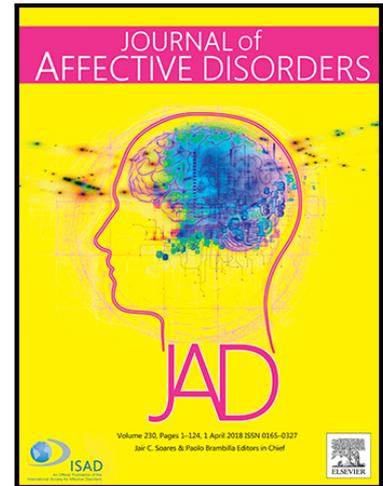


## Accepted Manuscript

Relationship between posttraumatic stress symptoms, caregiving response, and parent mental health in youth exposed to single incident trauma

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### Highlights

- The results of this study indicate that the stress experienced by parents in the aftermath of a traumatic event that affected their child impacts upon parenting factors that are associated with child psychopathology.
- Expressed emotion and family accommodation are associated with posttraumatic stress reactions in young people in the month following a traumatic event, and child stress in response to emotional overinvolvement mediates this effect.
- Parental posttraumatic stress symptoms and anxiety were associated with emotional overinvolvement and accommodating behaviours.
- The measurement of expressed emotion was comprehensive and allowed for analysis of the specific components from multiple perspectives.
- The inclusion of a measure of family accommodation provides new data on how families may respond to a child's distress following a difficult and injurious life event.
- Understanding the child in the context of their family environment and relationships offers an important framework for making sense of and facilitating adaptive adjustment following a traumatic event.
- Specific skills training for parents may be of benefit for a youth population at risk of developing persistent traumatic stress reactions, and including parents in interventions offered to young people may improve their effectiveness.

Relationship between posttraumatic stress symptoms, caregiving response, and parent mental health in youth exposed to single incident trauma

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Keywords

Posttraumatic stress disorder; depression; youth; family; expressed emotion; family accommodation

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## Abstract

*Background:* Family factors may alter the risk of developing posttraumatic stress disorder (PTSD) or depression in young people after a traumatic event, but it is not clear which modifiable family variables can be addressed in psychological therapies. This study examined the relationships between family factors (Expressed Emotion [EE] and family accommodation) and psychopathology (posttraumatic stress symptoms; PTSS) in young people following a single incident trauma. Potential mediators of these relationships were also investigated.

*Method:* Sixty-six parent-child dyads (aged 8-17 years) were assessed within one month of attending an Emergency Department. Self-reported PTSS and perceived EE were assessed in young people. Parents' own PTSS, mood symptoms, EE, and accommodating behaviours were also assessed.

*Results:* Cross-sectional analyses revealed that young person-perceived parental EE, parent-reported emotional over involvement (EOI) and accommodation behaviours significantly predicted higher PTSS in young people. The stress experienced as a consequence of parental EE mediated the relationship between perceived parental EOI and PTSS in young people. Parental PTSS and anxiety were positively correlated with EOI and accommodation. Parental PTSS was not significantly associated with symptoms in young people.

*Conclusions:* The results support the hypothesis that EE and accommodation are positively associated with PTSS in young people in the month following a potentially traumatic event. Understanding the child in the context of their family environment and relationships offers an important framework for making sense of and facilitating adaptive adjustment following a traumatic event.

Core symptoms of posttraumatic stress disorder (PTSD) involve intrusive recollections of a traumatic event, avoidance and numbing symptoms and physiological hyper-arousal [1]. Posttraumatic stress symptoms (PTSS) are those symptoms that constitute the diagnosis, but can be measured continuously (usually using self-report measures). Almost half of young people report being significantly impaired as a direct consequence of PTSS in the month after a traumatic event [e.g. 2]). Single incident, potentially traumatic events that lead to a young person being seen at a hospital Emergency Department (ED) are common and present a significant risk in the development of PTSD in young people [3, 4]. A recent meta-analysis suggests 16% of trauma-exposed young people go on to develop PTSD [5]. Early PTSD (i.e. meeting all diagnostic criteria other than the time criterion; that is, within the first month following an event) is an important and robust predictor of persistent PTSD [4]. Unlike Acute Stress Disorder (also used to describe PTSS in the month following a traumatic event), early PTSD does not require the presence of dissociative symptoms which can lead to an underestimation of PTSS in children [6]. Better understanding of risk factors has potential to inform interventions for children and young people.

The variability in the development of PTSS has been attributed to cognitive factors such as maladaptive appraisals [7], disorganised trauma narratives [8] and unhelpful coping strategies [9]. Interestingly, despite the fact that many young people are embedded within their family of origin, relatively little attention has focused on the role of family factors in PTSD in young people. For example, a parent's wellbeing may be affected after their child has experienced a traumatic incident and their ability to cope may affect the adjustment and experience of their child. Likewise, it could also be argued that how parents appraise their child's behaviour, the quality of their relationship, and how parents communicate with their child may also impact on their child's adjustment in the immediate aftermath of trauma exposure.

A meta-analysis reviewed 7 studies that had included measures of family functioning in their study of PTSD. Poor family functioning was shown to be associated with poorer outcomes following both natural disasters and childhood physical abuse [10] however the size of effect differed greatly

between studies. Moreover, only three studies have examined family functioning in the context of single incident trauma. Two studies found that pre-trauma parenting defined as hostile was associated with acute PTSS in young people [11, 12] and one found that parental irritable distress was associated with concurrent symptoms of young people 6 months post-trauma [13]. Therefore, there are limited studies on the role of family communication in the development of PTSS and the field has been hampered by the use of a wide range of non-standardised measures and poor conceptualisation of specific family factors [10, 14, 15].

Expressed emotion (EE) provides an index of relationship quality and includes criticism, hostility, emotional over-involvement (EOI), warmth, and positive remarks about the person they care for [16]. High EE, which reflects above threshold levels of criticism, hostility and EOI independently or in combination, is a robust predictor of poorer patient outcomes in range of mental health conditions [17]. High carer EE is also positively correlated with poorer functioning and wellbeing in carers [18]. In a study of relatives of adults with PTSD, high EE was observed in 44.7% of relatives [19]. However, in a sample of young people who had indirect exposure to the 9/11 terrorist attacks in the USA, objectively measured parental EE, measured prior to the trauma, did not predict subsequent development of PTSD symptoms in young people [20]. It is possible that high EE is a *reaction* to the development of the young people's symptoms post-event [21]. In addition, there is also some evidence to suggest that perceived EE (i.e. rated by young people) is more closely associated with patient symptomatology than objective- or parent-rated measures of parent EE [22]. It is suggested that environments that are characterised by high EE relationships are stressful [17] and that it is the subjective experience of EE related stress (EE-stress) that can mediate the relationship between caregiver EE and patient symptoms [23, 24].

Family accommodating behaviours can arise when parents attempt to reduce their child's short term and observable distress by supporting less adaptive, typically avoidant, coping behaviours. Accommodation behaviours invariably contribute towards maintaining difficulties in the long-term in different conditions including a range of anxiety disorders [25, 26], obsessive compulsive disorder [27] and eating disorders [28]. To our knowledge, there are no published studies documenting the role

of accommodation in PTSD in young people, although there is some evidence showing that caregiver avoidance and overprotection is associated with child PTSS [29].

It is well established that parental PTSD and depression symptoms are significantly associated with chronic PTSD in young people, although fewer studies report on early PTSD [30, 31, 10]; however the specific mechanisms of this relationship are not well understood. There is evidence to suggest that parents with their own mental health difficulties report higher levels of accommodation than those who do not [18, 27] and that parental anxiety is associated with increased EOI in parents of anxious children [32]. It is therefore possible to hypothesise that accommodation and EOI mediate the relationship between parental anxiety and PTSS in young people. Similarly, parental depression has been associated with higher criticism [33, 34] and it is possible that criticism mediates the pathway between parental depression and young person PTSS.

In summary, the present study examined whether family factors (parental EE, accommodation) are related to PTSS in young people immediately following a traumatic event, and whether they affect young people via the stress they experience in relation to EE (EE-stress). The study further aimed to investigate whether EE and accommodation mediate the relationship between parental anxiety, depression and young person PTSS.

The primary hypothesis was that higher parental EE and accommodation would be associated with increased PTSS severity in the young people within 1 month following admission to an ED. Secondary hypotheses were young people's stress in relation to EE would mediate the relationship between EE and PTSS in young people; EE and accommodation would mediate the relationship between parent mental health symptoms and young person PTSS.

## Method

### *Participants*

Participants were a consecutive sample of children and adolescents aged 8-17 years and their primary caregivers. Young people had attended the ED at a large hospital in South London following a potentially traumatic event (as defined by DSM-5 criteria). The hospital is the largest in the county and provides the regional service for trauma emergencies. Caregivers were primary caregivers comprising biological or non-biological parents, close relatives, or legal guardians of the young

people with an assumed caregiving role and co-resident with the young person at the time of study entry. Ethical approval was granted by London Camden and Islington National Research Ethics Committee (REC reference: 13/LO/1785).

#### Inclusion and exclusion criteria

Young people and caregivers needed to be able to speak and read English. Exclusion criteria for both young people and parents were learning disability, organic brain disorder, current psychotic symptoms, substance abuse or poor understanding of English. Young people presenting to the ED with injuries caused by a family member or following a sexual assault were excluded, in accordance with the guidance from the ethical approval process.

#### *Procedure*

The study utilised a cross-sectional design, and considered trauma-exposed young people. Potential participants were identified at a weekly safeguarding meeting in collaboration with the ED paediatric medical and safeguarding teams. This weekly meeting was attended by approximately 10-15 staff members of varying professions, including all grades of doctors from the paediatric emergency department team, nurses, safeguarding officers, social workers, youth workers, health visitors, and administrative workers. All young people who had been assaulted, burned, or had been admitted to the Resuscitation Department (rather than the general paediatric area of the hospital) are discussed with the team in the meeting, as well as those for whom there were historic or current safeguarding concerns, and young people with repeat admissions, usually due to a chronic condition. This multidisciplinary discussion ensures safeguarding concerns are acted upon appropriately. Potential participants are identified through this discussion.

Individuals who were judged to meet inclusion criteria for the present study were sent a letter of invitation which was followed by a telephone call. Where a dyad agreed to take part, written informed consent/assent was obtained from both young people and parent and a face to face meeting was arranged within 1 month of the event.

#### *Measures*

Assessments lasted approximately one hour and interviews were audio-recorded. Trauma and demographic information were collected via clinical information from the hospital and from

participating families. Results are based on DSM-5 PTSD criteria [1]. Young people were reimbursed for their time with a £10 voucher.

#### Young person measures

Child PTSD Symptom scale (CPSS) [35] (primary outcome). A 17-item self-report measure that assesses posttraumatic symptom severity in children aged 8-18 years using a 4-point Likert scale. Good psychometric properties have been reported [35, 36]. Internal reliability in this study for items that correspond with DSM-IV was  $\alpha=0.92$ . Seven additional items to cover DSM-5 symptoms were included (e.g. since the event, do you blame yourself for what happened in [EVENT], even though other people say it wasn't your fault?); the internal reliability for this was  $\alpha=0.94$ .

Child version of the Anxiety Disorders Interview Schedule for DSM-IV (ADIS) for PTSD [37, 38]. Symptomatology and functional impact were rated to give a diagnosis of 'early PTSD' based on the interview schedule for young people. Early PTSD refers to when a young person meets all criteria for PTSD except the time criterion. Additional questions were included to assess DSM-5 criteria of early PTSD. The first 9 items refer to traumatic events and young people are asked to indicate whether they have experienced a particular trauma type; 4 items refer to situation reactivity; 40 items refer to symptoms arranged into symptom clusters; 1 item refers to symptom impact. A minimum number of items need to be endorsed in order to meet each criterion. The interview took approximately 20 minutes to administer.

Brief Dyadic Scale of EE (BDSEE) [39]. A 14 item self-report measure of the degree to which young people perceive their parent to be critical (young people-reported CRIT), emotionally over involved (young people-reported EOI), or warm (young people-reported warmth). This measure shows good reliability and validity in young adult samples when measured against the Camberwell Family Interview (CFI), the gold standard measure of EE [39, 40]. The internal reliability in the subscales used in the present study was  $\alpha = 0.80$  for criticism and  $\alpha = 0.70$  for EOI.

Perceived Stress due to EE (PSEE) [41]. The single item criticism and EOI stress scales were used in this study. Participants are asked to rate the degree to which they feel stressed or upset when their caregiver is critical (CRIT-stress) or overprotective (EOI-stress). The scale is based on the Perceived Criticism Scale [42] which has good reliability and predictive validity [43].

### Parent measures

Impact of Events Scale – Revised (IES-R) [44]. A 22 item self-report measure of parents' PTSS, in relation to the same incident, over the previous 7 days. Good psychometric properties are reported for this measure [45]. The internal reliability in this sample was  $\alpha = 0.91$ .

Hospital Anxiety and Depression Scale (HADS) [46]. A 14 item self-report measure of anxiety and depression in parents, with good reliability and validity [47]. The internal reliability in this sample was  $\alpha = 0.86$  for both the anxiety and depression subscales.

Five Minute Speech Sample (FMSS) [48]. A recorded interview measure of EE where parents are asked to speak for 5 minutes uninterrupted about their child and the relationship they have together. Verbatim transcripts of the interviews are used to code EE against pre-defined criteria. An overall rating of EE (high, low, borderline) is generated and recordings can be further categorised as high or borderline CRIT or EOI. Although borderline categories were rated for this study, they were not used in analyses as they did not change the pattern of results and have been less well validated compared to the high/low distinction. The task has adequate predictive utility and convergent reliability with the CFI and is the best abbreviated measure of EE [22].

The FMSS has been used extensively in EE research with young people [22, 49]. One third of the recordings were double-coded by a second blind-rater. There was 85% agreement on the initial independent ratings. Where two coders did not agree, a discussion was held and a third blind rater (JO) was consulted if the rating could not be resolved. A final decision was agreed for all ratings.

The Family Questionnaire (FQ) [50]. A 20-item self-report measure of EE where parents are asked to rate the level of EOI and criticism towards their child on a 4-point Likert scale. Cut-off scores of 23 and 27 are used for criticism and EOI respectively. For the purposes of this study, item 5 was amended to read "I keep thinking of reasons for the event" to replace "I keep thinking of reasons for his/her illness". The internal reliability in this sample was  $\alpha = 0.81$  for EOI and  $\alpha = 0.89$  for criticism.

Family Accommodation Scale – Anxiety (FASA) [26]. A 13 item self-report measure family accommodation and has been validated in paediatric anxiety disorders [26]. The internal reliability in this sample was  $\alpha = 0.92$ .

*Statistical analyses*

The present study aimed to detect a medium sized correlation of 0.3 at significance level  $\alpha=.05$  and 80% power. Based on this, a sample size of 64 parent-child dyads was required. The primary outcome was a continuous measure of PTSS. A diagnosis of 'early PTSD' (DSM-5 PTSD without the time criterion) was considered as a secondary outcome. Predictor variables were parent-reported EE (EOI, CRIT), observer-rated EE (FMSS high, low), young people-reported EE (EOI, CRIT), family accommodation, parent PTSS, and parent anxiety and depression symptoms. Established predictors of PTSD were also included in the regression models where indicated (e.g. gender, age, number of previous traumatic events, trauma type).

SPSS for Windows version 22 was used for all analyses. In order to address primary and secondary hypotheses, bivariate correlations were employed to explore relationships between variables. The primary hypothesis, that family factors predict PTSS in young people, was tested using a multiple linear regression analysis and the  $p$  value was set at .05. Significance for secondary outcomes was set at .01. Bootstrapping was applied for analyses where the assumption of normality was violated and the corrected significance value is reported. Chi-square tests were used to compare two measures with dichotomous proportional outcomes (FMSS).

To test hypothesised mediation models, SPSS bootstrap macro PROCESS was used [51]. For each mediation analysis, 1000 bootstrap samples were used and the bias corrected accelerated 95% confidence interval reported.

## Results

*Participants*

Of the 336 young people who were invited to participate, 66 dyads were recruited. A large number of young people were not contacted due to incorrect contact details or no response ( $N = 209$ ; 62%). A further 41 (12%) of dyads declined to participate for a range of reasons (e.g. did not want to, too busy) and 10 (3%) families were excluded (e.g. poor English). The vast majority of the caregivers were mothers ( $N = 63$ , 95%) and none were directly involved in the index event.

Table 1 presents demographic data for the sample. The group was mixed in terms of their ethnic background. Table 2 presents the trauma types experienced by young people. The majority of young people came to hospital by ambulance (N=40; 61%) or car (N=13; 20%). Over one third of the group stayed overnight in hospital (N=25; 38%), where they spent an average of 4.7 nights (SD=3.6). Many participants reported at least one previous traumatic event on the ADIS (N=45; 68%). Almost one quarter of the sample met criteria for 'early PTSD' (N=15; 23%). Rates of diagnosis did not differ according to DSM-IV or DSM-5 criteria.

#### *Descriptive data for clinical and family variables*

Descriptive data for clinical and family assessment measures are presented in Table 3. Overall, young people PTSS were in the low-moderate range [52]. Twenty four percent of parents reported mild-severe levels of depression, and 46% rated mild-severe anxiety (using the HADS). Eighteen percent of parents scored above the recommended cut off for high CRIT ( $\geq 23$ ) and 23% scored at or above the recommended cut off ( $\geq 27$ ) for high EOI on the FQ.

#### *Hypothesis 1: EE and accommodation will predict PTSS in young people*

Table 4 reports the correlational relationships between young people and family variables. Young people-reported EE was significantly, moderately positively correlated with PTSS in young people. Neither gender, age, injury type (interpersonal vs non-interpersonal), nor whether the young person had to stay overnight in hospital predicted symptoms and were therefore excluded from the subsequent regression model (see Hypothesis 2 results below). The number of previous traumatic events significantly predicted outcome and was therefore included. Observer-rated EE (FMSS) was not correlated with outcomes and was therefore excluded from the regression model. Young people-reported CRIT and young people-reported EOI were moderately to highly correlated ( $\rho=0.57$ ,  $p < .001$ ) and were combined as a single score of perceived EE (young people-reported EE) in order to limit the effects of multicollinearity in the regression analysis. There was also evidence of substantial multicollinearity between parent-reported EOI and accommodation ( $\rho = 0.62$ ,  $p < .001$ ). It was decided not to combine the measures because they are conceptualised as distinct parenting constructs and measures. Therefore parent-reported EOI and accommodation were included in identical but separate models. A higher number of previous traumatic events ( $\beta = 0.23$ ,  $p = .036$ ), higher young

people-reported EE ( $\beta = 0.45, p < .001$ ) and higher parent-reported EOI ( $\beta = 0.29, p = .029$ ) significantly predicted PTSS in young people ( $F_{5, 58}=5.52, p < .001, \text{Adjusted } R^2=0.26$ ). Similar results were observed when accommodation was included as a predictor instead of EOI ( $\beta = 0.27, p = .028; F_{5, 58}=5.55, p < .001, \text{Adjusted } R^2=0.27$ ).

*Hypothesis 2: Stress experienced in response to EE (EOI-stress; CRIT-stress) will mediate the relationship between EE and PTSS in young people*

Independent linear regression analyses indicated that young people-reported EOI had a direct effect on PTSS ( $B=0.63, SE=0.18, \beta=0.40, t=3.44, p=.001$ ) and EOI-stress ( $B=0.09, SE=0.03, \beta=0.33, t=2.77, p=.007$ ). EOI-stress predicted PTSS ( $B=2.53, SE=0.68, \beta=0.42, t=3.70, p < .001$ ) (Figure 1). The indirect effect of young people-reported EOI through EOI-stress on PTSS was significant (95% CI=.04 to .38), controlling for age. The indirect effect of CRIT-stress on PTSS was not significant (95% confidence interval = -.33 - .41).

*Hypotheses 3 & 4: EOI and accommodation will mediate the relationship between parent anxiety/PTSS and PTSS in young people, and CRIT will mediate the relationship between parent depression and PTSS in young people*

Parent PTSS were significantly, positively correlated with parent-report EOI ( $r=0.52, p < .001$ ) and accommodation ( $\rho=0.60, p < .001$ ). Similarly, parent anxiety was significantly and positively correlated with parent-report EOI ( $r=0.62, p < .001$ ) and accommodation ( $\rho=.60, p < .001$ ). Neither parent PTSS nor parent anxiety were significantly correlated with symptoms in young people nor were the mediation models significant. Parent-reported CRIT was not correlated with parent depression symptoms ( $\rho = 0.18, p = .153$ ), nor was parent depression correlated with PTSS in young people ( $\rho = 0.08, p = 0.544$ ) and the mediation model was not significant.

## Discussion

This study examined the cross-sectional relationship between family factors (EE and accommodation) and posttraumatic stress reactions in young people after a single, potentially traumatic event that led to an attendance at an ED. The primary hypothesis that high EE and accommodation would be associated with higher PTSS in young people within the month following the traumatic event was supported. Specifically, higher young people-reported EE and parent-reported

EOI and accommodation were significantly and positively associated with higher PTSS in young people. Partial support was found for the hypothesis that EE-stress would mediate the relationship between EE and PTSS in young people; EOI-stress significantly mediated the relationship between young people-reported EOI and PTSS but the same pattern was not observed for criticism. Although EOI and accommodation were positively correlated with parent PTSS and anxiety, the final hypothesis, that EE and accommodation would mediate the relationship between parent and young people's symptoms, was not supported. Overall the results of this study indicate a cross-sectional relationship between parent response (EOI, accommodation) and PTSS in young people, but the direction of effect needs to be addressed in future studies.

#### *Expressed emotion and family accommodation in child psychopathology*

The results of this study are consistent with a growing literature that adverse family environment or interactions are associated with PTSS in young people [10-15]. This study adds to the literature base by clarifying specific, modifiable parenting behaviours that are associated with greater PTSS symptoms after a single incident trauma. Specifically, young people-reported EE, and parent-reported EOI and family accommodation behaviours were associated with outcomes. This is consistent with studies showing that higher EOI [53, 54] and family accommodation [25] are associated with child anxiety and PTSS [15], and extends the literature to a community sample of young people at risk for PTSD following a single-incident trauma.

Moreover, the stress young people experienced in response to EOI mediated the relationship between young people-reported EOI and PTSS. This is consistent with research demonstrating that one mechanism through which EE adversely affects outcomes is via the attribution of parenting behaviours and subsequent negative experience in young people [55, 56]. Interestingly, young people-reported EE was a stronger predictor of self-reported PTSS than both parent and observer rated EE (FQ and FMSS). Although this may in part be due to shared method variance, it is in line with evidence supporting the importance of perceived EE in understanding an individual's unique experience of their interpersonal relationships [55].

The results suggest that young people-reported criticism is associated with self-reported PTSS. These findings are in line with some previous research demonstrating that pre-event, child-

reported perceptions of critical or hostile parenting is associated with psychopathology following a traumatic event [e.g., 11, 12] and is elevated in families of children with depression and anxiety disorders [57, 53]. In contrast, no association between parent or clinician-reported criticism and PTSS in young people was found. Significant small to medium effects between criticism rated on the FMSS and child anxiety disorders have been reported [53, 54] although a prospective study of PTSD found no effect of EE measured prior to a traumatic event [20]. It is possible that criticism in response to a young people's symptoms after the event predicts the maintenance of PTSD [e.g. 58], a longitudinal relationship that could not be tested in the present study.

A specific aim of the present study was to examine whether parent symptoms exerted their effects via specific parenting behaviours. Although parent anxiety and PTSS were correlated with EOI and accommodating behaviours, parent mental health symptoms were not associated with symptomatology in young people. A recent meta-analysis found that parent PTSS and depression predicted child PTSD with small to medium sized effects and that the effects were stronger for studies that used interview measures and longitudinal design [31]. Therefore it is possible that the effects were not adequately detected with the measures used in the present study. Also, parent depression was not correlated with criticism. Previous research presents mixed findings for this relationship and some authors have argued that criticism more closely resembles a trait, whereas EOI, especially in mothers, may be particularly exacerbated in stressful situations and may therefore be more likely to be associated with distress following a traumatic event [59–61]. This relationship may become stronger over time [e.g. 13].

#### *Strengths, limitations and future research*

This study was adequately powered for primary analyses, and the measurement of the key family variables of EE was comprehensive and allowed for analysis of the specific EE components from multiple perspectives. In addition, the inclusion of a measure of family accommodation provides new data on how families may respond to a child's distress following a difficult and injurious life event. The mediation analyses to identify mechanisms of effect extend the current literature base and provide useful targets for early intervention with young people and their families.

However, the study has some limitations. Firstly, the cross-sectional design preclude conclusions about causality and directionality of findings and it is likely that the processes are bi-directional within family relationships. It is possible that young people-reported EE is a reflection of, or exacerbated by, their negative affect at the time of measurement (i.e. a state effect) or a negative cognitive style. However, there is evidence that perceived EE is not fully accounted for by current state [62, 63]. Longitudinal research is needed to clarify whether high EE and family accommodation predict psychopathology at later time points and to test the mediation pathways between parent mental health symptoms, EE and PTSD in young people. The second limitation relates to the measures used. Although the EE measures included in this study have been validated against the gold standard measure of EE, the CFI [40], although acceptable, none show exactly the same degree of sensitivity and reliability [22, 39, 50]. The development and use of more trauma symptom specific parenting measures may reveal stronger relationships with PTSS.

Power analyses were not conducted for mediation analyses. Although age was not a significant predictor of outcomes in the current study, further systematic examination of the nature and predictive validity of EOI in younger children compared to adolescent samples would be of interest given that recent studies have shown that overprotective parenting is more problematic for adolescents compared to younger child samples because of their developmental needs [64]. Adequately powered studies to examine the differences in response and outcomes between different ethnic and cultural groups could also be of benefit, for example, differences in the nature and impact of high EE have been documented between different ethnic groups [65-67]. Additionally, the inclusion of more than one parent and a broader family functioning measure might allow for a more detailed examination of the relational context in which high EE and accommodating behaviour negatively impact young people. Future research could also examine how a sense of responsibility for the traumatic experience affected parental mental health as well as their responses to their child following the traumatic event. Finally, the sample was comprised of young people and a carer willing to take part and therefore may not be representative of the population of young people presenting at the ED. Moreover, the selective nature of the sample may have led to biases, for example, families with particularly high EE or accommodation may have been less likely to be recruited.

*Clinical implications*

The results of this study indicate that further support to reduce and/or mitigate the impact of overinvolved and accommodating parenting on child outcomes may augment family-based interventions [68, 69]. Stress experienced by parents in the aftermath of a traumatic event experienced by their child was associated with parenting behaviours that are associated with child symptomatology and therefore additional support for parents' to address their own stress and mood disturbance are potentially indicated.

*Summary*

Expressed emotion and family accommodation are associated with posttraumatic stress reactions in young people in the month following a traumatic event, and child stress in response to EOI mediates this effect. Parental PTSS and anxiety were associated with EOI and accommodating behaviours. Understanding the child in the context of their family environment and relationships offers an important framework for making sense of and facilitating adaptive adjustment following a traumatic event. Specific skills training for parents may be of benefit for a youth population at risk of developing persistent traumatic stress reactions, and including parents in interventions offered to young people may improve their effectiveness.

**Conflict of interest statement**

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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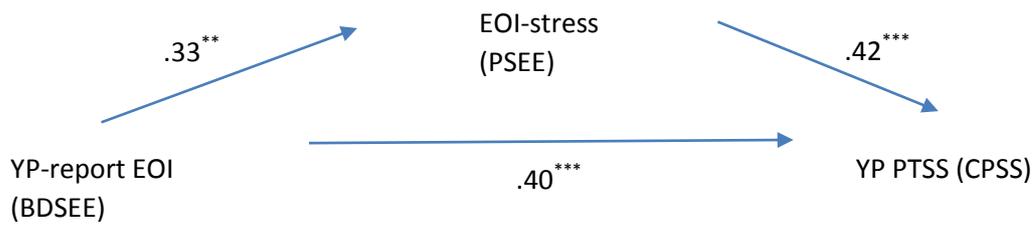


Figure 1. Proposed mediation of stress in response to emotional overinvolvement (EOI-stress) on the relationship between young-person reported emotional overinvolvement (YP-report EOI) and posttraumatic stress symptoms (PTSS). Standardised regression coefficients are reported.  $^{**} p < .01$ ,  $^{***} p < .001$

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Table 1. Descriptive data for demographic information for young people and caregivers.

	Young person	Parent
	M (SD) / N (%)	M (SD) / N (%)
Age	13.5 (2.7)	44.2 (6.7)
Gender: Male	39 (59%)	2 (3%)
Ethnicity		
White British or Other White	27 (41%)	32 (49%)
African or mixed African	22 (34%)	20 (31%)
Caribbean or mixed Caribbean	12 (18%)	11 (17%)
Asian or mixed Asian	4 (7%)	3 (5%)
English first language - Yes	58 (88%)	41 (62%)
Years of education	9.2 (2.6)	14.3 (2.9)
Highest qualification		
Too young	15 (24%)	-
SATS	25 (40%)	1 (2%)
GCSE	19 (30%)	9 (16%)
A levels	3 (5%)	5 (9%)
NVQ	-	10 (17%)
University	-	24 (41%)
Did not complete any	1 (2%)	3 (5%)
Other	-	6 (10%)
Parental marital status		
Single / separated / divorced	-	28 (43%)
Married / living together	-	30 (46%)
In a relationship	-	6 (9%)
Parent currently employed	-	46 (71%)

Table 2. Index trauma type

	Number	Percentage of sample
Physical assault	31	47
Road traffic incident	17	26
Fall	9	14
Burn	4	6
Sporting injury	3	5
Other	2	4

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Table 3. Descriptive statistics of clinical and family assessment measures

	Whole sample	No Early PTSD	Early PTSD
<i>Young people-report</i>	M (SD) / N (%)	M (SD) / N (%)	M (SD) / N (%)
CPSS Total *	11.0 (5.0 – 23.5)	8.0 (3.0 – 14.0)	37.0 (18.0 – 47.0)
YP-report CRIT *	11.0 (7.0 – 18.5)	10.5 (7.0 – 18.0)	14.0 (11.0 – 24.0)
YP-report EOI	22.3 (9.8)	20.8 (8.8)	27.5 (11.3)
CRIT-stress *	4.0 (1.0 – 5.0)	4.0 (1.0 – 5.0)	5.0 (3.0 – 7.0)
EOI-stress *	3.0 (0 – 5.0)	2.0 (0 – 4.0)	5.0 (4.0 – 7.0)
<i>Parent-report</i>			
IES-R Total	29.5 (20.9)	25.4 (19.3)	40.2 (21.8)
HADS Anxiety	7.6 (4.9)	6.8 (4.4)	10.3 (5.4)
HADS Depression *	4.0 (1.0 – 7.3)	3.0 (1.0 – 6.0)	6.0 (1.0 – 11.0)
Accommodation (FASA) *	12.0 (4.0 – 24.0)	8.5 (4.0 – 23.0)	19.0 (8.0 – 32.0)
Parent-reported CRIT	17.0 (6.3)	17.0 (6.5)	17.3 (6.0)
Parent-reported EOI	21.8 (6.2)	21.0 (6.0)	24.6 (6.5)
<i>Observer-rated</i>			
FMSS Category N (%)			
Low	40 (63%)	31 (63%)	9 (60%)
High	24 (38%)	18 (37%)	6 (40%)
FMSS subcategory N (%)			
Low	18 (28%)	14 (29%)	4 (27%)
Critical	16 (25%)	12 (25%)	4 (27%)
EOI	8 (13%)	6 (12%)	2 (13%)
Borderline Critical	1 (2%)	1 (2%)	-
Borderline EOI	21 (33%)	16 (33%)	5 (33%)

CPSS: Child PTSD Symptom Scale; YP-report CRIT: young person reported criticism; YP-report EOI: young person reported emotional overinvolvement. YP-report CRIT and EOI measured using

the Brief Dyadic Scale of Expressed Emotion (BDSEE); CRIT-stress: stress in response to criticism, reported by YP; EOI-stress: stress in response to emotional overinvolvement, reported by young person; both measured using the Perceived Stress for Expressed Emotion (PSEE); IES-R: Impact of Events Scale - revised; HADS: Hospital Anxiety and Depression Scale; FASA: Family Accommodation Scale – Anxiety; FQ: Family Questionnaire; FMSS: Five Minute Speech Sample; PTSD: Posttraumatic Stress Disorder; DSM-5; M: Mean; SD: standard deviation; \* median and interquartile range reported for non-normally distributed data.

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Table 4. Spearman's rank correlations between young people outcomes and family variables

	CPSS Total
YP-report CRIT	<b>.359<sup>**</sup></b>
YP-report EOI	<b>.390<sup>***</sup></b>
Parent-report Accommodation	.122
Parent-report EOI	.053
Parent-report CRIT	-.095
Observer-rated FMSS Category <sup>¶</sup>	.068

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$ ; § Pearson's correlation; ¶ Point biserial correlation; EE: Expressed Emotion; CRIT: Criticism; EOI: Emotional overinvolvement; Young people-reported EE measured using the Brief Dyadic Scale of EE; Parent-report EE measured using the Family Questionnaire; Family Accommodation measured using the Family Accommodation Scale; FMSS: Five Minute Speech Sample; CPSS: Child PTSD Symptom Scale; YP: Young people.