, Patrick Smith^{7,10}

¹Department of Clinical Psychology and Psychological Therapies, Norwich Medical School, University of East Anglia, Norwich, UK; ²Norwich Clinical Trials Unit, Norwich Medical School, University of East Anglia, Norwich, UK; ³Hertfordshire Partnership University NHS Foundation Trust, Hatfield, UK; ⁴King's Health Economics, King's College London, London, UK; ⁵Department of Child and Adolescent Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK; ⁶Social, Genetic and Developmental Psychiatry Centre, King's College London, London, UK; ⁷National and Specialist CAMHS Clinic for Trauma, Anxiety and Depression, South London and Maudsley NHS Foundation Trust, London, UK; ⁸Public and Patient Involvement representative; ⁹North East London NHS Foundation Trust, Rainham, UK; ¹⁰Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge, UK; ¹¹Department of Psychology, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK; ¹²Cardiff and Vale University Health Board, Cardiff, UK; ¹³Division of Psychiatry, Faculty of Brain Sciences, University College London, London, UK; ¹⁴Department for Health, University of Bath, Bath, UK; ¹⁵Department of Clinical, Educational and Health Psychology, University College London, London, UK; ¹⁶Norfolk and Suffolk NHS Foundation Trust, Norwich, UK; ¹⁷MRC Cognition and Brain Sciences Unit, Cambridge, UK

ABSTRACT

Trauma-focused cognitive-behavioral therapies (TF-CBTs) are efficacious in children and adolescents with post-traumatic stress disorder (PTSD). However, there is limited evidence in youth exposed to multiple traumas, especially in real-world settings. This paper reports on a pragmatic randomized controlled trial (RCT) evaluating whether one form of TF-CBT, cognitive therapy for PTSD (CT-PTSD), was effective for PTSD following multiple trauma exposure in 8-17 year-olds attending UK mental health services, relative to treatment-as-usual (TAU). Youth with PTSD (N=120) following multiple traumas were randomly allocated to receive CT-PTSD or TAU. At baseline, complex PTSD diagnosis was common (55.0% of cases), and a large proportion of youth had comorbid mental disorders. The primary outcome was the score on the Child Revised Impact of Event Scale, 8-item version (CRIES-8) at post-treatment. Secondary outcomes included the CRIES-8 score at 11 months post-randomization, and several measures of PTSD, anxiety, depression, suicidal ideation, affect regulation, irritability, and general functioning at post-treatment and 11 months post-randomization. CT-PTSD was not found to be significantly superior to TAU on the CRIES-8 at post-treatment (adjusted difference: -3.80 , 95% CI: -7.56 to -0.06 , $p=0.095$; Hedges' $g=-0.37$, 95% CI: -0.78 to 0.03), but it was superior to TAU when patients who had received TF-CBT were excluded from that arm (adjusted difference: -4.60 , 95% CI: -8.36 to -0.81 , $p=0.047$; $g=-0.46$, 95% CI: -0.89 to -0.04). CT-PTSD was also superior to TAU on the CRIES-8 at 11 months (adjusted difference: -5.38 , 95% CI: -8.88 to -1.87 , $p=0.003$; $g=-0.46$, 95% CI: -0.90 to -0.02), and in a mixed-effect model incorporating all time points ($p=0.007$). Evidence of superiority for CT-PTSD was observed on parent-reported emotional difficulties at post-treatment and 11 month; and on child-reported total anxiety and depression, total anxiety, panic and separation anxiety, and parent-reported affect dysregulation and irritability at 11 months. Treatment withdrawal rate was low. Despite high baseline levels of comorbidity and impairment not seen in previous trials, CT-PTSD was not associated with significant deterioration or adverse events. This pragmatic trial is likely to contribute to the optimization of psychological intervention in youth with PTSD following multiple traumas, accompanied by severe comorbid mental disorders, in routine settings.

Key words: Post-traumatic stress disorder (PTSD), children and adolescents, multiple traumas, trauma-focused cognitive-behavioral therapies, cognitive therapy for PTSD (CT-PTSD), pragmatic trial

INTRODUCTION

Post-traumatic stress disorder (PTSD) is a deeply distressing and disabling psychiatric condition. In youth, it is usually comorbid with other psychiatric conditions¹, and may persist for years or even decades if untreated^{2,3}. A recent epidemiological study suggested that over 7% of UK youth will have developed PTSD at some point by the age of 18 years¹. Some systematic reviews attest to the efficacy of psychological therapies for the treatment of PTSD in children and adolescents^{4,5}, particularly trauma-focused cognitive-behavioral therapies (TF-CBTs), which are endorsed by treatment guidelines⁶ as a first-line treatment for PTSD.

While this evidence is promising, several important issues remain. First, few trials to date have been pragmatic, which reduces the relevance of their findings to routine settings. In particular, few trials have compared an experimental treatment with treatment-as-usual (TAU) delivered by a mental health service. Several early trials used supportive counselling as a control condition, but network meta-analyses suggest that this treatment is no more efficacious than waiting list⁴. Although many trials have targeted youth identified in child protection/social service settings or schools, few have focused on youth referred to mental health services. Moreover, many trials have used highly trained research therapists rather than frontline clinicians. Finally, whether youth with complex PTSD⁷ and severe comorbid psychiatric conditions stemming from multiple trauma exposure benefit from psychological therapies for PTSD is poorly understood.

In this context, it is important to consider the effectiveness of cognitive therapy for PTSD (CT-PTSD), a particular form of TF-CBT. Pronounced increases in treatment efficacy for adults with PTSD have been achieved through careful individual formulation and enhanced use of theoretically derived techniques in CT-PTSD^{8,9}. This therapy may translate well to “frontline” clinical settings, as it employs a formulation-based approach (i.e., clinicians are able to tailor session content to a patient’s needs), which may be particularly helpful when treating people with more complex histories and more comorbidity.

The present randomized controlled trial (RCT) was designed to be pragmatic and focused on the most severe yet common PTSD presentations in child and adolescent mental health services (CAMHS) and on youth who had experienced multiple traumas. The primary objective of the study was to evaluate whether CT-PTSD is an effective treatment for PTSD in youth aged 8-17 years who have been exposed to multiple traumatic stressors, relative to TAU, in UK National Health Service (NHS) CAMHS.

Our primary hypothesis was that CT-PTSD would be superior to TAU on a routine outcome measure of PTSD severity. Our secondary hypothesis was that CT-PTSD would be superior to TAU with respect to other measures of PTSD, complex PTSD, anxiety, depression, general functioning, and parent-rated mental health in youth with a diagnosis of PTSD. We

further assessed potential adverse events and harms.

METHODS

Trial design

The DECRYPT (Delivery of Cognitive Therapy for Young People after Trauma) trial employed a multicentre, pragmatic, single-blind, superiority study design¹⁰. All procedures complied with the ethical standards of the relevant national and institutional committees on human experimentation, as well as with the Helsinki Declaration of 1975, as revised in 2013. All procedures involving human subjects/patients were approved by the East of England - Cambridge South Research Ethics Committee (16/EE/0233).

Participants

Youth aged 8-17 years with a diagnosis of PTSD following exposure to multiple traumatic stressors were recruited from CAMHS clinics and youth mental health services across six mental health trusts in England and Wales (Cambridgeshire, Cardiff, Hertfordshire, North East London, Norfolk and Suffolk, and South London). Youth were eligible for inclusion if they: a) met the criteria for a diagnosis of PTSD according to the DSM-5¹¹, as ascertained by the Child PTSD Symptom Scale for DSM-5, interviewer version (CPSS-I-5)¹²; b) scored 17 or more on the Child Revised Impact of Event Scale, 8-item version (CRIES-8)¹³; and c) had been exposed to multiple traumatic stressors, assessed through the interview administration of the Child and Adolescent Trauma Screen (CATS)¹⁴.

Exclusion criteria were: change of prescribed psychiatric medication in the previous two months; pervasive developmental disorder or neurodevelopmental disorder (except attention deficit hyperactivity disorder, ADHD); intellectual disability; another primary psychiatric diagnosis or clinical need that warranted treatment ahead of PTSD; inability to speak English; ongoing exposure to threat or safeguarding issues; strong likelihood of being unable to complete treatment (e.g., foster placement move); or history of organic brain damage.

Youth aged 16 and older gave their own written informed consent. Caregivers/parents gave written informed consent for participants aged under 16, while the children themselves gave their assent.

Interventions

CT-PTSD

CT-PTSD is a structured, fully manualized¹⁵ psychological treatment delivered in an individual format for children and adolescents. In this trial, the suggested number of sessions was up to 15, lasting 60-90 min each. While previous trials (conducted in youth exposed to single traumas) suggested that up to 10 sessions be offered, we increased this number to allow for the extra complexities associated with PTSD following multiple traumas.

CT-PTSD includes several core elements: psychoeducation, with an emphasis on the role of cognitive processes in the onset and maintenance of PTSD; timelines, narrative work and imaginal reliving to help develop a coherent trauma narrative; cognitive restructuring (to reframe the meanings and interpretations associated with trauma and its aftermath), and coping management (e.g., addressing maladaptive strategies such as thought suppression, rumination, and safety-seeking behaviors). Up to three sessions were allowed for addressing other comorbid conditions and difficulties (e.g., depression or self-harm).

CT-PTSD was delivered by NHS CAMHS/youth mental health service therapists with an appropriate professional qualification, who had completed a CT-PTSD training by a member of the trial team (see also supplementary information). Therapists were discouraged from changing medication in this arm, but such changes were not prohibited or considered a breach of trial protocol. Therapists were asked to inform the trial team of any medication changes.

Treatment-as-usual (TAU)

TAU involved any active treatment selected by the mental health professionals in charge of the patients randomized to this arm. Since TF-CBTs are a recommended treatment for PTSD in the UK, therapists in this arm were not prevented from delivering these interventions. Changes to medication were not discouraged in this arm.

Treatment adherence

Supervision for CT-PTSD therapists was provided by a trial team clinical psychologist. Therapists delivering TAU received supervision according to their usual practice. To assess treatment fidelity and quality in the CT-PTSD arm, participants were asked to consent to therapy sessions being recorded, although this was not mandated. Clinical psychologists with extensive experience of delivering CT-PTSD rated these recordings, using a scale adapted from a trial of CT-PTSD in adults⁹ (see also supplementary information).

Therapists in each arm were asked to provide information at post-treatment about their own professional experience and training, the nature of the treatment they had provided, and the use of specific therapy techniques. For a planned sensitivity analysis, when

psychoeducation, cognitive restructuring and some form of trauma memory work (e.g., narrative work, imaginal reliving) or narrative exposure therapy were endorsed, a participant randomized to TAU was deemed to have received TF-CBT. Eye movement desensitization and reprocessing (EMDR) was not regarded as a form of TF-CBT.

Outcomes

The primary outcome was self-reported PTSD symptoms at post-treatment (i.e., 5 to 6 months post-randomization), as measured with the CRIES-8. The CRIES-8, a validated self-report questionnaire¹³, is the routine outcome monitoring tool for PTSD in children and adolescents endorsed by the UK Children and Young People's Improving Access to Psychological Therapies programme, and is recommended by the International Consortium for Health Outcomes Measurement¹⁶. The CRIES-8 was also completed at baseline, as well as at 2.5 months (mid-treatment) and 11 months post-randomization (secondary outcomes).

Further secondary outcomes (assessed at mid-treatment, post-treatment, and 11 months post-randomization) were: PTSD diagnosis and symptoms, using the CPSS-I-5¹² (with additional items assessing complex PTSD symptoms); DSM-5 PTSD symptom self-reported severity, using the CATS questionnaire¹⁴; disturbances in self-organization symptoms of complex PTSD, using the 12-item Child Complex PTSD Checklist questionnaire¹⁷; trauma-related misappraisals, using the Children's Post-Traumatic Cognitions Inventory¹⁸; anxiety and depression, using the Revised Child Anxiety and Depression Scale (RCADS)¹⁹; suicidal ideation, using four items from the Mood and Feelings Questionnaire²⁰; and affect regulation and irritability, using the Affective Reactivity Index (ARI) (child and parent/caregiver report)²¹. Clinician-rated functioning was assessed using the Children's Global Assessment Scale²². Parent/caregiver-rated mental health and well-being were indexed by the Strengths and Difficulties Questionnaire (SDQ)²³, and emotional instability by the McLean Screening Instrument for Borderline Personality Disorder, caregiver version (MSI-BPD-C)²⁴.

If the onset of treatment was delayed after randomization, the timings of mid-treatment, post-treatment and 11-month assessments were also postponed, up to an additional three months.

Sample size

Our power calculation was based on a meta-analysis²⁵ which considered trials of TF-CBT in youth with PTSD, many of which used active control treatments, and obtained a pooled effect size of 0.67. In order to have 90% power to detect a between-group effect size of 0.67 (two-tailed t-test, 0.05 significance level), a combined sample size of 96 (48 participants per

group) was required. In order to account for dropout (estimated at 20%), 120 participants were recruited.

Randomization and blinding

Trial data collection, randomization, blinding and data analysis were overseen by the Norwich Clinical Trials Unit. Patients were randomly assigned (1:1), via a web-based randomization service, to receive either CT-PTSD or TAU. Randomization was performed by the trial coordinator, with stratification by baseline CRIES-8 score (17-28 vs. 29-40) and site (i.e., recruiting NHS Trust). Allocation was by preset lists of permuted blocks with randomly distributed block sizes.

Participants and clinicians were aware of group allocation. Trained assessors who collected post-treatment and follow-up interview data were blinded to group allocation. Following allocation, all participants in the study and their clinical team were asked not to reveal the group to which they were randomized to the assessor.

At post-treatment, blind assessors administering the structured interviews were asked to guess their interviewee's randomization status. There was no relationship between these guesses and the actual arm to which a participant had been randomized ($X^2=1.41$, $p=0.50$).

Statistical analysis

The primary analysis was conducted on an intention-to-treat basis, i.e. all participants were followed up, and their data were analyzed according to group allocation rather than intervention received or adherence. The statistical analysis plan was approved by the Trial Steering Committee and the Trial Management Group. A general linear mixed effects model (assuming that the CRIES-8 has a normal distribution) was used for the primary efficacy analysis. This model included the stratification factor of site as a random factor. The CRIES-8 baseline score (also used for stratification of randomization) was included as a covariate as a probable prognostic variable. Treatment arm was added as a fixed effect. The effect of therapist was not included as a random effect in the model, as very few therapists had more than one participant. Statistical significance was set at 0.05 (two-sided).

The analyses of secondary outcomes (including CRIES-8 score at 11 months) followed an analogous approach. In each case, an appropriate linear mixed effects model with inclusion of the stratification factors (i.e., site), measure at baseline (if available) and treatment arm was constructed. Between-group differences at each time point were analyzed (i.e., time by arm interaction) as well as overall treatment effect. This approach was also followed for the CRIES-8 (i.e., including mid-treatment, post-treatment and 11-month data). Diagnostic status (i.e., the

presence of DSM-5 PTSD, and ICD-11 PTSD and complex PTSD) was analyzed using a logistic regression model with the stratification factors, measure at baseline (if available) and treatment arm as explanatory variables.

In addition to reporting effect sizes, we also calculated several indices of clinical improvement for the PTSD outcomes, i.e. reliable improvement or deterioration²⁶, 50% improvement, and being below clinical thresholds where known. These were based on observed data only (see supplementary information for details). A separate committee, including three independent researchers, monitored adverse events and severe adverse events (see supplementary information for definitions).

Analyses were conducted using Stata (version 12.0). All models used full information maximum likelihood estimation to handle missing data. The trial was registered with an International Standard Randomized Controlled Trial Number (<https://doi.org/10.1186/ISRCTN12077707>).

RESULTS

Participant flow and recruitment

Of 304 youth identified by services as being potential participants, 35 (11.5%) were not eligible for trial entry. In 149 (49.0%) cases, the young persons or their families did not consider the trial further, their team did not advance the referral, or trial entry was not possible. Between February 7, 2017 and July 21, 2021, 58 participants were randomized to CT-PTSD and 62 to TAU (see Figure 1).

Three participants were not offered treatment sessions by their clinical team. Treatment data were missing for two participants. Six patients withdrew from the trial by post-treatment, and a further two withdrew by 11 months. Our recruitment and follow-up target of N=96 was met for the CRIES-8 at post-treatment.

Demographics and baseline data

Demographic characteristics of the participants, their trauma history, and aspects of their baseline psychopathology are reported in Table 1 (see also supplementary information). The sample mainly comprised adolescents (mean age: 14.9 years), and females (72.5%). Participants had typically been seen by the mental health service for several months (mean: 10.0) prior to trial entry. Ten participants (8.3%) were in a foster care placement.

The mean number of trauma types reported by youth was 4.7 (SD=2.2), while the median

number of traumatic events reported was 14 (interquartile range: 4 to 45). The most common forms of trauma were physical abuse or attacks (within or outside the family), witnessing physical abuse or attacks, and sudden bereavement. Some form (either direct exposure or witnessing) of intrafamilial abuse was very common (75.0% of cases). Sexual abuse or violence was reported by 40.8% of participants.

Comorbid mental health problems were common: 55.0% of the participants fulfilled the ICD-11 requirements for complex PTSD; a large proportion had clinically significant depression (74.2%), anxiety (50.8%) or emotional instability (48.0%); and a significant minority reported hearing voices (24.2%) (see Table 1). A minority of participants (26.7%) were taking medication for their mental health problems.

Therapist and treatment characteristics

Thirty-nine therapists delivered CT-PTSD and 52 therapists delivered TAU. Therapists were from a wide range of professional backgrounds. CT-PTSD arm participants (relative to TAU) were more likely to receive treatment from CBT therapists, while TAU arm participants (relative to CT-PTSD) were more likely to receive treatment from child psychotherapists. CT-PTSD arm therapists were more likely to have a cognitive-behavioral orientation, while TAU arm therapists were more likely to have a family/systemic or “other” approach (see Table 2 and supplementary information).

No differences were apparent between arms in terms of total sessions, but the distribution of sessions was different: CT-PTSD participants were more likely to have more than 8 sessions, while TAU participants were more likely to have more than 18 sessions (see Table 2 and supplementary information).

Therapists in the CT-PTSD arm received more supervision than those in the TAU arm. There were no differences between the trial arms with respect to participant-rated treatment credibility and therapeutic alliance at mid- or post-treatment. CT-PTSD was rated as quite credible (mean = 31.5 at post-treatment on a 4-40 scale) (see Table 2). The mean overall rating of treatment fidelity and quality in recorded sessions was 4.0 (i.e., “good”) (see also supplementary information).

CT-PTSD arm therapists were more likely to report using behavioral activation, cognitive restructuring, trauma discussion, and trauma narrative work. TAU therapists were more likely to report using EMDR, mindfulness exercises, parent work, psychodynamic work, relaxation exercises, and supportive work (see Table 3 and supplementary information). One TAU case was mistakenly assigned a therapist who had been trained in CT-PTSD, contrary to our protocol, but the therapist reported delivering EMDR rather than CT-PTSD.

Assessments were conducted at an average of 199 (SD=64) days post-randomization for

post-treatment, and 389 (SD=76) days post-randomization for 11 months. There were no between-arm differences.

Medication changes were reported for five participants in the CT-PTSD arm (four started an antidepressant; one switched from an antidepressant to a mood stabilizer), and two participants in the TAU arm (one started an antidepressant, and another an anti-ADHD medication).

Primary outcome

Our primary intention-to-treat analysis considered CRIES-8 score at post-treatment, finding a non-significant adjusted difference of -3.80 (95% CI: -7.56 to -0.06 , $p=0.095$; Hedges' $g=-0.37$, 95% CI: -0.78 to 0.03) between the two arms (see Table 4).

Two sensitivity analyses were undertaken. In seven cases (all in the CT-PTSD arm), post-treatment CRIES-8 scores were taken from clinical notes (as the trial team questionnaire battery was not completed); when these data were excluded (in an analysis recommended by the Trial Steering Committee), the difference between the two arms was also non-significant ($p=0.360$). When excluding cases from the TAU arm that were confirmed to have involved TF-CBT ($N=9$), CT-PTSD was superior to TAU (adjusted difference: -4.60 , 95% CI: -8.36 to -0.81 , $p=0.047$; $g=-0.46$, 95% CI: -0.89 to -0.04).

Secondary outcomes

Linear mixed effect models that incorporated data at each timepoint (i.e., mid-treatment, post-treatment and 11-month follow-up assessment) were derived for each secondary outcome. A significant treatment effect was found for the CRIES-8 score across time points ($p=0.007$), and for CRIES-8 score at the 11-month follow-up considered alone (adjusted difference: 5.38 , 95% CI: -8.88 to -1.87 , $p=0.003$; $g=-0.46$, 95% CI: -0.90 to -0.02). Pre-post effect sizes for each arm were large, and maintained at 11-month follow-up (see Table 5; see also supplementary information for mean scores by arm).

No significant effects were detected for the self-reported DSM-5 PTSD questionnaire (the CATS), the interview-based measure of DSM-5 PTSD severity (the CPSS-I-5), and self-reported disturbances in self-organization, dissociation, or negative trauma-related appraisals. Pre-post effect sizes were large for the CATS and the CPSS-I-5 in both trial arms and were maintained at 11-month follow-up. No between-arm differences were apparent for PTSD diagnoses (i.e., DSM-5 PTSD, ICD-11 PTSD, or ICD-11 complex PTSD) at post-treatment or 11 months (see Table 5).

For several subscales of the RCADS, CT-PTSD was superior to TAU at 11 months: total

anxiety and depression score (adjusted difference: -9.37, 95% CI: -18.28 to -0.46, $p=0.039$); total anxiety (adjusted difference: -7.44; 95% CI: -14.55 to -0.33, $p=0.041$); panic (adjusted difference: -2.57, 95% CI: -4.69 to -0.46, $p=0.017$), and separation anxiety (adjusted difference: -1.85, 95% CI: -3.26 to -0.44, $p=0.011$).

CT-PTSD was superior to TAU on the SDQ subscale for parent-reported emotional difficulties at post-treatment ($p<0.001$) and 11 months ($p=0.002$); on MSI-BPD-C emotional instability at post-treatment ($p=0.014$); and on parent-reported affect dysregulation and irritability at 11 months ($p=0.015$). Significant treatment effects across time points were found for parent-reported affect dysregulation and irritability ($p=0.013$), emotional instability ($p=0.022$), SDQ emotional difficulties ($p<0.001$), and SDQ total score ($p=0.043$) (see Table 5).

These analyses were repeated excluding cases from the TAU arm that were confirmed to have involved TF-CBT. The same pattern of results was found for secondary outcomes, but with further between-arm differences: CT-PTSD was superior to TAU on parent-reported affect dysregulation, SDQ total difficulties, and overall functioning at post-treatment, and on emotional instability at 11 months (see supplementary information).

Clinical improvement

Reliable improvement on the CRIES-8 (decreased by 11.92 or more) was reported by 42.9% of CT-PTSD and 29.8% of TAU participants at post-treatment, and by 47.4% of CT-PTSD and 27.9% of TAU participants at 11-month follow-up. These differences were not statistically significant (see also supplementary information).

Reliable improvement on the CATS (decreased by 14.89 or more) was reported by 39.0% of CT-PTSD and 24.4% of TAU participants at post-treatment (non-significant difference), and by 56.8% of CT-PTSD and 30.2% of TAU participants at 11-month follow-up ($p=0.017$). An improvement of at least 50% on the CATS was reported by 29.3% of CT-PTSD and 17.8% of TAU participants at post-treatment (non-significant difference), and by 37.8% of CT-PTSD and 14.0% of TAU participants at 11-month follow-up ($p=0.014$) (see also supplementary information).

Deterioration and adverse events

Our protocol pre-specified that we would report the frequency with which participants experienced a deterioration of 7 or more from baseline on the CRIES-8. At mid-treatment, three CT-PTSD participants (7.5%) and one TAU participant (2.4%) had experienced this degree of deterioration. At post-treatment, no CT-PTSD participants and two TAU participants (4.3%) had experienced it. This was also the case at the 11-month follow-up assessment (see

also supplementary information).

Four adverse events were reported in the CT-PTSD arm, that were classified, respectively, as “decline in mental state”, “any untoward increase in extent of self-harm or suicidal ideation”, “overdose of medication without signs or symptoms”, and “other” (the participant was thought to be beginning to experience a psychotic episode). Three adverse events were reported in the TAU arm, classified as “decline in mental state” (two cases) and “any untoward increase in extent of self-harm or suicidal ideation” (one case). One severe adverse event was reported in each arm, classified respectively as “overdose of medication without signs or symptoms” in the CT-PTSD arm, and “any untoward increase in extent of self-harm or suicidal ideation” in the TAU arm.

DISCUSSION

In this pragmatic trial of CT-PTSD versus TAU for children and adolescents with PTSD following multiple trauma exposure, in whom significant comorbid mental health conditions at baseline were common, CT-PTSD was not significantly superior to TAU on the CRIES-8 at post-treatment, but showed a significant superiority at 11-month follow-up ($p=0.003$). CT-PTSD was significantly superior to TAU on the CRIES-8 at post-treatment when patients who had received TF-CBT were excluded from that arm ($p=0.047$), and in a mixed-effect model incorporating all time points ($p=0.007$).

CT-PTSD was superior to TAU at post-treatment with respect to parent-reported emotional instability ($p=0.014$) and emotional difficulties ($p<0.001$). At the 11-month assessment, CT-PTSD demonstrated superiority with respect to total anxiety and depression ($p=0.039$), total anxiety ($p=0.041$), panic symptoms ($p=0.017$) and separation anxiety symptoms ($p=0.011$), as well as to parent-reported emotional difficulties ($p=0.002$) and affect dysregulation and irritability ($p=0.015$). No differences were apparent for other outcomes, including PTSD diagnoses.

Several features of the DECRYPT trial underline the robust nature of the evaluation undertaken, and particularly the relevance of the trial’s findings to routine clinical practice.

First, it is noteworthy how severe participants’ mental health problems were at baseline. All participants met full DSM-5 PTSD criteria, unlike many earlier trials which included youth with subsyndromal PTSD. Moreover, a considerable proportion fulfilled ICD-11 requirements for a complex PTSD diagnosis (55.0%), and a large proportion had clinically significant depression (74.2%), anxiety (50.8%), or emotional instability (48.0%). A significant minority (24.2%) also reported hearing voices. The degree of impairment (measured by the Children’s Global Assessment Scale) and in particular the degree of negative trauma-related appraisals

(measured by the Children's Post-Traumatic Cognitions Inventory) were much more severe than in comparable European trials^{27,28}. Future TF-CBT treatment protocols should consider how to address the degree of impairment and comorbidity identified here.

Second, the therapists in this trial were highly diverse, with a wide range of professional backgrounds and therapeutic orientations represented. The CT-PTSD arm comprised more therapists with a cognitive-behavioral orientation than the TAU arm, but the amount of specific training that they received during their participation in the present trial was minimal. While CT-PTSD therapists received a greater amount of supervision, TAU therapists were free to use whatever treatments they had already been using in clinical practice, including TF-CBT. Treatment fidelity and quality were deemed to be satisfactory in the recorded sessions, although there is certainly scope for improvement.

The number of completed sessions in the treatment phase was fewer than expected, and this was not attributable to treatment dropout. Services were free to continue to offer psychological treatment after the post-treatment assessment. It may be that there was an inadequate dose of therapy delivered in the main treatment phase for CT-PTSD to have its full effect, and the extension of therapy beyond the post-treatment assessment led to between-group differences at the 11-month assessment.

The trial's pattern of findings – with some features of the post-traumatic stress response (e.g., trauma-related appraisals and disturbances in self-organization) only showing a modest shift in the treatment phase – suggests that clinicians may need to consider extending the number of sessions offered to these complex cases to address issues relating to self-concept and identity, and possibly using multiple assessment measures to track progress over time.

It is noteworthy that, despite the severity of the needs of the recruited youth, there were very few adverse events, and little evidence of deterioration in PTSD severity over the course of treatment. Moreover, suicidal ideation showed some improvement in each group. This is important, given clinician concerns around the delivery of TF-CBT to youth with PTSD, including lack of confidence and fears around “retraumatization”²⁹. Furthermore, the large pre-post effect sizes for each group with respect to PTSD severity and overall functioning (that compare favorably to earlier trials) emphasize the value of offering treatment to children and adolescents with PTSD following multiple trauma exposure, despite the complexity of their needs. An embedded qualitative study³⁰ found that youth who received CT-PTSD derived self-defined benefits, including feeling more able to talk about trauma and improved abilities to cope.

This trial has some limitations. In attempting to understand the full range of difficulties that youth experienced, we may have increased participant burden excessively, generating a relatively high number of missing data. The trial arms were unbalanced with respect to some treatment characteristics (e.g., more CBT practitioners and supervision in the CT-PTSD

condition). While we attempted to assess treatment fidelity, only a limited number of therapy recordings were available.

It might be argued that TF-CBT should not have been allowed as a treatment option in the TAU arm. However, this has been the recommended first-line treatment for PTSD in children and adolescents since a UK treatment guideline recommendation in 2005, and so we deemed that formally excluding this option may have been unethical. Moreover, as a pragmatic trial, the TAU arm represented the range of interventions available in routine mental health settings.

In conclusion, although we did not find that CT-PTSD was superior to TAU on our primary outcome at post-treatment, we did show that CT-PTSD was superior at the 11-month follow-up, and in a mixed-effect model incorporating all time points. Both CT-PTSD and TAU were acceptable to youth and not associated with significant deterioration or adverse events, despite the significant range of comorbid mental health problems experienced by these youth. This pragmatic trial is likely to add significantly to the optimization of psychological intervention in youth with PTSD following multiple traumas, accompanied by severe comorbid mental health problems, in routine settings.

ACKNOWLEDGEMENTS

The DECRYPT trial was funded by a UK National Institute for Health and Care Research (NIHR) Career Development Fellowship to R. Meiser-Stedman (CDF-2015-08-073). The views expressed here are those of the authors and not necessarily those of the UK National Health System, the NIHR, or the UK Department of Health and Social Care. The authors gratefully acknowledge the support of the Trial Steering Committee (S. Cartwright-Hatton, P. Fonagy, S. Reynolds, and the late W. Yule) and the Data Monitoring Committee (B. Dunn, I. Goodyer, V. Vickerstaff), as well as the contribution of the late M.-S. Man. T. Dalgleish and P. Smith are joint senior authors of the paper. Supplementary information on this study is available at <https://osf.io/jkbvr/>.

REFERENCES

1. Lewis SJ, Arseneault L, Caspi A et al. The epidemiology of trauma and post-traumatic stress disorder in a representative cohort of young people in England and Wales. *Lancet Psychiatry* 2019;6:247-56.
2. Morgan L, Scourfield J, Williams D et al. The Aberfan disaster: 33-year follow-up of survivors. *Br J Psychiatry* 2003;182:532-36.
3. Yule W, Bolton D, Udwin O et al. The long-term psychological effects of a disaster experienced in adolescence: I: The incidence and course of PTSD. *J Child Psychol Psychiatry* 2000;41:503-11.

4. Mavranouzouli I, Megnin-Viggars O, Daly C et al. Research Review: Psychological and psychosocial treatments for children and young people with post-traumatic stress disorder: a network meta-analysis. *J Child Psychol Psychiatry* 2020;61:18-29.
5. Hoppen TH, Meiser-Stedman R, Jensen TK et al. 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. *Br J Psychiatry* 2023;222:196-203.
6. National Institute for Health and Care Excellence. Guideline 116: Post-traumatic stress disorder. London: National Institute for Health and Care Excellence, 2018.
7. World Health Organization. International classification of diseases, 11th revision. Geneva: World Health Organization, 2022.
8. Ehlers A, Clark DM, Hackmann A et al. A randomized controlled trial of cognitive therapy, a self-help booklet, and repeated assessments as early interventions for posttraumatic stress disorder. *Arch Gen Psychiatry* 2003;60:1024-32.
9. Ehlers A, Hackmann A, Grey N et al. A randomized controlled trial of 7-day intensive and standard weekly cognitive therapy for PTSD and emotion-focused supportive therapy. *Am J Psychiatry* 2014;171:294-304.
10. Allen L, Ashford PA, Beeson E et al. DECRYPT trial: study protocol for a phase II randomised controlled trial of cognitive therapy for post-traumatic stress disorder (PTSD) in youth exposed to multiple traumatic stressors. *BMJ Open* 2021;11:e047600.
11. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, 5th ed. Arlington: American Psychiatric Association, 2013.
12. Foa EB, McLean CP, Capaldi S et al. Prolonged exposure vs supportive counseling for sexual abuse-related PTSD in adolescent girls: a randomized clinical trial. *JAMA* 2013;310:2650-57.
13. Perrin S, Meiser-Stedman R, Smith P. The Children's Revised Impact of Event Scale (CRIES): validity as a screening instrument for PTSD. *Behav Cogn Psychother* 2005;33:487-98.
14. Sachser C, Berliner L, Holt T et al. International development and validation of the Child and Adolescent Trauma Screening Questionnaire (CATS). Dallas: International Society for Traumatic Stress Studies, 2016.
15. Smith P, Perrin S, Yule W et al. Post traumatic stress disorder: cognitive therapy with children and young people. London: Routledge, 2009.
16. Krause KR, Chung S, Adewuya AO et al. International consensus on a standard set of outcome measures for child and youth anxiety, depression, obsessive-compulsive disorder, and post-traumatic stress disorder. *Lancet Psychiatry* 2021;8:76-86.
17. Hiller RM, Meiser-Stedman R, Elliott E et al. A longitudinal study of cognitive predictors of (complex) post-traumatic stress in young people in out-of-home care. *J Child Psychol Psychiatry* 2021;62:48-57.
18. Meiser-Stedman R, Smith P, Bryant R et al. Development and validation of the Child Post-Traumatic Cognitions Inventory (CPTCI). *J Child Psychol Psychiatry* 2009;50:432-40.
19. Chorpita BF, Moffitt CE, Gray J. Psychometric properties of the Revised Child Anxiety and Depression Scale in a clinical sample. *Behav Res Ther* 2005;43:309-22.

20. Hammerton G, Zammit S, Potter R et al. Validation of a composite of suicide items from the Mood and Feelings Questionnaire (MFQ) in offspring of recurrently depressed parents. *Psychiatry Res* 2014;216:82-8.
21. Stringaris A, Goodman R, Ferdinando S et al. The Affective Reactivity Index: a concise irritability scale for clinical and research settings. *J Child Psychol Psychiatry* 2012;53:1109-17.
22. Shaffer D, Gould MS, Brasic J et al. A Children's Global Assessment Scale (CGAS). *Arch Gen Psychiatry* 1983;40:1228-31.
23. Goodman R. Psychometric properties of the Strengths and Difficulties Questionnaire. *J Am Acad Child Adolesc Psychiatry* 2001;40:1337-45.
24. Goodman M, Patil U, Triebwasser J et al. Parental burden associated with borderline personality disorder in female offspring. *J Pers Disord* 2011;25:59-74.
25. Cary CE, McMillen JC. The data behind the dissemination: a systematic review of trauma-focused cognitive behavioral therapy for use with children and youth. *Child Youth Serv Rev* 2012;34:748-57.
26. Jacobson NS, Truax P. Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *J Consult Clin Psychol* 1991;59:12-9.
27. Goldbeck L, Mucbe R, Sachser C et al. Effectiveness of trauma-focused cognitive behavioral therapy for children and adolescents: a randomized controlled trial in eight German mental health clinics. *Psychother Psychosom* 2016;85:159-70.
28. Jensen TK, Holt T, Ormhaug SM et al. A randomized effectiveness study comparing trauma-focused cognitive behavioral therapy with therapy as usual for youth. *J Clin Child Adolesc Psychol* 2014;43:356-69.
29. Purnell L, Chiu K, Bhutani GE et al. Clinicians' perspectives on retraumatisation during trauma-focused interventions for post-traumatic stress disorder: a survey of UK mental health professionals. *J Anxiety Disord* 2024;106:102913.
30. Allen L, Fox A, Copello A et al. A qualitative study exploring children and young people's experiences of cognitive therapy for PTSD delivered within the context of a randomised controlled trial. *Psychol Psychother* 2025;98:74-89.

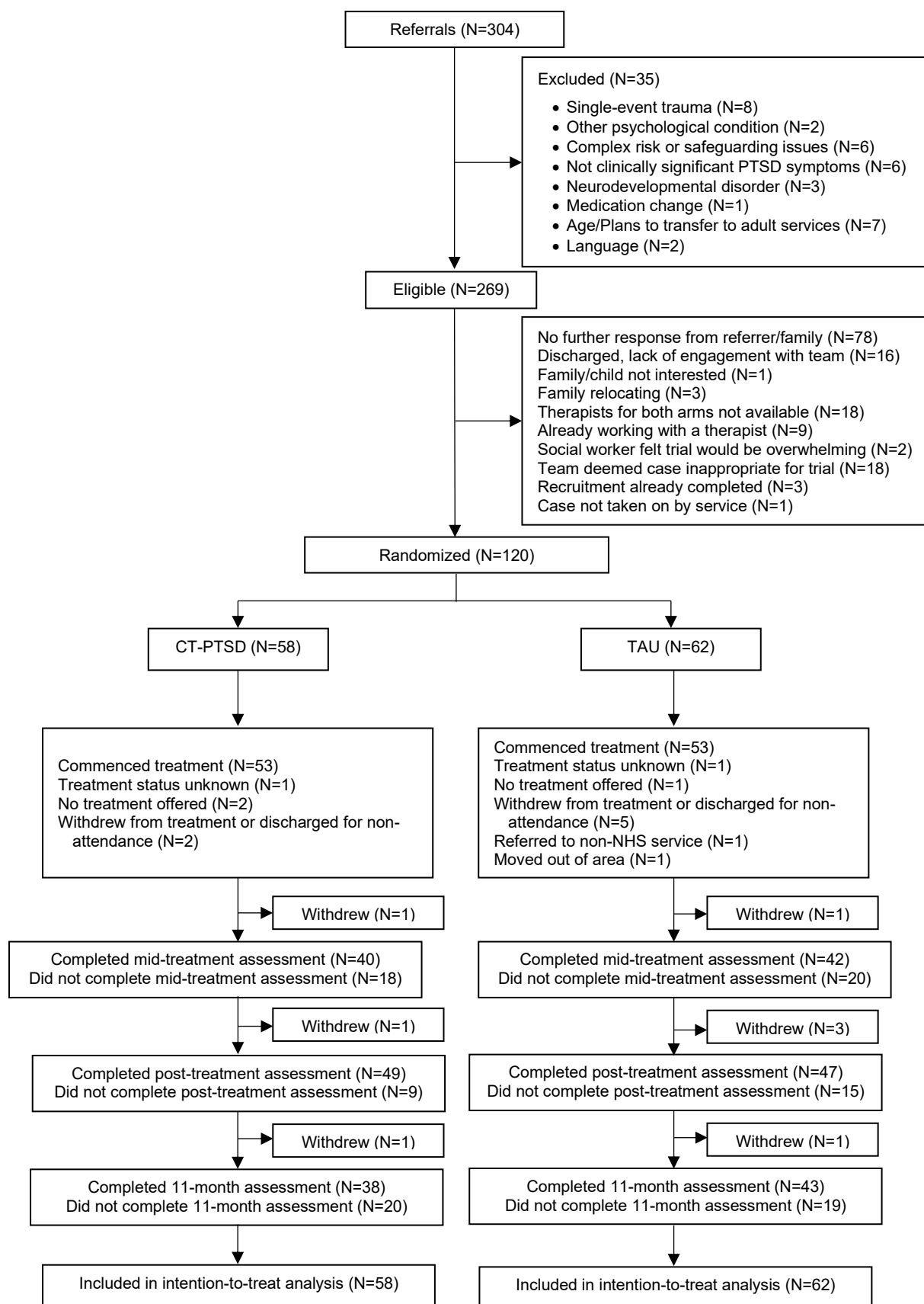


Figure 1 Study flow diagram. PTSD – post-traumatic stress disorder, CT-PTSD – cognitive therapy for PTSD, TAU – treatment as usual, NHS – National Health Service.

Table 1 Participant baseline characteristics

	CT-PTSD (N=58)	TAU (N=62)	Total (N=120)
Age (years), mean±SD	15.4±2.0	14.5±2.8	14.9±2.5
Female sex, N (%)	47 (81.0)	40 (64.5)	87 (72.5)
Race or ethnicity, N (%)			
Asian	0	3 (4.8)	3 (2.5)
Black	4 (6.9)	5 (8.1)	9 (7.5)
Mixed	7 (12.1)	7 (11.3)	14 (11.7)
White British	45 (77.6)	46 (74.2)	91 (75.8)
White other	2 (3.4)	1 (1.6)	3 (2.5)
Family status, N (%)			
Single	10 (21.7)	11 (21.6)	21 (21.6)
Relationship, not cohabiting	1 (2.2)	4 (7.8)	5 (5.2)
Cohabiting	8 (17.4)	6 (11.8)	14 (14.4)
Married	16 (34.8)	17 (33.3)	33 (34.0)
Separated/divorced	9 (19.6)	13 (25.5)	22 (22.7)
Widow/widower	2 (4.3)	0	2 (2.1)
Trauma history, N (%)			
Serious natural disaster	2 (3.4)	1 (1.6)	3 (2.5)
Serious accident/injury	8 (13.8)	26 (41.9)	34 (28.3)
Robbed by threat, force or weapon	5 (8.6)	5 (8.1)	10 (8.3)
Physical abuse/attack, family	34 (58.6)	23 (37.1)	57 (47.5)
Physical abuse/attack, non-family	24 (41.4)	33 (53.2)	57 (47.5)
Witness physical abuse/attack, family	33 (56.9)	33 (53.2)	66 (55.0)
Witness physical abuse/attack, non-family	25 (43.1)	28 (45.9)	53 (44.5)
Someone older touching private parts	20 (35.1)	16 (25.8)	36 (30.3)
Someone forcing or pressuring sex	17 (29.3)	13 (21.7)	30 (25.4)
Sudden/violent death of someone close	26 (44.8)	29 (46.8)	55 (45.8)
Attacked, stabbed, shot at, or hurt badly	2 (3.4)	11 (17.7)	13 (10.8)
Witness attack/stabbing/shooting/killing	13 (22.4)	22 (35.5)	35 (29.2)
Medical procedure	16 (27.6)	13 (21.3)	29 (24.4)
Other	38 (65.5)	45 (72.6)	83 (69.2)
Any sexual abuse, N (%)	27 (46.6)	22 (35.5)	49 (40.8)
Any intrafamilial trauma/abuse, N (%)	42 (72.4)	48 (77.4)	90 (75.0)
Trauma types, mean±SD	4.5±2.2	4.8±2.1	4.7±2.2
Trauma total number, median (IQR)	14 (4 to 42)	17 (6 to 46)	14 (4 to 45)
Use of psychotropic medication, N (%)			
Anti-ADHD	2 (3.4)	2 (3.2)	4 (3.3)
Antipsychotic	2 (3.4)	2 (3.2)	4 (3.3)
Antidepressant	15 (25.9)	11 (17.7)	26 (21.7)
Benzodiazepine	1 (1.7)	0	1 (0.8)
Any	19 (31.0)	13 (21.0)	32 (26.7)
Time under care before trial entry (months), mean±SD	9.9±7.6	10.1±8.2	10.0±7.9
Psychopathology			
Complex PTSD, N (%)	38 (65.5)	28 (45.2)	66 (55.0)
Elevated emotional instability (MSI-BPD-C ≥7), N (%)	22 (46.8)	25 (49.0)	47 (48.0)
Hears voices (not re-experiencing), N (%)	14 (24.1)	15 (24.2)	29 (24.2)
RCADS clinical range (T-score ≥70), N (%)			
Total	36 (62.1)	39 (62.9)	75 (62.5)
Depression	43 (74.1)	46 (74.2)	89 (74.2)
Anxiety total	32 (55.2)	29 (46.8)	61 (50.8)
Generalized anxiety disorder	20 (34.5)	20 (32.3)	40 (33.3)

	CT-PTSD (N=58)	TAU (N=62)	Total (N=120)
Obsessive-compulsive disorder	17 (29.3)	16 (25.8)	33 (27.5)
Panic disorder	38 (65.5)	31 (50.0)	69 (57.5)
Separation anxiety disorder	35 (60.3)	30 (48.4)	65 (54.2)
Social anxiety disorder	17 (29.3)	18 (29.0)	35 (29.2)

PTSD – post-traumatic stress disorder, CT-PTSD – cognitive therapy for PTSD, TAU – treatment as usual, ADHD – attention deficit hyperactivity disorder, MSI-BPD-C – McLean Screening Instrument for Borderline Personality Disorder, caregiver version, IQR – interquartile range, RCADS – Revised Child Anxiety and Depression Scale

Table 2 Therapist and therapy characteristics

	CT-PTSD (N=58)	TAU (N=62)	p
Therapist profession, N (%)			<0.001
CBT therapist	20 (37.0)*	3 (5.1)*	
Child psychotherapist	0*	9 (15.3)*	
Clinical psychologist	20 (37.0)	21 (35.6)	
Counselling psychologist	3 (5.6)	0	
Family therapist	1 (1.9)	6 (10.2)	
Nurse	4 (7.4)	6 (10.2)	
Social worker	1 (1.9)	3 (5.1)	
Other	5 (9.2)	11 (18.6)	
Therapist orientation			<0.001
Cognitive-behavioral	38 (79.2)*	12 (27.3)*	
EMDR	1 (2.1)	3 (6.8)	
Family/systemic	2 (4.2)*	12 (27.3)*	
Psychodynamic	0	3 (6.8)	
Other	7 (14.6)*	14 (31.8)*	
Number of therapy sessions, mean±SD	10.7±4.2	11.1±9.7	0.774
8+ sessions, N (%)	43 (75.4)	35 (56.5)	0.029
12+ session, N (%)	26 (45.6)	24 (28.7)	0.446
18+ session, N (%)	2 (3.5)	13 (21.0)	0.004
Supervision (minutes), mean±SD	159±103	90±109	0.005
Patients' therapy ratings			
Credibility, mid; mean±SD	30.0±8.36	28.4±8.79	0.421
Credibility, post; mean±SD	31.5±9.37	29.1±9.90	0.264
Therapeutic alliance, mid; mean±SD	36.9±7.86	37.0±7.20	0.941
Therapeutic alliance, post; mean±SD	37.6±7.94	38.0±6.97	0.853

Asterisks indicate a significant post-hoc difference. PTSD – post-traumatic stress disorder, CT-PTSD – cognitive therapy for PTSD, TAU – treatment as usual, CBT – cognitive-behavioral therapy, EMDR – eye movement desensitization and reprocessing, mid – mid-treatment, post – post-treatment.

Table 3 Treatment components reported by therapists (%)

	CT-PTSD (N=58)	TAU (N=62)	p
Behavioral activation	67.6	38.1	0.032
Art therapy	0	5.3	0.413
Cognitive restructuring	91.7	54.5	0.002
Trauma discussion	100	70.8	<0.001
EMDR	0	35.0	0.001
Medical review	14.3	11.8	1.00
Mindfulness exercises	28.1	60.9	0.015
Parent work	36.4	70.0	0.018
Play therapy	3.6	22.2	0.069
Problem solving	46.7	61.9	0.283
Psychoeducation	100.0	100.0	-
Psychodynamic work	0.0	20.0	0.037
Relaxation exercises	40.6	76.2	0.011
Reliving	70.6	55.6	0.278
Supportive work	74.3	100.0	0.005
Trauma narrative	88.9	41.2	<0.001

PTSD – post-traumatic stress disorder, CT-PTSD – cognitive therapy for PTSD, TAU – treatment as usual, EMDR – eye movement desensitization and reprocessing

Table 4 Adjusted mean differences between CT-PTSD and TAU for the primary and sensitivity analyses (CRIES-8) at post-treatment

	Adjusted difference (95% CI)	p	Hedges' g (95% CI)
All available data	-3.80 (-7.56 to -0.06)	0.095	-0.37 (-0.78 to 0.03)
Excluding scores taken from clinical notes	-2.20 (-6.05 to 1.74)	0.360	-0.20 (-0.62 to 0.22)
Removing TAU cases treated with TF-CBT	-4.60 (-8.36 to -0.81)	0.047	-0.46 (-0.89 to -0.04)

PTSD – post-traumatic stress disorder, CT-PTSD – cognitive therapy for PTSD, TAU – treatment as usual, TF-CBT – trauma-focused cognitive behavioral therapy, CRIES-8 – Child Revised Impact of Event Scale, 8-item version

Table 5 Comparisons between CT-PTSD and TAU on the primary and secondary outcome measures (intention-to-treat analysis)

	Adjusted difference (95% CI)	Treatment by time point (p value)	Treatment effect across all time points (p value)	Standardized between- group effect size (95% CI)	Standardized within-group effect size (95% CI)	
					CT-PTSD	TAU
PTSD severity (CRIES-8)			0.007			
Mid-treatment	-3.434 (-6.923 to 0.055)	0.054		-0.352 (-0.789 to 0.084)	1.264 (0.751 to 1.776)	0.636 (0.178 to 1.094)
Post-treatment	-3.099 (-6.402 to 0.205)*	0.066		-0.343 (-0.747 to 0.060)	2.137 (1.661 to 2.613)	1.437 (1.012 to 1.861)
11 months	-5.377 (-8.883 to -1.871)	0.003		-0.459 (-0.901 to -0.017)	2.155 (1.533 to 2.777)	1.225 (0.720 to 1.730)
PTSD severity (CATS)			0.360			
Mid-treatment	-1.197 (-5.549 to 3.156)	0.589		-0.153 (-0.587 to 0.281)	0.618 (0.191 to 1.044)	0.330 (-0.077 to 0.738)
Post-treatment	0.493 (-3.748 to 4.735)	0.819		-0.026 (-0.447 to 0.395)	1.148 (0.717 to 1.579)	1.039 (0.633 to 1.444)
11 months	-4.230 (-8.628 to 0.169)	0.059		-0.270 (-0.712 to 0.171)	1.498 (0.989 to 2.008)	1.017 (0.561 to 1.472)
PTSD severity, assessor (CPSS-I-5)			0.366			
Post-treatment	-1.092 (-6.376 to 4.192)	0.684		0.081 (-0.359 to 0.521)	1.208 (0.761 to 1.655)	0.977 (0.564 to 1.391)
11 months	-4.869 (-10.761 to 1.022)	0.105		-0.071 (-0.566 to 0.424)	1.541 (1.032 to 2.051)	1.127 (0.652 to 1.601)
PTSD diagnosis, DSM-5 (CPSS-I-5)			-			
Post-treatment	OR=0.6 (0.22-1.84)	0.405				
11 months	OR=1.7 (0.59-4.89)	0.324				
PTSD diagnosis, ICD-11 (CPSS-I-5)			0.110			
Post-treatment	OR=1.4 (0.47-4.42)	0.479				
11 months	OR=1.1 (0.54-2.10)	0.835				
Complex PTSD diagnosis (CPSS-I-5)			0.522			
Post-treatment	OR=0.9 (0.45-1.60)	0.568				
11 months	OR=0.4 (0.10-1.80)	0.210				
Disturbances in self-organization (CCPC)			0.616			
Mid-treatment	0.309 (-2.590 to 3.208)	0.834		-0.050 (-0.483 to 0.383)	0.266 (-0.226 to 0.758)	0.120 (-0.363 to 0.602)
Post-treatment	-0.638 (-3.489 to 2.214)	0.660		-0.032 (-0.456 to 0.392)	0.771 (0.354 to 1.188)	0.645 (0.254 to 1.036)
11 months	-1.469 (-4.384 to 1.446)	0.322		-0.099 (-0.536 to 0.338)	0.956 (0.390 to 1.522)	0.740 (0.199 to 1.281)
Dissociation (CCPC)			0.992			
Mid-treatment	0.068 (-0.811 to 0.947)	0.879		-0.073 (-0.506 to 0.360)	-0.032 (-1.05 to 0.990)	-0.093 (-1.09 to 0.905)
Post-treatment	0.023 (-0.817 to 0.863)	0.958		-0.030 (-0.451 to 0.391)	0.465 (0.060 to 0.870)	0.451 (0.065 to 0.837)
11 months	-0.064 (-0.946 to 0.819)	0.888		0.013 (-0.423 to 0.450)	0.370 (-0.807 to 1.547)	0.402 (-0.781 to 1.585)
Trauma-related appraisals (CPTCI)			0.949			
Mid-treatment	0.451 (-5.469 to 6.370)	0.881		-0.011 (-0.449 to 0.427)	0.102 (-0.248 to 0.452)	0.101 (-0.239 to 0.441)
Post-treatment	-0.752 (-6.705 to 5.201)	0.804		-0.064 (-0.497 to 0.370)	0.606 (0.188 to 1.024)	0.541 (0.145 to 0.937)

Total anxiety and depression (RCADS)			0.402			
Post-treatment	1.597 (-7.126 to 1.319)	0.719		-0.034 (-0.460 to 0.392)	0.788 (0.371 to 1.206)	0.669 (0.275 to 1.063)
11 months	-9.369 (-18.282 to -0.456)	0.039		-0.243 (-0.681 to 0.195)	0.923 (0.543 to 1.303)	0.515 (0.166 to 0.865)
Depression (RCADS)			0.656			
Post-treatment	0.972 (-1.188 to 3.133)	0.376		0.050 (-0.376 to 0.476)	0.548 (0.138 to 0.958)	0.656 (0.262 to 1.049)
11 months	-1.860 (-4.071 to 0.352)	0.099		-0.275 (-0.714 to 0.163)	0.801 (0.208 to 1.394)	0.496 (-0.053 to 1.044)
Anxiety total (RCADS)			0.371			
Post-treatment	0.605 (-6.333 to 7.544)	0.864		-0.059 (-0.485 to 0.367)	0.797 (0.379 to 1.215)	0.617 (0.225 to 1.010)
11 months	-7.440 (-14.555 to -0.326)	0.041		-0.223 (-0.661 to 0.214)	0.884 (0.478 to 1.290)	0.479 (0.104 to 0.853)
Generalized anxiety (RCADS)			0.314			
Post-treatment	-0.170 (-1.608 to 1.269)	0.817		-0.182 (-0.609 to 0.245)	0.726 (0.310 to 1.141)	0.534 (0.143 to 0.924)
11 months	-1.325 (-2.795 to 0.146)	0.077		-0.260 (-0.699 to 0.178)	0.873 (0.135 to 1.610)	0.564 (-0.116 to 1.245)
Obsessive-compulsive (RCADS)			0.453			
Post-treatment	-0.032 (-1.311 to 1.247)	0.961		-0.223 (-0.651 to 0.204)	0.701 (0.286 to 1.115)	0.591 (0.199 to 0.982)
11 months	-0.816 (-2.131 to 0.499)	0.223		-0.275 (-0.713 to 0.164)	0.688 (-0.189 to 1.565)	0.505 (-0.286 to 1.296)
Panic (RCADS)			0.529			
Post-treatment	1.066 (-0.985 to 3.116)	0.307		0.159 (-0.267 to 0.586)	0.524 (0.115 to 0.934)	0.456 (0.067 to 0.844)
11 months	-2.575 (-4.690 to -0.461)	0.017		-0.140 (-0.576 to 0.297)	0.638 (-0.023 to 1.300)	0.248 (-0.376 to 0.872)
Separation anxiety (RCADS)			0.094			
Post-treatment	-0.466 (-1.834 to 0.902)	0.503		-0.074 (-0.500 to 0.352)	0.626 (0.213 to 1.038)	0.346 (-0.040 to 0.733)
11 months	-1.847 (-3.259 to -0.436)	0.011		-0.236 (-0.674 to 0.202)	0.650 (-0.160 to 1.459)	0.164 (-0.572 to 0.900)
Social anxiety (RCADS)			0.884			
Post-treatment	0.207 (-1.971 to 2.386)	0.852		-0.049 (-0.475 to 0.377)	0.581 (0.170 to 0.992)	0.487 (0.098 to 0.877)
11 months	-0.789 (-3.026 to 1.449)	0.488		-0.115 (-0.551 to 0.322)	0.633 (0.046 to 1.220)	0.456 (-0.109 to 1.021)
Affect regulation and irritability (ARI), child report			0.773			
Post-treatment	0.916 (-0.300 to 2.133)	0.139		-0.009 (-0.440 to 0.421)	0.184 (-0.219 to 0.588)	0.363 (-0.030 to 0.755)
11 months	-0.326 (-1.572 to 0.920)	0.607		-0.247 (-0.685 to 0.191)	0.445 (-0.424 to 1.313)	0.368 (-0.429 to 1.165)
Affect regulation and irritability (ARI), parent report			0.013			
Post-treatment	-1.315 (-2.716 to 0.086)	0.066		-0.398 (-0.861 to 0.066)	0.514 (0.066 to 0.962)	0.210 (-0.216 to 0.636)
11 months	-1.897 (-3.428 to -0.366)	0.015		-0.374 (-0.869 to 0.120)	0.669 (-0.293 to 1.631)	0.382 (-0.442 to 1.207)
Suicidality (MFQ-4)			0.334			
Post-treatment	0.392 (-0.314 to 1.098)	0.274		0.117 (-0.314 to 0.548)	0.440 (0.033 to 0.848)	0.433 (0.040 to 0.827)
Emotional instability (MSI-BPD-C)			0.022			
Post-treatment	-1.106 (-1.983 to -0.230)	0.014		-0.252 (-0.728 to 0.224)	0.880 (0.406 to 1.354)	0.426 (0.002 to 0.851)
11 months	-0.871 (-1.832 to 0.091)	0.076		-0.045 (-0.570 to 0.480)	1.076 (0.016 to 2.136)	0.850 (-0.184 to 1.884)
Functioning (CGAS)			0.845			
Post-treatment	3.863 (-1.638 to 9.365)	0.168		0.210 (-0.227 to 0.648)	-1.275 (-1.721 to -0.827)	-0.663 (-1.062 to -0.264)
11 months	-1.603 (-7.680 to 4.475)	0.604		-0.169 (-0.652 to 0.315)	-1.358 (-1.755 to -0.962)	-1.354 (-1.738 to -0.969)
Parent-reported emotional difficulties (SDQ)			<0.001			
Post-treatment	-1.486 (-2.290 to -0.683)	<0.001		-0.214 (-0.674 to 0.246)	0.892 (0.430 to 1.353)	0.128 (-0.298 to 0.553)
11 months	-1.338 (-2.197 to -0.478)	0.002		-0.129 (-0.619 to 0.362)	1.045 (0.132 to 1.959)	0.382 (-0.479 to 1.244)
Parent-reported total difficulties (SDQ)			0.043			
Post-treatment	-1.404 (-2.976 to 0.167)	0.080		-0.168 (-0.627 to 0.292)	0.647 (0.195 to 1.099)	0.305 (-0.122 to 0.733)

11 months	-1.687 (-3.389 to 0.016)	0.052	-0.166 (-0.657 to 0.325)	0.781 (0.224 to 1.337)	0.418 (-0.107 to 0.943)
-----------	--------------------------	-------	--------------------------	------------------------	-------------------------

*Values are different from those given in Table 4 as these analyses include data from all four time points (i.e., not just baseline and post-treatment). PTSD – post-traumatic stress disorder, CT-PTSD – cognitive therapy for PTSD, TAU – treatment as usual, ARI – Affective Reactivity Index, CATS – Child and Adolescent Trauma Screen questionnaire, CCPC – Child Complex PTSD Checklist, CGAS – Children’s Global Assessment Scale, CPSS-I-5 – Child PTSD Symptom Scale for DSM-5, interviewer version, CPTCI – Children’s Post-Traumatic Cognitions Inventory, MFQ – Mood and Feelings Questionnaire, MSI-BPD-C – McLean Screening Instrument for Borderline Personality Disorder, caregiver version, RCADS – Revised Child Anxiety and Depression Scale, SDQ – Strengths and Difficulties Questionnaire.