Characteristics of complex posttraumatic stress disorder (PTSD) in young people with PTSD following multiple trauma exposure

Katie Lofthouse,[1] Ella Beeson,[2] Tim Dalgleish,[3,4] Andrea Danese,[5,6] Joanne Hodgekins,[1,7] Gerwyn Mahoney-Davies,[8] Patrick Smith,[9] Paul Stallard,[10] Jon Wilson,[7] and Richard Meiser-Stedman[1]

[1]Department of Clinical Psychology and Psychological Therapies, Norwich Medical School, University of East Anglia, Norwich, UK; [2]Hertfordshire Partnership University NHS Foundation Trust, St Albans, UK; [3]MRC Cognition and Brain Sciences Unit, University of Cambridge, Cambridge, UK; [4]Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge, UK; [5]Department of Child and Adolescent Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK; [6]Social, Genetic and Developmental Psychiatry Centre, King's College London, London, UK; [7]Norfolk and Suffolk NHS Foundation Trust, Norwich, UK; [8]Cardiff and Vale University Health Board, Cardiff, UK; [9]Department of Psychology, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK; [10]Department for Health, University of Bath, Bath, UK

Background: Complex PTSD (CPTSD) is a relatively new diagnosis. The objective of the present study was to investigate how trauma characteristics, comorbid psychopathology and cognitive and social factors experienced by children and adolescents with a posttraumatic stress disorder (PTSD) diagnosis following exposure to multiple traumatic events differs between those who meet the criteria for CPTSD and those who do not. **Method:** The present research used baseline data from the DECRYPT trial (BMJ Open, 2021, 11, e047600). Participants ($n = 120$) were aged 8–17 years and had exposure to multiple traumas and a PTSD diagnosis. The data collected comprised self-report and parent/caregiver-report questionnaires and interviews. Three primary analyses were conducted, comparing number of trauma types, prevalence of sexual trauma and prevalence of intrafamilial abuse between the CPTSD and PTSD-only groups. A range of comorbid psychopathology and cognitive and social factors were compared between the groups in an exploratory secondary analysis. All analyses were preregistered. **Results:** The CPTSD group ($n = 72$, 60%) had a significantly higher frequency of sexual trauma than the PTSD-only group ($n = 48$, 40%). The groups did not significantly differ on number of trauma types or prevalence of intrafamilial abuse. From the secondary analysis, the CPTSD group were found to have significantly higher scores on measures of negative post-traumatic cognitions, depression and panic. These results were replicated in correlation analyses using a continuous measure of CPTSD symptoms. **Conclusions:** A large proportion of youth exposed to multiple traumatic events met criteria for CPTSD. Sexual trauma appears to be related to CPTSD symptoms. Youth with CPTSD appear to have greater severity of comorbid depression and panic symptoms, as well as more negative post-traumatic cognitions. Further investigation could focus on the directionality and mechanisms for these associations. **Keywords:** Post-traumatic stress disorder; trauma; depression; cognition; panic.

Background

Post-traumatic stress disorder (PTSD) is a reaction to trauma which has comorbidity with other mental health difficulties (Lewis et al., 2019) and is associated with a range of outcomes related to overall functioning. The new diagnosis of complex post-traumatic stress disorder (CPTSD), introduced in the ICD-11 (World Health Organization, 2019), requires disturbances of self-organisation (DSO) comprising emotion dysregulation, negative self-perception and relationship disturbances) as well as the core PTSD symptoms of re-experiencing, avoidance and a sense of heightened current threat. This diagnosis is related to wider complexity comprising symptoms outside the remit of current PTSD diagnosis or potentially specific trauma characteristics. Research into CPTSD is important for improving the understanding and effective treatment of people who have been exposed to trauma.

Previous research validating the CPTSD diagnosis using latent class analysis found a 40.6% prevalence rate of CPTSD in children and adolescents exhibiting post-traumatic stress symptoms after exposure to one or more traumatic events (Sachser, Keller, & Goldbeck, 2017). Research into treatment of youth with CPTSD has demonstrated that trauma-focused CBT, the treatment recommended by National Institute for Health and Care Excellence (NICE) guidelines (NICE, 2018), is effective in reducing PTSD symptoms in young people with CPTSD, but that these individuals end treatment with significantly greater PTSD symptoms than PTSD-only individuals (Sachser, Keller, & Goldbeck, 2017).

As a relatively new diagnosis, research into CPTSD could be useful to better understand the phenotype and experience of trauma-exposed youth. The ICD-11 states that CPTSD typically occurs 'after exposure

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to chronic, repeated traumatic events', and that 'exposure to repeated traumas, especially in early development, is associated with a greater risk of developing CPTSD'. However, Elliott et al. (2021) found that in a sample of young people exposed to a *single* incident trauma, of those who met the criteria for ICD-11 PTSD, one third met the full CPTSD criteria, demonstrating a reasonably high prevalence. Therefore, investigation of how the frequency of traumatic events influences CPTSD onset in youth is necessary.

A further area which may be relevant to consider is how specific trauma types may be related to CPTSD symptoms. Villalta et al. (2020) demonstrated that disturbances in self-organisation are frequent in adolescents exposed to sexual trauma, suggesting that sexual trauma may be associated with a greater risk of developing CPTSD symptoms. In addition, Daniunaite et al. (2021) found that CPTSD in adolescence is associated with family problems (financial difficulties and conflict in the home, school problems, and a lack of social support) and a systematic review by Karatzias et al. (2019) demonstrated that CPTSD is associated with younger age, interpersonal trauma in childhood, and interpersonal trauma in adulthood. These findings imply that interpersonal trauma may be more associated with CPTSD than other trauma types. Specifically, intrafamilial abuse (witnessing or experiencing abuse within the family environment) could be linked to CPTSD as it can be a marker of *repeated* traumatic events, although little research has thus far been conducted in young people to explore the effects of interpersonal trauma within the family.

In addition to trauma characteristics, a CPTSD diagnosis could be associated with comorbid psychopathology and a number of cognitive and social factors. Karatzias et al. (2019) found in their systematic review that those with CPTSD are more likely to endorse symptoms of major depressive disorder and generalised anxiety disorder and that both PTSD and CPTSD increased likelihood of suicidality. Furthermore, Karatzias et al. (2018) used logistic regression analysis to demonstrate that negative trauma-related cognitions about the self was the most important factor in CPTSD diagnosis. This aligns with the cognitive model of PTSD (Ehlers & Clark, 2000), whereby negative appraisals are central in maintaining a sense of current threat, contributing to PTSD symptoms. Other aspects of the cognitive model, such as safety-seeking behaviours ('strategies intended to control threat/symptoms', Ehlers and Clark (2000)) may also be related to CPTSD diagnosis.

The present study aimed to investigate how trauma characteristics in young people exposed to multiple traumatic events are related to CPTSD diagnosis, in order to better understand potential risk factors for this increased complexity. We identified three possible characteristics of trauma exposure to consider on the basis of ICD-11 criteria for CPTSD and previous research, comprising number of trauma types, exposure to sexual trauma and exposure to intrafamilial abuse. Number of trauma types was selected as a primary outcome due to reduced variability compared to total trauma frequency, which was included as a secondary outcome variable. Furthermore, the present research also explored how a range of comorbid psychopathology and cognitive and social factors, selected based on the cognitive model of PTSD (Ehlers & Clark, 2000) and the ICD-11 criteria for CPTSD, might differ between the CPTSD and PTSD-only groups. Elucidating the comorbidities and phenotype of young people who meet the criteria for CPTSD could inform better treatment for these individuals through addressing specific comorbid symptoms or underlying mechanisms found to be associated with CPTSD.

Our primary hypotheses were that the CPTSD group would have a significantly higher number of trauma types and significantly higher prevalence of sexual trauma and intrafamilial abuse. Our secondary hypothesis was that the CPTSD group would have significantly higher scores than the PTSD-only group on measures of comorbid psychopathology and cognitive and social factors.

Method
Design

The present study was a cross-sectional design comprising of analysis of the baseline data from the Delivery of Cognitive Therapy for Young People after Trauma (DECRYPT) trial (Allen et al., 2021), a randomised controlled trial of cognitive therapy for PTSD in youth exposed to multiple traumatic stressors. Measures were selected from the battery of self-report and parent/caregiver-report interviews and questionnaires to assess number of trauma types, prevalence of sexual trauma and prevalence of intrafamilial abuse for the primary analysis. For the secondary analysis, measures assessing dissociation, depression, anxiety, irritability, trauma memory quality, safety behaviours and social support were identified. Hypotheses were preregistered on the Open Science Framework (https://osf.io/chx7s/).

Ethical considerations

Ethical approval for the DECRYPT trial was provided by UK Health Research Authority Research Ethics Committee (East of England–Cambridge South, 16/EE/0233). For participants aged under 16 years, informed consent was provided by parents and caregivers, and the child or young person was also asked to give their assent. Participants aged 16 years or older could provide informed consent without their parent or caregiver.

Participants

One hundred twenty participants were included in this analysis; this sample size was determined by a power calculation for the primary outcome of the DECRYPT trial. Participants were drawn from Child and Adolescent Mental Health Services and Youth Services in Cambridgeshire Cardiff,

Essex, Hertfordshire, Kent, Norfolk, South London and Suffolk. Inclusion criteria required participants to be aged 8–17 years with a diagnosis of PTSD (as defined by DSM-5 and diagnosed using the CPSS-I-5, Child PTSD Symptom Scale – Interview version, Foa et al. (2018)) following multiple trauma exposure, and to have a score equal to or greater than 17 on the Child Revised Impact of Events Scale, 8-item version (CRIES-8, Perrin et al. (2005)). Six potential participants were excluded due to having a score below 17 on the CRIES-8, prior to administering the CPSS-I-5. Exclusion criteria were a change of prescribed psychiatric medication within the past 2 months, PTSD symptoms relating exclusively to one trauma, pervasive developmental or neurodevelopmental disorder, intellectual disability, another primary psychiatric diagnosis or clinical need warranting treatment ahead of PTSD (e.g. psychosis), inability to speak English, ongoing exposure to threat, strong likelihood of being unable to complete treatment (e.g. imminent house move), or history of organic brain damage. Table 1 contains the demographic and trauma history data for the sample.

At baseline, participants completed a battery of interviews and questionnaires in an appointment lasting 60–90 min, with further appointments made available if required. See Allen et al. (2021) for full procedure information. Interviews and questionnaires relevant for the present study are described below.

Measures

Complex PTSD screen. In order to establish whether participants met the criteria for CPTSD, as defined by ICD-11 (World Health Organization, 2019), a 3-item self-report structured interview was conducted. When the DECRYPT trial was designed, the ICD-11 was not yet published so the interview was devised by the DECRYPT trial team (see Supporting Information) based on draft criteria for CPTSD. The three interview items correspond to the three DSO symptoms defined in ICD-11: affective dysregulation, negative self-concept, and difficulties in sustaining relationships. Each item had one introductory question assessing the overall symptom, with optional follow-up questions for positive responses. Each of the three DSO symptoms was assessed on a 5-point Likert-type scale from zero ('Not at all') to four ('Six or more times a week/almost always'), consistent with the CPSS-I-5, with scores above zero sufficient for endorsement of a symptom. Participants met criteria for CPTSD if they endorsed all three DSO symptoms.

Child Complex PTSD Checklist. The Child Complex PTSD Checklist is a 12-item self-report measure which assesses the three DSO symptoms of CPTSD, comprising negative self-concept, interpersonal difficulties and affect dysregulation. Each item is rated on a 4-point Likert-type scale from zero ('Never') to three (almost always). The measure was developed based on preliminary drafts of ICD-11 in 2016 and has been demonstrated to have good internal consistency (Hiller et al., 2021).

Child and Adolescent Trauma Screen (CATS). The CATS (Sachser, Berliner, et al., 2017) has self-report and caregiver-report versions, both of which were employed in the present study as a structured interview. For the present research, the first 15 items pertaining to trauma history were analysed; these list 14 different trauma types and an open answer question to accommodate any nonlisted trauma types, with the participant asked to indicate if they have experienced each event as a yes or no question; caregivers were asked the same with regards to the young person in their care. These data, alongside qualitative description of traumatic events, was used to establish the prevalence of sexual trauma (items 8 and 9) and intrafamilial abuse (items 4 and 6).

Children's Revised Impact of Event Scale, 8-item version (CRIES-8). The CRIES-8 (Perrin et al., 2005) is a self-report questionnaire measure assessing frequency of post-traumatic stress symptoms over the preceding 7 days. It has good face, construct, predictive and criterion validity (Perrin et al., 2005; Stallard et al., 1999).

Post-Traumatic Cognitions Inventory – Child version (CPTCI). The Post-Traumatic Cognitions Inventory – Child version (Meiser-Stedman et al., 2009) is a 25-item self-

Table 1 Sample demographic characteristics

	Whole sample (n = 120)	CPTSD sample (n = 72)	PTSD-only sample (n = 48)
Age in years, mean (SD)	14.9 (2.5)	15.5 (2.2)	14.1 (2.7)
Sex, n (%)			
Male	33 (27.5)	14 (19.4)	19 (39.6)
Female	87 (72.5)	58 (80.6)	29 (60.4)
Ethnicity, n (%)			
White (any background)	97 (80.8)	59 (81.9)	38 (79.2)
Black (any background)	9 (7.5)	4 (5.6)	5 (10.4)
Asian (any background)	2 (1.7)	2 (2.8)	0 (0.0)
Mixed (any background)	11 (9.2)	7 (9.7)	4 (8.3)
Any other ethnic group	1 (0.8)	0 (0.0)	1 (2.1)
Traumatic experiences, n (%)			
Natural disaster	3 (2.5)	2 (2.8)	1 (2.1)
Accident	34 (28.3)	21 (29.2)	13 (27.1)
Robbed	10 (8.3)	5 (6.9)	5 (10.4)
Physical abuse inside family	57 (47.5)	32 (44.4)	25 (52.1)
Physical abuse outside family	57 (47.5)	36 (50.0)	21 (43.8)
Witnessed physical abuse inside family	66 (55)	37 (51.4)	29 (60.4)
Witnessed physical abuse outside family	53 (44.2)	34 (47.2)	19 (39.6)
Inappropriate sexual contact	36 (30)	30 (41.7)	6 (12.5)
Someone forcing/pressuring sex	30 (25)	25 (34.7)	5 (10.4)
Sudden death/injury of a close person	55 (45.8)	35 (48.6)	20 (41.7)
Attacked, stabbed, shot at or hurt badly	13 (10.8)	10 (13.9)	3 (6.3)
Witnessed someone attacked, stabbed, shot at or hurt badly	35 (29.2)	22 (30.6)	13 (27.1)
Medical procedure	29 (24.2)	19 (26.4)	10 (20.8)
Exposure to war	0 (0.0)	0 (0.0)	0 (0.0)
Other	83 (69.2)	49 (68.1)	34 (70.8)
Number of trauma types, mean (SD)	4.7 (2.2)	5.0 (2.3)	4.3 (1.9)

report questionnaire which assesses appraisals of traumatic experiences in the preceding 2 weeks. The measure has good internal consistency, test–retest reliability, convergent validity and discriminative validity (Meiser-Stedman et al., 2009).

Revised Child Anxiety and Depression Scale.   The Revised Child Anxiety and Depression Scale (RCADS) (Chorpita et al., 2000) is a 47-item self-report questionnaire assessing symptoms in the preceding 2 weeks corresponding to anxiety disorders and depression in young people. The measure has good internal consistency (Kösters et al., 2015), test–retest reliability and convergent validity (Chorpita et al., 2000).

Child PTSD symptom scale – Interview version (CPSS-I-5).   The Child PTSD Symptom Scale – Interview Version (Foa et al., 2018) is a 27-item semistructured self-report interview assessing DSM-5 PTSD symptoms. Foa et al. (2018) demonstrated that the interview has excellent internal consistency, reliability and validity. The present study used the final seven items which assess impairment of experienced symptoms on daily functioning.

Dissociation screen.   The dissociation screen used in the present study is a 2-item self-report interview assessing the presence of depersonalisation ('Have you felt as if you were outside your body?') and derealisation ('Have you felt as if things around you weren't real?') measured on a 5-point Likert-type scale from 'Not at all' to 'Six or more times a week/almost always'.

Strengths and Difficulties Questionnaire.   The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a 25-item caregiver-report measure assessing emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour, with each of these scales comprised of five items. The first four scales (comprised of 20 items), excluding prosocial behaviour, are used to calculate a total difficulties score, which was employed in the present study. The total difficulties score has acceptable test–retest reliability (Bergström & Baviskar, 2021), and sufficient convergent, discriminant and criterion validity (Vugteveen et al., 2021).

Affective Reactivity Index – Child version.   The Affective Reactivity Index – Child version (ARI-C; Stringaris et al., 2012) is a 7-item self-report measure of irritability, which asks participants to rate irritability symptoms compared to others of the same age (e.g. 'I am easily annoyed by others').

Trauma Memory Quality Questionnaire (TMQQ).   The TMQQ (Meiser-Stedman et al., 2007) is an 11-item self-report questionnaire which assesses the current characteristics of trauma memories; particularly the extent to which they are composed of sensory elements. The measure has good internal consistency, criterion validity and convergent validity (Meiser-Stedman et al., 2007). Higher scores indicate more sensory-based and fragmented memories.

Child Safety Behaviour Scale (CSBS).   The Child Safety Behaviour Scale (Alberici et al., 2018) is a 13-item self-report questionnaire designed to assess safety behaviours conducted over the past 2 weeks. The items can be divided into two subscales comprising hypervigilance and suppression. The measure has excellent internal consistency and good discriminant validity and specificity (Alberici et al., 2018).

Multidimensional Scale of Perceived Social Support (MSPSS).   The Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) is a 12-item self-report questionnaire measuring a participant's perceptions of support from family, friends and a significant other. The measure has good internal reliability (Zimet et al., 1988) and good convergent and discriminative validity (De Maria et al., 2018).

McLean Screening Instrument for Borderline Personality Disorder (MSI).   The McLean Screening Instrument (Zanarini et al., 2003) is a 10-item parent/guardian-report interview assessing symptoms of DSM-4 borderline personality disorder (BPD), in which items are rated on a dichotomous scale of present or absent. The measure has good sensitivity, specificity, reliability and validity (Zanarini et al., 2003). A cut-off of seven is commonly used in screening for BPD.

Mood and Feelings Questionnaire – Suicidal Ideation (MFQ-SI).   The Mood and Feelings Questionnaire – Suicidal Ideation subset is a self-report four-item questionnaire developed by Hammerton et al. (2014), as a composite of relevant items from the full Mood and Feelings Questionnaire (Angold & Costello, 1987). Hammerton et al. (2014) demonstrated that this composite has reasonable validity.

Data analysis

The sample size was predetermined by the DECRYPT trial. For the current study, a post hoc power analysis conducted using G*Power version 3.1.9.7 (Faul et al., 2007) indicated that two groups ($n = 48$ and $n = 72$) with a significance criterion of $\alpha = .05$ for a test of means comparisons would have 80% power to detect an effect size (standardised mean difference) of .47. Statistical analysis was conducted using IBM SPSS Statistics Version 28 (IBM Corp., 2021). Data were assessed for assumptions of normality, skewness and kurtosis. The normality of the score distribution on each measure was assessed using the Kolmogorov–Smirnov Test.

Demographic data were compared between the CPTSD and PTSD-only groups. For the categorical variables (ethnicity and sex), chi-square tests were conducted. A Mann–Whitney test was conducted to compare the ages of the groups.

The scores for number of trauma types, total trauma frequency, CRIES-8, SDQ, ARI-C, total RCADS, Dissociation, MSI (BPD), CSBS suppression subscale, CPSS impairment and Suicidal Ideation did not meet the normality assumption. For the number of trauma types, CRIES-8, ARI-C, Dissociation, MSI (BPD), CPSS Impairment and Suicidal Ideation scores, no adequate transformations could be found; therefore, nonparametric Mann–Whitney tests were conducted for these variables. The scores for the SDQ, total RCADS and CSBS suppression subscale met the normality assumption after a square root transformation, and the total trauma frequency met the normality assumption after a log transformation, allowing parametric tests to be conducted as planned. Independent samples *t*-tests were conducted to compare the voice hearing and nonvoice hearing groups on scores for the following variables: total trauma frequency, CPTCI, RCADS total and subscales (depression, panic, generalised anxiety disorder), SDQ, TMQQ, CSBS subscales (hypervigilance and suppression) and MSPSS. Prevalence of sexual trauma and intrafamilial abuse was compared between the CPTSD and PTSD-only groups using chi-square tests due to the categorical nature of these variables.

Corrections were applied to adjust for multiple comparisons. For the primary analysis (number of trauma types, sexual trauma prevalence, intrafamilial abuse prevalence), a Bonferroni correction was applied. For the exploratory secondary analysis comprising all other variables, a Holm-Bonferroni correction was applied.

Levene's test for equal variances was conducted for all t-tests; this was not significant and equal variances were assumed unless otherwise specified. Cohen's d effect sizes were calculated for all between-groups analyses, with effects sizes for dichotomous factors (e.g. sex, trauma type) converted from odds ratios to Cohen's d to allow easy comparison between variables.

In order to confirm that the CPTSD self-report questionnaire assessed the intended CPTSD symptoms, a t-test was conducted to compare the CPTSD and PTSD-only groups (as defined using the CPTSD diagnostic interview) on the CPTSD questionnaire scores. As expected, the CPTSD group had a significantly higher score on the CPTSD questionnaire ($M = 26.2$, $SD = 7.02$) than the PTSD only group ($M = 20.2$, $SD = 7.58$), $p < .001$, Cohen's $d = .825$.

Correlation analyses were then conducted using the Complex PTSD checklist and all of the trauma characteristics, psychopathological, cognitive and social variables. A Holm-Bonferroni correction was applied.

Results
Descriptive statistics

Table 2 contains descriptive statistics of all measures included in the present study. 72 of 120 participants (60%) met the criteria for CPTSD with the remaining 48 meeting criteria for PTSD. In the PTSD-only group, one participant (2.1%) had 0 DSO symptoms, six participants (12.5%) had one DSO symptom, and 41 participants (85.4%) had two DSO symptoms. The distribution of scores for the CPTSD questionnaire measure are reported in the Supporting Information, Figure S1.

Demographic analyses

There was no significant difference between the CPTSD and PTSD-only groups on ethnicity ($p = .542$). There was a significant difference between the groups on age ($p = .008$), with a higher mean age for the CPTSD group ($M = 15.5$, $SD = 2.20$) than for the PTSD-only group ($M = 14.1$, $SD = 2.72$). There was also a significant difference in the sex distribution of the groups ($p = .016$), with a greater proportion of females in the CPTSD group (80.6%) than in the PTSD-only group (60.4%).

Primary analyses

Table 3 contains mean scores differentiated by group. With respect to number of trauma types, a Mann–Whitney test indicated that despite the CPTSD group having a higher mean score, there was no significant difference between the CPTSD group and the PTSD-only group ($p = .344$; Cohen's $d = .37$). A chi-square test indicated a significant difference between prevalence of sexual trauma in the CPTSD and PTSD-only groups, ($p < .001$, Bonferroni correction required $p = .0167$; Cohen's $d = .83$). 54.2% of the CPTSD group had experienced sexual trauma, compared to 20.8% of the PTSD-only group. There was no significant relationship between

CPTSD and intrafamilial abuse ($p = .28$; Cohen's $d = .32$).

A logistic regression was performed to assess the effect of sexual trauma on CPTSD diagnosis while controlling for PTSD symptom severity (CRIES-8 score). Sexual trauma remained a significant predictor of CPTSD diagnosis ($p < .001$) after controlling for PTSD symptom severity; the model found that participants exposed to sexual trauma were 4.5 times more likely to have a CPTSD diagnosis than those not exposed to sexual trauma.

Secondary analyses

For mean scores on secondary measures, see Table 3. The CPTSD group endorsed our measure of negative trauma-related cognitions (the CPTCI) more strongly than the PTSD-only group ($p < .001$; Cohen's $d = .69$). The CPTSD group also had a significantly higher score on the RCADS depression subscale ($p < .001$; Cohen's $d = .73$) and the RCADS panic disorder subscale ($p = .002$; Cohen's $d = .54$) than the PTSD-only group. There were no significant differences between the CPTSD and PTSD-only groups on the other secondary measures.

A one-way analysis of covariance was conducted to assess whether the significant results from the secondary analysis remained after controlling for PTSD symptom severity (CRIES-8 scores). There was still a significant difference between the groups on negative trauma-related cognitions ($F(1, 115) = 10.1$, $p = .002$), RCADS depression ($F(1, 117) = 12.5$, $p < .001$) and RCADS panic disorder ($F(1, 117) = 7.1$, $p = .009$) when controlling for PTSD symptom severity.

Correlation analysis

See Table 4 for the full correlation analysis. CPTSD symptoms as assessed by the self-report questionnaire measure were found to have large correlations ($r > .5$) with negative trauma-related cognitions (CPTCI), depression (RCADS), panic (RCADS), suicidal ideation (MFQ-SI), dissociation and PTSD symptoms (CRIES-8); medium correlations ($r > .3$) with generalised anxiety (RCADS), suppression (CSBS), trauma memory quality (TMQQ) and borderline personality disorder traits (MSI); small correlations ($r > .1$) with irritability, parent-reported emotional difficulties and sexual trauma.

The pattern of correlation analyses remained broadly the same when controlling for PTSD symptom severity (CRIES-8 score), see Table S1.

Discussion

The present study is a novel investigation of the presentation of CPTSD in children and adolescents with a PTSD diagnosis following multiple trauma exposure. The CPTSD and PTSD-only groups were

Table 2 Descriptive statistics for all measures

Measure	n	M	SD	Range	Cronbach's α
Trauma characteristics					
Sexual trauma	120	N = 50[a]	41.7%[a]		
Number of trauma types	120	4.7	2.2	1–11	.47
Intrafamilial abuse	120	N = 90[a]	75.0%[a]		
Negative post-traumatic cognitions (CPTCI)	118	73.6	15.9	26–100	.94
Depression (RCADS)	120	19.5	6.2	2–30	.83
Panic (RCADS)	120	14.4	7.1	0–27	.91
Dissociation	120	6.87	2.5	3–12	.73
Generalised Anxiety Disorder (RCADS)	120	12.0	3.93	2–18	.78
Safety behaviours – Suppression subscale (CSBS)	115	17.8	3.6	7–24	.69
Strengths and Difficulties Questionnaire (SDQ)	94	21.5	6.1	9–35	.66
Impairment (CPSS)	119	4.6	1.3	1–7	.48
PTSD symptoms (CRIES-8)	120	31.6	6.0	17–40	.66
Trauma memory quality (TMQQ)	120	31.8	5.5	17–44	.73
Safety behaviours – hypervigilance subscale (CSBS)	114	17.8	5.2	7–28	.83
Suicidal ideation (MFQ-SI)	119	4.8	2.7	0–8	.86
Social support (MSPSS)	119	57.8	13.4	17–84	.82
Trauma frequency	120	152.3	653.2	0–6,110	.46
Borderline personality disorder traits (MSI)	98	6.3	2.4	0–10	.71
Irritability (ARI-C)	120	7.9	4.2	0–14	.94

ARI-C, Affective Reactivity Index – Child version; CRIES-8, Child Revised Impact of Events Scale; CPTCI – Post-Traumatic Cognitions Inventory, Child version; CSBS, Child Safety Behaviour Scale; MSPSS, Multidimensional Scale of Perceived Social Support; RCADS, Revised Child Anxiety and Depression Scale; SDQ, Strengths and Difficulties Questionnaire; TMQQ, Trauma Memory Quality Questionnaire.
[a]Sexual trauma and CPTSD diagnosis are categorical variables, so the frequencies and percentages for these variables are reported here.

compared on trauma characteristics, comorbid psychopathology, and cognitive and social factors. The CPTSD group had a significantly higher prevalence of sexual trauma and significantly higher scores on measures of negative trauma-related cognitions, depression and panic.

First, the prevalence of CPTSD within this sample is higher than rates reported by other studies; 72 of 120 participants (60%) met the criteria for CPTSD compared to 40.6% found by Sachser, Keller, and Goldbeck (2017) in latent class analysis of a sample of youth exposed to at least one traumatic event with at least medium severity of post-traumatic stress symptoms. This difference may be due to the requirement for multiple traumas as well as high PTSD symptom severity scores in the present sample, potentially contributing to greater complexity and higher rates of CPTSD. Furthermore, the high rates of subthreshold DSO symptoms (97.9% of PTSD-only group endorsing at least one symptom) show that these are experienced by a majority of young people with a PTSD diagnosis, consistent with Elliott et al. (2021), who found that 90% of participants meeting PTSD criteria also endorsed at least one DSO symptom.

Primary analyses comprising between-groups comparisons showed that the CPTSD group had a significantly higher prevalence of sexual trauma than the PTSD-only group. This is consistent with Cloitre et al. (2019), where childhood sexual abuse by caregivers was associated with risk for CPTSD in adults. However, the other two primary hypotheses

were not confirmed. There was no significant difference between the CPTSD and PTSD-only groups on number of trauma types or prevalence of intrafamilial abuse. The lack of significant difference for number of trauma types echoes the finding of Daniunaite et al. (2021), although the lack of difference in intrafamilial abuse prevalent does not replicate their finding that CPTSD was associated with family problems such as financial difficulties and conflicts in the home. However, it should be noted that the number of trauma types was high for both groups (M = 5.0 for CPTSD group; M = 4.3 for PTSD-only group) relative to similar samples such as Jensen et al. (2014).

The secondary analyses showed that the CPTSD group scored significantly higher on measures of negative post-traumatic cognitions, symptoms of depression and symptoms of panic. The finding for negative post-traumatic cognitions is consistent with Karatzias et al. (2018), who used logistic regression analysis to establish negative trauma-related cognitions about the self were the most important factor in predicting CPTSD diagnosis in adults. However, given that negative self-concept is a symptom of CPTSD, it is possible that this is related to, or overlaps with, negative post-traumatic cognitions, causing the significant difference between the groups. Furthermore, the findings for depression and panic are supported by Karatzias et al. (2019), in which adults with CPTSD were more likely to endorse symptoms for major depressive disorder and generalised anxiety disorder. It is feasible that

Table 3 Between-groups analysis for primary and secondary outcomes

Measure	CPTSD group ($n = 72$), m (SD)	PTSD-only group ($n = 48$), m (SD)	Test statistic	p	Effect size (Cohen's d unless specified)
Primary analysis					
Sexual trauma[a]	39 (54.2%)	10 (20.8%)	$\chi^2 = 13.2$	**<.001**	.828
Number of trauma types	5.0 (2.3)	4.3 (1.9)	$U = 1553.5$	.344	.173
Intrafamilial abuse[a]	51 (70.8%)	39 (81.3%)	$\chi^2 = 1.7$	.197	.319
Secondary analysis					
Trauma frequency	209.2 (827.8)	66.9 (180.7)	$t = 0.27$	.788	.051
Psychopathology					
Depression (RCADS)	21.2 (5.6)	16.9 (6.3)	$t = 3.9$	**<.001**	.731
Panic (RCADS)	16.0 (6.5)	12.0 (7.4)	$t = 3.2$	**.002**	.587
Dissociation	7.3 (2.5)	6.1 (2.4)	$U = 1246.0$	.009	.489
Generalised Anxiety Disorder (RCADS)	12.6 (4.0)	11.1 (3.7)	$t = 2.1$	.037	.393
Parent-reported emotional difficulties (SDQ)	22.5 (5.7)	20.3 (6.5)	$t = 1.8$	.072	.379
Impairment (CPSS)	4.9 (1.1)	4.2 (1.5)	$U = 1376.5$	.076	.330
PTSD symptoms (CRIES-8)	32.3 (5.9)	30.5 (6.0)	$U = 1401.0$	.078	.326
Suicidal ideation (MFQ-SI)	5.2 (2.6)	4.3 (2.7)	$U = 1480.5$	.22	.226
Borderline personality disorder traits (MSI)	6.5 (2.0)	5.9 (2.9)	$U = 1159.0$	.902	.025
Irritability (ARI-C)	7.9 (4.2)	7.9 (4.2)	$U = 1722.5$	.976	.005
Cognitive and social factors					
Negative post-traumatic cognitions (CPTCI)	77.8 (14.6)	67.4 (16.0)	$t = 3.7$	**<.001**	.686
Safety behaviours – Suppression subscale (CSBS)	12.6 (3.6)	10.8 (3.4)	$t = 2.1$	.04	.393
Trauma memory quality (TMQQ)	32.5 (5.1)	30.7 (6.0)	$t = 1.7$	.095	.313
Safety behaviours – hypervigilance subscale (CSBS)	11.3 (5.3)	10.3 (5.0)	$t = 1.3$	.208	.240
Social support (MSPSS)	56.8 (13.8)	59.4 (12.7)	$t = 1.1$	.285	.201

Significant results depicted in bold. A Bonferroni correction was applied for the three primary analyses and a Holm-Bonferroni correction was applied for the secondary analysis. ARI-C, Affective Reactivity Index – Child version; CPTCI – Post-Traumatic Cognitions Inventory, Child version; CRIES-8, Child Revised Impact of Events Scale; CSBS, Child Safety Behaviour Scale; MSPSS, Multidimensional Scale of Perceived Social Support; RCADS, Revised Child Anxiety and Depression Scale; SDQ, Strengths and Difficulties Questionnaire; TMQQ, Trauma Memory Quality Questionnaire.
[a] Categorical variables so frequencies rather than means are reported.

these features are transdiagnostic, whereby negative self-concept seen in CPTSD could feed into symptoms of depression, while emotional dysregulation, also a feature of CPTSD, could contribute to symptoms of panic.

Correlational analyses using the continuous questionnaire self-report measure of CPTSD symptoms replicated the results from the primary and secondary analyses with all of the factors identified in the between-groups analyses producing significant correlations, as well as some factors which were nonsignificant in the between-groups analyses producing significant correlations.

A further finding of note was the difference in age and sex distribution of the CPTSD and PTSD-only groups. The CPTSD group was found to be significantly older and contain a significantly higher proportion of females than the noncomplex group. The finding for age is not consistent with Karatzias et al. (2019), who found that younger age was associated with CPTSD in an adult sample. One explanation for the difference in sex distribution may be that females are more likely to experience or report sexual trauma (Finkelhor et al., 2014), which significantly differed between the groups in the primary analysis. This may also relate to the difference in mean ages, as sexual trauma may be more likely to be disclosed as young people enter puberty and gain more independence.

An additional consideration is the range of comorbid psychopathology and cognitive and social factors which were *not* found to significantly differ between the CPTSD and PTSD-only groups. The lack of significant difference for social support is surprising given the relationship difficulties symptom of CPTSD. Similarly, irritability produced a small, significant correlation with CPTSD symptoms but was not found to significantly differ in the between-groups analysis, despite its apparent relation to the DSO symptom of affect regulation. PTSD symptom severity had a large correlation with the CPTSD questionnaire measure but was not significant in the between-groups analyses, although this may be attributed to the high scores for the entire sample and thus a potential ceiling effect.

Table 4 Correlation analysis for primary and secondary outcomes

Measure	n	r	95% Confidence interval	p
Trauma characteristics				
Sexual trauma*	120	.241	.064 to .403	**.008**
Number of trauma types	120	.159	.023 to .368	.083
Intrafamilial abuse*	120	.073	−.107 to .249	.426
Trauma frequency	120	.111	−.070 to 2.84	.229
Psychopathology				
Depression (RCADS)	120	.621	.497 to .720	**<.001**
Suicidal ideation (MFQ-SI)	119	.551	.412 to .665	**<.001**
PTSD symptoms (CRIES-8)	120	.517	.373 to .638	**<.001**
Panic (RCADS)	120	.509	.363 to .531	**<.001**
Dissociation	120	.516	.372 to .637	**<.001**
Generalised Anxiety Disorder (RCADS)	120	.443	.287 to .577	**<.001**
Impairment (CPSS)	119	.374	.208 to .519	**<.001**
Borderline personality disorder traits (MSI)	98	.347	.159 to .510	**<.001**
Irritability (ARI-C)	120	.286	.112 to .442	**.002**
Parent-report emotional difficulties (SDQ)	94	.279	.081 to .456	**.006**
Cognitive and social factors				
Negative post-traumatic cognitions (CPTCI)	118	.637	.516 to .734	**<.001**
Safety behaviours, suppression (CSBS)	115	.486	.333 to .615	**<.001**
Trauma memory quality (TMQQ)	120	.395	.232 to .536	**<.001**
Social support (MSPSS)	119	−.191	−.358 to −.011	.038
Safety behaviours, hypervigilance (CSBS)	114	.151	−.034 to .326	.108

Significant results depicted in bold. A Holm-Bonferroni correction was applied.
* Categorical variables.

This research could have clinical implications. It has shown that sexual trauma specifically may be associated with greater complexity in children and adolescents. In addition, the CPTSD group having higher scores on post-traumatic negative cognitions suggests that this may be an important treatment target for multiple trauma-exposed young people, consistent with a recent systematic review which demonstrated that negative post-traumatic cognitions was the most consistent mediator or mechanism of change in PTSD treatments (Alpert et al., 2023).

The present research had various strengths and limitations. The study design and hypotheses were preregistered and a correction for multiple compar-isons was used to ensure methodological rigour. Both the CPTSD and PTSD-only groups being comprised of youth with a PTSD diagnosis following exposure to multiple traumatic events allowed for a robust comparison, although there was the possibility for ceiling effects given the large proportion of the PTSD-only group endorsing two DSO symptoms and the elevated scores on psychopathology measures. The sample size was determined by the DECRYPT trial, meaning that while adequately powered, only medium-sized effects could be detected. In addition, most of the sample was female, which is comparable to other examples of PTSD research (Meiser-Stedman et al., 2017; Sachser & Goldbeck, 2016). A further consideration is the lack of validated diagnostic interviews available to assess CPTSD in youth. The additional interview items used in the present research were designed to be consistent with the CPSS-I-5 (an interview designed for DSM-5 PTSD, not ICD-11 PTSD or CPTSD); further research should aim to validate these supplementary interview items or other CPTSD diagnostic measures, in order to expand on the CPTSD self-report questionnaires now available (Haselgruber et al., 2020; Sachser et al., 2022).

Further research could be useful to better understand risk factors for CPTSD and the relationships linking CPTSD with psychopathological symptoms and cognitive and social factors. The cross-sectional design of the present research means that a longitudinal design affording exploration of causal relationships could develop these findings further. In addition, repeating similar analyses in an adult sample may be useful to know whether developmental stages influence these relationships. Given the higher mean age of the CPTSD group, examining psychometrics of CPTSD and PTSD measures across age groups in youth could elucidate this finding. Furthermore, investigating how CPTSD symptoms influence treatment course of PTSD could have important clinical implications.

In conclusion, this research has demonstrated that in youth with exposure to multiple traumatic events, CPTSD diagnosis is associated with only selected aspects of trauma history, namely sexual trauma. Youth with CPTSD were also shown to have more negative post-traumatic cognitions and more severe symptoms of depression and panic.

Supporting information

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Appendix S1. Complex PTSD Interview.
Appendix S2. Complex PTSD Checklist.
Figure S1. Complex PTSD Questionnaire Score.
Table S1. Partial Correlation Analyses Controlling for PTSD Symptom Severity.

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Data availability statement

Research data are not shared.

Correspondence

Katie Lofthouse, Department of Clinical Psychology and Psychological Therapies, Norwich Medical School, University of East Anglia, Norwich, NR4 7TJ, UK. Email: k.lofthouse@uea.ac.uk

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Key points

- Complex PTSD (CPTSD) is a relatively new diagnosis in the ICD-11. Research investigating factors related to CPTSD in young people could have clinical utility.
- The present study explored CPTSD in youth aged 8–17 years who had a diagnosis of PTSD and exposure to multiple traumatic stressors.
- Those who met criteria for CPTSD diagnosis had higher frequency of sexual trauma and higher scores on measures of negative post-traumatic cognitions, depression and panic than those who did not.
- The CPTSD group also had a higher mean age and larger proportion of females than the PTSD-only group.
- Future research should seek to clarify the directionality and mechanisms of these relationships and compare them to an adult sample.

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