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Exploring associations between mentalisation, expressed emotion, self-harm, and attachment: a research portfolio

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Doctorate in Clinical Psychology

The University of Edinburgh

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1 Thesis Abstract

Background: Research indicates that both familial Expressed Emotion (EE) and attachment security are associated with mental health outcomes for children and young people. This research portfolio investigates the associations between EE and attachment. It aims to determine whether there is a relationship between the two constructs, and how they may be connected to adolescent self-harm, a common transdiagnostic behaviour which is a major public health concern given its associations with psychological disorder and attempted and completed suicide.

Objectives: A systematic review was conducted to identify, collate, and appraise research reporting associations between parental EE and caregiver-child attachment. An empirical project was conducted to better understand the associations between adolescent self-harm and perceived EE, attachment insecurity, and reflective functioning (RF), each of which has been associated with self-harm in past studies.

Methods: *Systematic review*: A thorough search of electronic databases was conducted to identify eligible studies which investigated the associations between parental EE and caregiver-child attachment. These studies were assessed for quality using a standardised set of criteria and a narrative synthesis was conducted to collate research findings. *Empirical project:* A cross-sectional design was used. Participants aged 16 to 24 years completed an online survey containing a series of self-report questionnaires. A hierarchical serial mediation model, whereby attachment insecurity and RF mediated the relationship between perceived EE and adolescent self-harm, was tested using path analysis in IBM SPSS Amos.

Results: *Systematic review:* Nine studies were identified. From the extant evidence, no conclusive associations between parental EE and caregiver-child attachment have been established. Several studies reported that higher levels of parental EE were associated with attachment insecurity and disorganisation, but variability in measurement methods and study populations make comparisons challenging to draw. *Empirical study:* 377 participants aged 16 to 24 years gave full responses to the survey, reporting on one or two caregivers each. Responses were split into female and male caregiver databases. Statistical analyses revealed significant direct effects of perceived EE on attachment insecurity, and significant direct effects of RF on self-harm in both databases. A significant indirect effect of perceived EE on self-harm through attachment anxiety and RF was obtained in the female caregiver dataset only.

Conclusions: *Systematic review*: Previous studies have not evidenced a robust association between parental EE and child attachment, and the current evidence base has several methodological issues. *Empirical study:* Both attachment anxiety and RF mediated the relationship between perceived EE and adolescent self-harm for female caregivers only, and direct effects on self-harm were obtained for RF only. This suggests that family-based approaches, attachment-focused interventions, and mentalization-based therapy may be useful interventions for adolescent self-harm.

2 Lay Summary

How parents and caregivers communicate with their children is important, as their verbal and non-verbal behaviour contributes to the development of bonds, or attachments, between themselves and their children. If caregivers are unresponsive to children, or inconsistently or unpredictably responsive, this can lead to the development of insecure attachments, which have been linked to mental health difficulties and self-harm in children and young people. Research also suggests that some patterns of family communication could be harmful for young people. The term Expressed Emotion (EE) describes communication from a family member that is critical, hostile, or emotionally over-involved (e.g., over-protective or self-sacrificing). Some studies have found that young people whose caregivers express high levels of EE are more likely to have mental health problems and get less benefit from treatment. This research portfolio aimed to investigate the relationship between EE and attachment further and is made up of two sections, each describing a research project.

In the first project, a thorough search of online research databases was completed to find all past papers that explored the relationship between caregivers' EE and the quality of attachment relationships between caregivers and children. There was some evidence that higher levels of EE were associated with less secure attachments and disorganised attachment behaviour in children, but these findings were not consistently reported, and the studies used different ways of measuring EE and attachment, which makes comparing their results difficult. There seemed to be greater effects for older children and adolescents, but no firm conclusions can be drawn from the evidence available.

The second research project consisted of an online survey, which 377 people aged between 16 to 24 years completed. They filled out questionnaires about their mental health, their ability to understand thoughts, feelings, and behaviours in themselves and others (called reflective functioning) and their history of self-harm. They also completed questionnaires about one or two of their parents or main caregivers growing up, rating how secure they felt their attachment was to their caregiver(s) and how much EE they thought their caregiver(s) directed towards them. The results showed that people who perceived a higher level of EE from their caregiver(s) were less securely attached to them. In other words, young people who felt that their caregiver(s) were more critical, intrusive, irritable, or lacking in emotional support were more likely to report feeling anxious about their relationship with their caregiver(s), and to avoid seeking emotional support from them. The results also showed that young people who were more uncertain about their own and others' thoughts, feelings, and behaviour, were more likely to have self-harmed. Though perceived levels of EE did not have a direct effect on self-harm in this study, the results showed that perceived EE does influence attachment anxiety and reflective functioning, both of which affected self-harm. This was only true for ratings of perceived EE and attachment anxiety made about female caregivers. These findings suggest that families could play an important role in the prevention and treatment of self-harm in adolescence.

3 Systematic Review

A systematic review of the associations between expressed emotion and attachment between parents and young people

Jamie Kennedy-Turner[1,2,3] , Nienke van Alphen[1, 2], and Dr Helen Griffiths[1, 2]

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3.1 Abstract

Expressed Emotion (EE) is a measure of family emotional climate predictive of psychiatric relapse. Attachment theory focuses on caregiver-child relationships. Both are concerned with family processes, and research indicates both EE and insecure attachment are associated with negative psychological outcomes for young people, but the relationship between the two is unclear. This systematic review provides a narrative synthesis of research exploring associations between parental EE and caregiver-child attachment. Comprehensive online searches identified nine eligible studies which reported on EE and attachment in families of young people, using validated measures of both constructs. Contradictory findings were obtained and no clear associations between EE and attachment are yet established, though two studies reported associations between high maternal EE and attachment disorganisation. Comparisons across studies were limited due to variability in EE measurement and study populations, with questions raised over the applicability of the EE construct to families of young children.

Key words: attachment, expressed emotion, children, adolescents, families

3.2 Introduction

3.2.1 Expressed Emotion

Expressed Emotion (EE) is a measure of the quality of a family's emotional climate as reflected by the communication styles, attitudes, and comments of relatives towards an individual family member (1). The term 'expressed emotion' was first used in this context by Brown and colleagues (2), who reported that individuals diagnosed with schizophrenia were more likely to experience symptomatic relapse after hospital discharge if key relatives exhibited high levels of critical comments, emotional over-involvement (EOI), and hostility, and low levels of warmth when speaking about the individual in an unstructured interview. This led to the development of the Camberwell Family Interview (CFI; 3) and subsequent decades of research into the EE construct. There is now robust evidence that high EE in key relatives is associated with greater risk of relapse and poorer treatment outcomes for psychiatric illnesses (4,5). EE's relevance to symptomatic relapse now extends beyond schizophrenia and psychotic disorders; associations have been reported between key relatives' EE and relapse in depression (6), as well as treatment outcome and relapse in individuals with eating disorders (7), substance use (8), and post-traumatic stress disorder (9,10).

As EE research has developed, so too have different measurement tools. The original EE measurement method, still often described as "the gold standard" (11), was the CFI, which consists of a semi-structured interview with a key relative typically lasting one to two hours, in which they are invited to speak about the target individual. Responses are recorded and subsequently rated by trained coders using five sub-scales: criticism, EOI, hostility, positive remarks, and warmth. The criticism, hostility and EOI subscales are used to designate a classification of "high EE" or

"low EE" to the relative by using certain thresholds to determine group status, such as six or more critical comments (3). The CFI has demonstrated good concurrent and predictive validity (11) and good inter-rater reliability for full rather than dichotomised versions of sub-scales (12). However, it is lengthy to administer and code, and the formal training process is expensive. As a result, several observer-rated and self-report shortcuts have been developed, including the Five Minute Speech Sample (FMSS; 13), in which relatives speak for five uninterrupted minutes about the target individual. Responses are recorded and coded for criticism, EOI, hostility and overall level of EE. Alternatively, the Level of Expressed Emotion scale (LEE; 14) is a self-report questionnaire in which the target individual rates their relative(s) for EE themselves. Though less time-consuming than the CFI, these alternatives suffer from limited convergent validity, and it is questionable whether these methods capture the same underlying constructs as the CFI. Indeed, there is some debate over what the EE construct itself actually represents, whether it tells us more about the relative of the target individual or about the wider family system (11).

Despite conceptual and methodological concerns, research interest in EE has expanded into the field of child and adolescent psychopathology, with particular focus on how parental EE affects child outcomes (15). Associations have been reported between parental EE and self-harm (16,17), symptomatic relapse and severity in paediatric depression (18–20), and treatment outcome for paediatric obsessive-compulsive disorder (21,22), and anorexia nervosa (AN; 7,23). Parental EE is also associated with higher levels of externalising behaviour (24), and attention deficit hyperactivity disorder, conduct disorder, and emotional symptoms in children (25,26). It should be noted that many of these studies used adapted versions of standardised EE measures to improve their applicability to parents of children and

young people, raising further questions about what exactly is being captured by the EE construct and how it is being measured.

Nonetheless, a body of evidence indicates that high parental EE is associated with greater symptomatic presentation, greater risk of relapse, and poorer treatment outcomes for children and adolescents with various psychopathologies. This systematic review aims to explore associations between parental EE and attachment, another concept of great relevance to child and adolescent development and psychopathology.

3.2.2 Attachment

Attachment theory is a highly influential theory in developmental psychology (27). It is concerned both with attachment relationships between individuals, defined as enduring emotional or psychological bonds between people, and with attachment behaviour, defined as behaviour which achieves or maintains proximity with the attachment figure (28). The attachment system is conceptualised as an evolutionarily adaptive behavioural system, which activates at times of raised anxiety, fear or distress, with the primary purpose of improving an infant's survival odds by attracting the presence of a caregiver who can provide protection and resources (29). The system also serves psychological functions, with caregiver proximity facilitating distress reduction and providing a sense of "felt security" in the infant (30), allowing them to perform other developmental tasks from a secure base, e.g., exploration (31,32).

While the definition of the attachment relationship given above is not exclusive to early-life relationships, attachment theory has often conceptualised attachment in

terms of mother-infant relationships, resulting in historical neglect of other significant relationships (e.g. father-child) which have received more attention in recent decades (33–35). According to theory, attachment relationships develop in the context of an infant's early experiences with their caregiver(s), from which internal working models (IWMs) are formed; these are mental representations of the self and others which continue to influence the individual's relationships and sense of self-worth throughout life (36,37).

Central to attachment theory is the quality of the attachment relationship. Though debate exists over how best to characterise relationship quality at different developmental stages, an enduring system for classifying infant attachment is the Strange Situation Procedure (SSP; 38), in which caregiver-infant dyads undergo an experimental separation and reunion while being observed. The infant's behaviour is then coded, and an attachment style assigned. If an infant receives protective, sensitive care, this allows them to explore and develop using the caregiver as a secure base, and develops an IWM of the caregiver as loving and trustworthy, and the self as worthy of love (39). Experiences such as these contribute to the development of a secure attachment (31,38), characterised in the SSP by the infant becoming distressed upon separation, seeking proximity on reunion, and being able to regulate distress in the caregiver's presence. However, if an infant experiences the caregiver as lacking sensitivity, or as inconsistently sensitive, they may form an insecure attachment, where the infant either does not become distressed upon separation and avoids proximity on reunion (insecure-avoidant) or becomes highly distressed upon separation and seeks proximity on reunion but cannot regulate distress in the caregiver's presence (insecure-ambivalent). The fourth style occurs when infants experience their caregiver(s) as frightening and unpredictable, meaning they develop

no organised strategy for proximity seeking (disorganised), though levels of disorganisation can exist in other attachment styles too (40). Similar categorical classifications have been applied to adults. The Adult Attachment Interview is used to classify adult attachment styles into four categories which correspond to the SSP: autonomous (secure), dismissive (avoidant), preoccupied (ambivalent), and unresolved (disorganised) (41). However, recent research suggests that adult attachment, and possibly infant attachment too, could be conceptualised along two continuous dimensions of anxiety and avoidance, rather than using the categorical approach which has predominated (42,43).

Some theorists posit that the quality of a child's attachment relationship with their caregiver is heavily influenced by the caregiver's own IWMs (44–46). As described above, IWMs develop in the context of the caregiver's own experiences of attachment with their caregiver(s), providing rules and templates for processing attachment-related stimuli. This influences the caregiver's beliefs, attitudes and behaviours towards the infant, thus affecting the attachment relationship between them (47). The intergenerational transmission of attachment representations has received empirical backing, with a large-scale synthesis of three decades of research reporting a moderate effect size for transmission of secure attachment (r=.31) and a small effect size for transmission of insecure attachment (r=.21) (48). There remains a transmission gap between caregiver and child attachment representations, with effect sizes varying in strength contingent on the age of the children sampled, as well as the presence of other psychosocial risks in the population. For instance, stressful life events, parental psychopathology and substance use, divorce and single parenthood are all associated with transmission of insecure attachment representations (49), indicating that it is not solely a caregiver's own attachment that

influences the attachment of their child and perhaps suggesting that the term transmission should be used more critically. It is clear that the attachment relationship is not something automatically transmitted, neither biologically or behaviourally, from parent to child; multiple mechanisms appear to be involved.

Attachment is significant, as similarly to EE, attachment security has been linked to numerous outcomes in childhood and adolescence. Evidence indicates that insecure attachment increases the risk of depression (50) and anxiety disorders in childhood and adolescence (51–53). Associations have also been reported between insecure attachment and risky sexual behaviour (54), self-harm (55,56), suicidal behaviour (57), and substance use (58). Research also suggests a higher prevalence of insecure attachment in young people with eating disorders (59), though evidence is insufficient to make conclusions about causality (60), a criticism that can be levelled more broadly at this field given the lack of longitudinal studies. A further limitation of the current evidence base is the variability across attachment measures, with some studies using traditional observer-rated measures and interviews, and others relying on self-report measures which can be confounded by idealisation of attachment figures (61). Nonetheless, as with EE, the research points to associations between attachment security and health outcomes for young people.

3.2.3 Rationale for this review

From the above research, it can be inferred that both EE and attachment are associated with negative psychological outcomes for children and young people. There are also several commonalities between EE and attachment suggesting the two may be associated. Both are concerned with the characteristics and quality of dyadic relational experiences between a key relative and an individual. Furthermore, EE

sub-domains of criticism, hostility, EOI, and warmth all seem analogous to caregiver behaviour which is hypothesised to be important for the development of child-caregiver attachment relationships. For instance, research indicates that parental sensitivity and warmth are positively associated with secure attachment representations in infancy (62–64), whereas parental anger, irritability, and hostility are associated with insecure attachment representations (65,66).

Considering the wide-ranging evidence reporting a relationship between multiple psychological disorders in youth and high levels of parental EE and attachment insecurity, it seems theoretically plausible that high parental EE and attachment insecurity are two distinct, yet associated mechanisms involved in a developmental process, the result of which is an elevated risk of youth psychopathology. Attachment insecurity and parental EE may contribute to increased risk for the *p* factor (67), a hypothesised transdiagnostic level of general psychopathology offering a theoretical account of why many supposedly distinct psychological disorders are sequentially comorbid and present on a continuum rather than in discrete symptom-based categories (68). Further exploration of the associations between parental EE and attachment security therefore appears warranted, to better understand the associations between these two constructs.

3.2.4 Initial approach and research aims

This review is one component of a larger systematic review aiming to explore associations between caregiver EE, attachment, and other parenting factors. Initially, studies were considered relevant for inclusion if they reported on EE, attachment, and/or any of the following parenting factors using a validated observer-, clinician- or self-rated measure: parenting stress, beliefs, attributions, confidence, self-efficacy,

styles, skills, practices, behaviour, warmth, responsiveness, or sensitivity. This approach identified over 100 potentially eligible papers for final inclusion (see Figure 1), far beyond the scope of this project to collate and appraise.

For this reason, the current systematic review aims to identify, collate, and critically evaluate the extant literature on the associations between caregiver EE and caregiver-child attachment. The following research questions will be addressed:

1) Are low or high EE families associated with certain attachment styles or levels of attachment security?
2) Are certain sub-domains of EE (e.g., criticism, EOI) associated with certain attachment styles or levels of attachment security?

3.3 Methods

3.3.1 Search strategy

Guidance from the Centre for Reviews and Dissemination (69) was used to inform the design of this review. Initial scoping searches were conducted to assess feasibility and confirm there was no previous systematic review on this topic. To reduce publication bias, it was decided *a priori* to include grey literature in the search strategy. To enhance transparency, replicability and fidelity to search methodology and reduce the likelihood of duplication, an *a priori* protocol was developed following guidance in the PRISMA-P statement (70) and registered with the international database PROSPERO on October 28th, 2020. The protocol can be viewed at www.crd.york.ac.uk/prospero/display_record.php?RecordID=213248 (CRD42020213248; see Appendix B).

The search was conducted on October 28th, 2020 on the following electronic databases: ProQuest (ProQuest Dissertations and Theses Global, ASSIA); EBSCOHost (CINAHL Plus, ERIC); Ovid (PsycINFO, PsycArticles, EMBASE, Ovid MEDLINE (R) 1946 to Present, Ovid MEDLINE (R) Epub Ahead of Print, In Process and Other Non-Indexed Citations, Ovid MEDLINE (R) Daily Update); Cochrane Library; Web of Science; and OpenGrey. Search terms were formulated with assistance from an academic support librarian, and by using pilot searches and database thesauri to check for synonyms. The following search terms were submitted across databases using the "*" truncation to enhance search sensitivity: (Expressed Emotion OR Camberwell Family Interview OR Five Minute Speech Sample OR Level of Expressed Emotion OR Expressed Emotion Scale OR Perceived Criticism OR Family Attitudes Scale) AND (infan* OR bab* OR toddler OR child* OR boy* OR girl* OR preadolescen* OR adolescen* OR teen* OR student* OR young OR youth) AND (parent* OR matern* OR patern* OR attach* OR secur* OR insecur* OR bond* OR stress OR beliefs OR attitudes OR attributions OR confidence OR self-efficacy OR styles OR skills OR responsiveness OR sensitivity OR practices OR behaviour OR hostility OR emotional overinvolvement OR critic* OR warm* OR irritabil* OR emotional support OR intrusi*). Broad search terms were used to ensure that all potentially relevant papers were captured.

Identified articles from each database were exported to the Covidence systematic review software (71) and duplicates automatically removed. The first author conducted initial screening of records by title and abstract, removing all clearly irrelevant articles. Full text screening was conducted by the first and second authors on the sub-set of articles identified as relevant for the focused systematic review on associations between attachment and EE, resulting in a list of eligible papers. The reference lists

of included papers were hand-searched by the first author to identify additional potentially relevant papers, which were subjected to the screening process described above. Full agreement was achieved between first and second authors regarding articles eligible for inclusion.

3.3.2 Eligibility criteria

Articles were eligible for inclusion if they met the following criteria:

- The sample consisted of infants, children, and adolescents aged between 0 to 24 years and/or their family members.
- The study included at least one measure of EE, using a validated observer-rated or self-report measure, which was coded for EE or an EE sub-domain.
- The study included an assessment of attachment, using a validated observer-, clinician- or self-rated measure.
- The study was of quantitative design, including case series, case control, cross-sectional, and cohort studies, or had a quantitative design component reporting evidence relevant to the research questions.

Articles were excluded based on the following criteria:

- The study was of qualitative or case study design or was only available as an abstract or protocol.
- No full-text English translation was available.
- A validated EE measure was used but not coded for EE or an EE sub-domain.
- The study did not report on associations between EE and attachment.
- A digital copy was not available to the first author at the time of writing.

3.3.3 Data extraction

A data extraction form was created and piloted by the first author on two random included studies, then uploaded to Covidence for use by the first and second authors. Data extracted using the form included: author(s), year, and type of publication (e.g., journal article, dissertation), country of origin, design, setting (e.g., community, health, education), sample size and characteristics, sampling strategy, inclusion/exclusion criteria, EE measure and coding system, attachment measure and coding system, analyses completed, results obtained, and study limitations. The second author completed data extraction on a random subset of five included papers to ensure consistency in the data extracted. The first and second authors reviewed the extracted data together and discrepancies were resolved through discussion and consensus.

3.3.4 Quality appraisal

Included studies were of observational design; as such, the revised Item Bank for Assessing Risk of Bias and Confounding of Observational Studies of Interventions or Exposures (RTI-IB; 72,73) was selected as a thorough quality appraisal tool with good inter-rater reliability (74). The original tool consists of 13 items designed to allow quality appraisal across case series, case control, cross-sectional, and cohort designs. Possible responses are "Yes," "No," "Partially," "Cannot determine," and "Not applicable," the latter option allowing the user to tailor the item bank to the study being appraised (i.e., not all questions may be relevant for specific designs). These responses are also amenable to recommended graphical representation (75).

The RTI-IB authors encourage flexible use of the tool to fit the literature. As such, the tool was modified to ensure as many items would be relevant to the included studies

as possible, thus allowing appraisal and comparison across studies. Two items deemed least relevant to the literature were removed from the tool, and an additional two items removed after quality appraisal due to lack of relevance to most included studies, resulting in a modified 9-item RTI-IB (see Appendix C). The first author completed quality appraisal on all included articles, with the second author appraising a randomly selected subset of five. Inter-rater reliability analysis was conducted on both authors' ratings using Cohen's kappa (76), which indicated good agreement (κ=.72, 95%CI=.58, .87, p<.001). Discrepancies were discussed and resolved through consensus to provide final judgements for each study.

3.3.5 Data synthesis

Preliminary scoping revealed considerable heterogeneity in outcome measurement for both attachment and EE, rendering statistical data synthesis unfeasible. Following previously published guidance, narrative synthesis was used to analyse and present the data (77), with EE classification and EE sub-domains being the basis of synthesis, and exploring the associations reported between EE categorisation or sub-domains and attachment. Results were also synthesised based on the age of child participants, to explore whether differential effects are observed at different stages of development.

3.4 Results

The search strategy identified 4,005 potentially relevant articles, leaving 2,930 after de-duplication. After screening, a total of 104 articles were eligible for inclusion in the broader review on EE, attachment, and parenting factors, with 9 articles eligible for inclusion in the current review (see Figure 1).

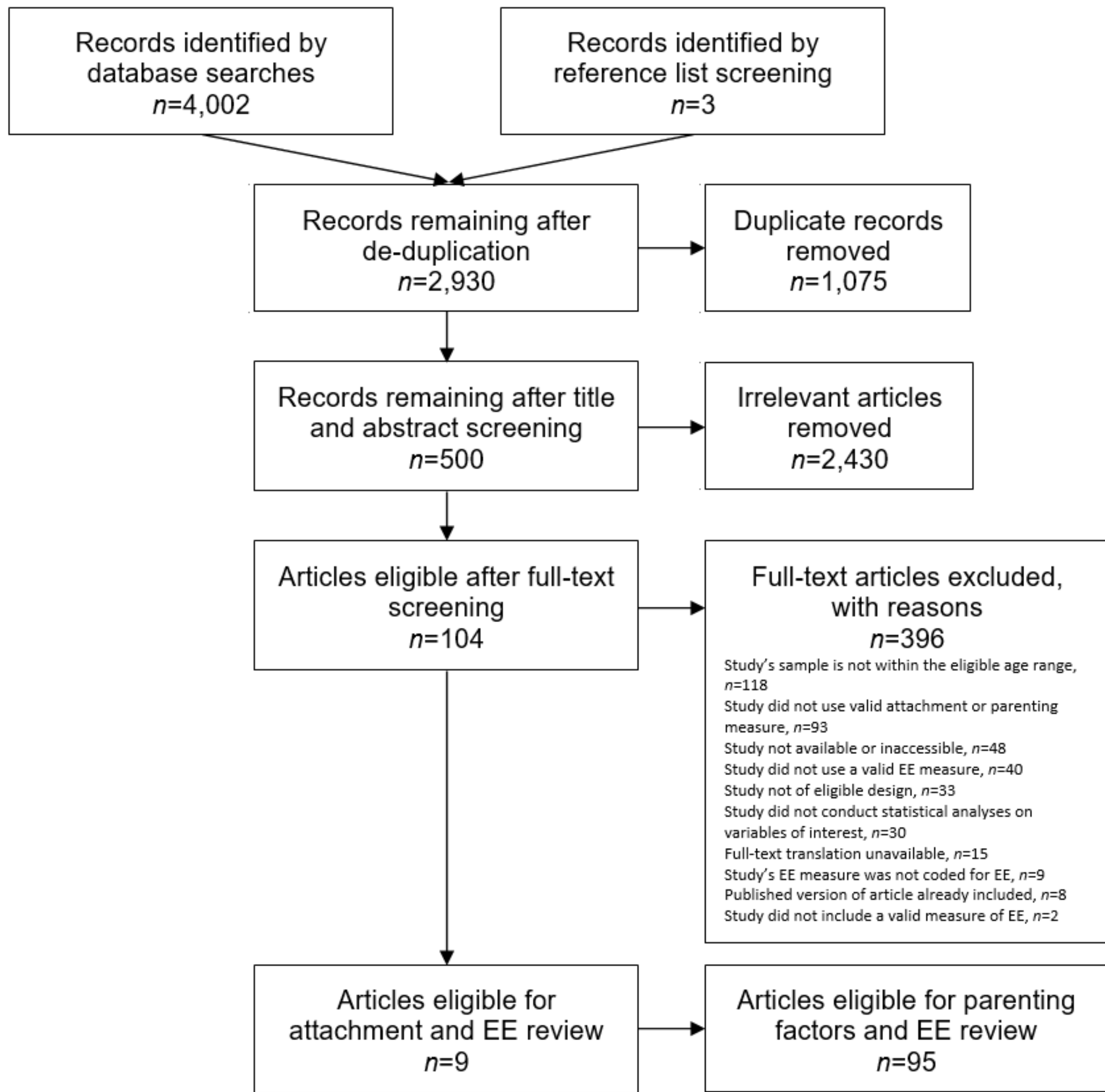

Figure 1. PRISMA flowchart displaying study selection procedure

3.4.1 Characteristics of the included studies

Table 1 summarises the characteristics, outcomes, and main findings of included studies. The nine studies reported on a total population of 1,074 young people and 1,108 parents, with the majority being mother-child dyads (*n*=994, 92.55%). Child participants had a mean age of 6.05 years, ranging from 9 months to 18 years. Of the

included studies, one did not report the gender of children who participated (*n*=206) (78). Of the remaining studies, most children were male, constituting 56.71% (*n*=492) of the pooled sample. Most parents were mothers (*n*=1,067, 96.30%). Two studies did not report parents' ages (*n*=309) (79,80); in the remaining seven, parents had a mean age of 31.82 years (*n*=799). Most participants were Caucasian, and eight of the studies took place in countries considered Western cultures (United States, United Kingdom, and Germany).

Recruitment sites varied; four studies recruited exclusively from the community (*n*=472 families, 43.95%), two exclusively from healthcare settings (*n*=131 families, 12.20%), one exclusively from an education setting (*n*=142 families, 13.31%), and two studies from mixed settings (*n*=328 families, 30.54%). Five studies drew samples from larger studies. Also of note is that for several studies, the main investigation was focused on exploring associations between other variables, rather than between EE and attachment, which was analysed as an adjunct. Six studies were cross-sectional, two were cohort studies, and one was of case control design, thus the ability to draw causal conclusions from this evidence base is severely limited.

Table 1.

Summary of included studies characteristics, outcomes, and main findings (studies are presented in order of mean child age)

Author(s), (year), country of origin, *publication type*	Study design, setting, and sampling strategy	Sample characteris ics, (n, participant characteristics, mean age (±SD), gender, ethnicity, group status	EE outcome(s); coding strategy	Attachment outcome(s); coding strategy	Key findings relevant to systematic review
Davis (2014) United States *dissertation*	Cohort, two time points. Community. Mother-child dyads recruited from racially and ethnically diverse, low-income urban population as part of larger study on maternal depression, child development and efficacy of interpersonal psychotherapy in treating maternal depression and mother-child relationship.	n=206 mother-infant dyads Children: 12 months at baseline, demographics not reported Mothers: Depressed group: 24.11 years 59.0% Black Non-depressed group: 25.14 years 67.7% Black Groups: n=144 mothers meeting diagnostic criteria for MDD n=62 demographically similar mothers without history of MDD	FMSS; Coding modified, see Section 3.4.2 below. Child-FMSS provided at T1 and T2, Self-FMSS and Mother-FMSS provided at T1 only. First coder rated all monologues, with second coder independently rated 20% of all recordings for reliability purposes.	AQS; Standard coding procedures used. AQS ratings made at T1 and T2 by two trained coders, only primary research assistant codes used in final analysis. PAAQ; Self-report questionnaire completed by mothers at T1.	Mothers designated high EE-Overall based on FMSS-Mother reported feeling more rejected (F=10.254(2,193) p<.001), vulnerable (F=5.525(2,184) p=.005), and angry (F=26.356(2,184) p<.001), and less loved (F=14.456(2,193) p<.001) and forgiving (F=8.623(2,183) p<.001), on PAAQ than borderline or low EE-Overall. High EE-Overall mothers reported higher levels of role reversal (F=5.356(2,193) p=.005) and lower levels of enmeshment (F=3.992(2,193) p=.020) on PAAQ. No significant differences for derogation, no memory or enmeshment/role reversal overall. Mothers designated high and borderline EOI differed from low EOI on rejection (F=4.946(2,193) p=.008), love (F=5.96(2,193) p=.003), forgiveness (F=3.053(2,183) p=.050), and deroga ion (F=4.812(2,193) p=.009) subscales. High EOI mothers had lower rejection scores compared to those with low EOI. Mothers with borderline EOI had higher love and forgiveness scores and lower derogation scores than those with low EOI. No group differences on vulnerability, anger, no memory, enmeshment/role reversal subscales or separated enmeshment and role reversal subscales. Mothers designated high EE-Crit had higher scores on the rejection (F=22.787(2,193) p<.001), vulnerability (F=10.774(2,184) p<.001), anger (F=39.467(2,184) p<.001), derogation (F=6.918(2,193) p=.001), and role reversal only (F=4.078(2,193) p=.018) subscales of the PAAQ; they also had lower love (F=27.465(2,193) p<.001), forgiveness (F=10.930(2,183) p<.001), and enmeshment only (F=8.101(2,193) p<.001) subscale scores. No significant differences between EE-Crit groups on no memory or combined enmeshed/role reversal subscales. Path analysis conducted to examine indirect effect between maternal depression and child attachment security and dependency via maternal EE-Overall regarding child, EE-Crit regarding self, and EE-Crit regarding mother. Good model fit achieved (χ^2(8,123)=2.540, p=.96; CFI=1.00; SRMR=.018). No EE variable was significantly associated with child attachment security or dependency.
Gravener, Rogosch, Oshri, Narayan, Cicchetti & Toth (2012), United States, *journal article*	Cross-sectional. Community. Mothers with history of depression recruited via adverts in newspapers, medical offices, community centres.	n=198 mother-toddler dyads Children: 20.32 months (±2.50) 53% male Mothers: 31.68 years (±4.68) 92.9% Caucasian	FMSS; Coding modified, see Section 3.4.2 below. Primary coder coded all samples, with a second coder rating 20% for reliability purposes.	SSP; Standard coding procedures used. Two coders rated tapes for reliability.	Maternal self-criticism and toddler attachment security were significantly positively correlated, (r=.21, p<.01), no significant correlation between maternal child-criticism and toddler attachment insecurity, (r=.12, *ns*). Logistic regression tested maternal self-criticism as mediator of relationship between maternal depression and child attachment insecurity. Mothers with high self-criticism had significantly higher probability of having insecurely attached children (β=.369, p=.025; Odds ratio=1.74), direct effect of maternal depression on security stayed significant while accounting for mediator of self-cri icism (β=.680, p<.001), supports partial mediation hypothesis.

	Birth records used to select comparison group of mothers without current or history of mental disorders, living in same neighbourhoods, and with toddler-aged child.	Groups: *n*=130 mothers who had experienced major depressive episode after birth of child *n*=68 mothers with no history of major mental disorders			Logistic regression tested whether maternal child-criticism mediated relationship between maternal depression and child attachment insecurity. Significant direct effect of maternal depression on child-criticism (β=.145, *p*=.03), but non-significant direct effect of child-criticism on attachment insecurity (β=.182, *p*>.05) when controlling for significant direct effect of maternal depression on attachment security (β=.788, *p*<.001). No evidence hat child-criticism mediates the effect of maternal depression on child attachment security.
Butler (2001), United States, *dissertation*	Cross-sectional. Health. Sample recruited from area hospitals in large Mid-Western city as part of a larger study of attachment in neurologically vs. non-neurologically impaired toddlers and heir mothers.	*n*=70 mother-toddler dyads Children: 24.7 months (±5.6) 63% male 70% Caucasian Mothers: 29.7 years (±6.8) Groups: *n*=38 toddlers with neurological impairment and their mothers *n*=32 toddlers with non-neurological impairment and their mothers	FMSS; Standard coding procedures used.	SSP; Standard coding procedures used. Rated by experienced coder, with first author coding 20% for reliability.	No significant inter-correlations reported between high EE and attachment categories. Chi-squared tests found no significant differences across four attachment categories for high EE. High EE marginally associated with insecure attachment (χ^2(1,70)=3.6 *p*=.057). One-way ANOVA tested associations between attachment classification and EE criticality and EOI. No significant differences found for criticality, (*F*(3,67)=.89, *ns*), or EOI (*F*(3,67)=.87, *ns*). Logistic regressions used to predict secure vs. insecure attachment classification from EE, sensi ivity, and synchrony. Maternal age and ethnicity were entered in the first step, then sensitivity then EE. Only maternal age significantly predicted attachment security when other variables entered (Wald χ^2(1)=5.7, *p*=.02). Final model was significant (Wald χ^2(5)=14.3, *p*=.01), correctly classifying 72.5% of cases. Logistic regressions used to predict disorganised attachment. Maternal age was entered first as a covariate, then oversynchrony, hen overinvolvement. The overall model was significant, (Wald χ^2(4)=12.3, *p*=.02), correctly classifying 86.6% of cases. Oversynchrony significantly predicted Type D attachment, controlling for confounds (Wald χ^2(1)=4.2, *df*=l, *p*=.04). Overinvolvement did not contribute significantly to prediction. High EE/criticality did not predict attachment disorganisa ion. Logistic regressions used to predict Type A and Type C attachment. It was hypothesised that dyssynchrony and criticality were related to avoidant attachment; dyssynchrony alone approached statis ical significance (Wald χ^2=3.3, *p*=.06), but cri icality did not add to the prediction, (Wald χ^2=2.3, *ns*). Neither high EE nor overinvolvement predicted Type A. No EE variables predicted Type C attachment classification after controlling for ethnicity.
Heckelman (1993), United States, *dissertation*	Cross-sectional. Community. Participants recruited hrough positive responses to a letter inviting them for participation in a study on parent-management styles for 2- to 3-year-old boys.	*n*=35 mother-toddler dyads Children: 44 months (±4.72) All male Mothers: 36 years (±3.96) 94% Caucasian	CFI; Coding modified, see Section 3.4.2 below. Two raters coded for reliability purposes.	AQS; Standard coding procedures used. Five coders completed observations but only ratings made by three trained coders used in analysis due to reliability. Mothers also completed AQS.	Significant negative correlation between criticism and child's attachment score (*r*(33)=- 38; p<.05). Positive correlation between warmth and attachment security neared significance (*r*(33)=.33; p=.058). Hos ility, EOI, and positive remarks were not significant predictors of attachment. T-test comparing maternal criticism scores across dichotomised secure/insecure attachment ratings was non-significant (*t*(32)=1.32; *p*=.19, *ns*). T-test comparing high vs. low EE (dichotomised based on 3 or more criticisms) and attachment scores was found to be significant (*t*(32)=2.57; *p*< 02). Sample divided using median split for face-to-face contact (greater than and less than 50.25 hours per week). In mothers above median split, maternal criticism not significantly correlated with attachment (*r*(17) =.09; *ns*). For mothers below median split, criticism was significantly correlated with attachment (*r*(16)=-.56; *p*<.02). A comparison of the significance of this difference between effect sizes of the two correlations was non-significant (z=1.46, *p*=.072, *ns*). Two by two ANOVA (criticism high/low x face-to-face contact high/low predicting attachment score) found main effect of criticism was significant (*F*(1.30)=5.55; *p*=.03) but main effect of face-to-face

					contact was non-significant ($F(1.30)=.89$; $p=.35$, *ns*) and interaction was non-significant ($F(1.30)=3.58$; $p=.07$, *ns)*
Jacobsen, Hibbs & Ziegenhain (2000), Germany, *journal article*	Cohort, hree time points. Community. Dyads were randomly recruited from city lists of families applying for public day-care programmes in Berlin.	*n*=33 mother-infant dyads Children: T1: 11 months (±1.6) T2: 17.5 months (±1.4) T3: 72 months (±0.68) 52% male Mothers: 25 years (±3.9)	FMSS; Standard coding procedures used.	SSP; Standard coding procedures used. Two experienced coders rated tapes for reliability. “Standard sixth-year attachment observation”; 3-5-minute reunion following 1 hour separation coded for attachment category, assigned by first rater, with second rater classifying 15 random tapes for reliability.	Maternal EE category significantly associated with attachment security at six years ($\chi^2(1)=4.23$, $p<.05$). 88% of high EE mothers had children with insecure attachments at age 6 years. The relation between maternal EE and 6 h-year attachment disorganisation was also significant, ($\chi^2(1)=6.40$, $p<.05$). 75% of high EE mothers had children with disorganised attachment. Logistic regression analysis completed to determine adjusted effects of maternal EE on sixth year attachment disorganisa ion, with longitudinal measure of attachment disorganisation and current family stress considered. The overall model was significant, ($\chi^2(3)=14.95$, $p<.01$.) Maternal EE ($\chi^2=3.92$, $p<.05$) and current family stress ($\chi^2=4.54$, $p<.05$) had significant effects on sixth year attachment disorganisa ion. High EE mothers were 10 times more likely to have children with disorganised attachment than children with low EE mothers. High stress families were twice as likely to have children with disorganised attachment than children with low stress families.
Savile (2014), United Kingdom, *dissertation*	Cross-sectional. Education. Parents of children were recruited via 53 primary schools, secondary analysis on a sample drawn from a larger study.	*n*=143 mother-child dyads Children: 73.22 months (±7.16) 51.7% male Mothers: 28.78 years (±6.21) at child’s birth 78% White British	FMSS; Coding modified, see Section 3.4.2 below.	MCAST; Standard coding procedures used.	No significant differences were found between attachment classification and levels of warmth or criticism in FMSS. Multivariate analysis of predictor variables found that none of he EE subscales or confounder variables (gender, mother and child mental health, child behaviour, and parenting) were significantly associated with attachment classification. No support found for the hypothesis that EE is associated with attachment classification.
Green, Stanley & Peter (2007), United Kingdom, *journal article*	Cross-sectional. Health. Children with externalising disorders and their mothers presenting to mental health services in a large urban area were randomly selected from larger sample recruited for a study on parent training.	*n*=61 mother-child dyads Children: all children met diagnostic criteria for ODD and CD 7 3 years (4.4 to 9.6 years) 81% male Mothers: 97% Caucasian Other demographics not reported	CFI; Coding modified, see Section 3.4.2 below.	MCAST; Standard coding procedures used.	Very high maternal EE associated with child disorganised attachment ($\chi^2=11.1$, $p=.001$). This was specific to pervasive disorganisation. No significant relationship was found between EE status and episodic disorganisation ($\chi^2=1.7$, $p=.20$), no linear rela ionship reported between overall child disorganisation maternal EE status ($F=1.12$, $p=.36$). Using EE as an ordinal measure, very high EE was specifically associated with pervasive disorganisation (Mann Whitney U, $z=72.34$, $p=.02$).

Scott, Briskman, Woolgar, Humayun & Conner (2011), United Kingdom, *journal article*	Cross-sectional. Health, education. High and medium risk samples recruited from mental health clinics and schools in South London as part of larger study. Normative risk sample recruited through a typical primary and secondary school letters sent to parents.	*n*=248 mother-child dyads High risk group (*n*=102): Children: 13.2 years (±1.8) 76% male 84% White British Moderate risk group (*n*=96): Children: 11.0 years (±0.90) 66% male 50% White British Normative risk group (*n*=50): Children: 14.2 years (±1.7) 52% male 68% White British	FMSS; Coding modified, see Section 3.4.2 below.	CAI; Standard coding procedures used.	Significant associations reported between FMSS negative comments and secure (*M*=3.39, *SD*=2.77) vs. insecure (*M*=4.43, *SD*=2.68) attachment (F(1,120)=7.07, p<.01). No significant association between FMSS positive comments and secure (*M*=7.68, *SD*=4.32) vs. insecure (*M*=6.71, *SD*=3.67) attachment (F(1,120)=2.80, *ns*).
Nalbant, Kalayci & Akdemir (2020), Turkey, *journal article*	Case control. Health, community. AN sample recruited after consultation with Hacettepe University Medical School Child and Adolescent Mental Health and Diseases Department. Matched control group recruited from community.	*n*=80 adolescents and their parents AN group: Adolescents (*n*=43): 15.3 years (±1.5) All female Mothers (*n*=39): 43.2 years (±5.4) Fathers (*n*=21): 46.9 years (±6.2) Control group: Adolescents (*n*=37): 15.4 years (±1.7) Mothers (*n*=34): 41.0 years (±4.9) Fathers (*n*=20): 45.4 years (±4.3)	EES; Self-report measure completed by parent(s). PEES; Self-report measure completed by adolescents.	IPPA; Self-report measure completed by adolescents.	Total scores on IPPA-M and IPPA-F significantly lower in the AN group (IPPA-M; AN group (*M*=63.0, *SD*=12.9), control group (*M*=73.8, *SD*=9.1)(t=-4.12, p=.000); IPPA-F;AN group (*M*=56.0, *SD*=19.2), control group (*M*=69.1, *SD*=10.3)(t=-3.70, p=.000)), and mean scores on PEES-CH (AN group (*M*=5.6, *SD*=4.0), control group (*M*=2.1, *SD*=2.0) (t=5.02, p<.000)) and EES(father)-CH subscale (AN group (*M*=5.0, *SD*=2.9), control group (*M*=2.5, *SD*=1.5)(t=3.35, p=.002)) significantly higher in AN group, indicating higher lower levels of attachment security in parent-child relationships and higher criticism and hostility (both father- and adolescent-reported) in the AN group. Significant negative correlations in AN group between IPPA-M and EES(father)-CH (r=-.476, p<.05) and PEES-CH (r=-.624, p<.01). Linear regression analysis used to investigate predictive power of different variables for PEES-CH. Predictor variables included EES(mother)-CH, IPPA-M, IPPA-F, adolescent depression and anxiety, and explained 44.3% of variance in PEES-CH. In stepwise regression analysis with model 1, IPPA-M explained 42.3% of the PEES-CH variance (Nagelkerke R^2=0.423, p<.000). Results of linear regression analyses demonstrated that security of attachment to the mother was significantly predictive of the PEES-CH in AN (B=-.166, t=-3.49 (95% CI=-.26, -.07), p<.000).

Abbreviations: MDD – Major Depressive Disorder; FMSS - Five Minute Speech Sample; AQS – Attachment Q-Sort; PAAQ – Perceptions of Adult Attachment Questionnaire; EOI – Emotional Over-Involvement; SSP – Strange Situation Procedure; CFI – Camberwell Family Interview; MCAST – Manchester Child Attachment Story Task; ODD – Oppositional Defiant Disorder; CD – Conduct Disorder; CAI – Child Attachment Interview; AN – Anorexia Nervosa; EES – Expressed Emotion Scale; PEES – Perceived Expressed Emotion Scale; IPPA – Inventory of Parent and Peer Attachment; IPPA-M – Inventory of Parent and Peer Attachment, Mother; IPPA-F – Inventory of Parent and Peer Attachment, Father.

3.4.2 EE outcomes

Though several studies used the same EE measure, scoring systems differed substantially and non-standardised modifications were made, raising the question whether results are truly comparable. Five of the nine studies used the FMSS (47,78,80–82), in which a five-minute monologue given by the parent is recorded and subsequently coded across several dimensions (13). Typically, the FMSS is coded for initial statement and relationship quality, as well as on criticism and EOI sub-scales which contribute to the assignation of high or low EE. Positive and negative comments are also coded using a frequency count. High criticism is assigned if relatives make one or more critical or negative comments about the relationship, or a critical initial statement, whereas high EOI is scored if the relative demonstrates excessive praise or loving comments regarding the target relative, or self-sacrifice above reasonable expectations (83). Of the included studies, Butler (2001) and Jacobsen et al. (2000) used standard coding procedures (13,83). Davis (2014) and Gravener et al. (2012) also partially followed standardised coding instructions for FMSS (78,81); however, Gravener et al. (2012) coded only criticism and used a novel procedure where mothers provided two speech samples about themselves and their children. Both samples were then designated high, low, or borderline EE based on frequency of critical comments. Davis (2014) followed a similar procedure, coding three FMSSs about child, self, and self's mother, which was again coded using a novel system developed by the author based on the standardised coding procedures. Savile (2014) also used FMSS, but rated criticism and warmth based on three-point coding scales, and Scott et al. (2011) used FMSS but only reported on frequency of positive and negative comments. Neither of these two studies assigned categorical high or low EE ratings (80,82).

Two of the studies used the CFI (79,85), however, in both cases slight modifications were made to scoring procedures. Green et al. (2007) noted that the prevalence of high EE categorisation was very high in their sample and distinguished between moderate/high EE, where a mother's speech sample met criteria for high EE based on the presence of any hostility *or* high scores on the criticism *or* EOI subscale, and very high EE, where the speech samples met all three criteria. Heckelman (1993) followed standardised coding procedures, other than for EOI, which was adjusted to make it more developmentally appropriate for mothers of young children. It is also noteworthy that Heckelman (1993) designated high and low EE categories using a cut-off of 3 or more criticisms, a threshold previously used for relatives of individuals with depression, and substantially lower than the 6 or 7 criticisms commonly used for relatives of individuals diagnosed with schizophrenia.

One study used self-report measures of EE (86), the Expressed Emotion Scale (EES) and the Perceived Expressed Emotion Scale (PEES). The EES was developed as a brief measure accounting for Turkish cultural norms (87), with the PEES resulting from an adaptation to the EES which allows target individuals to rate their key relatives for EE (88). The EES has reported good convergent validity with the Turkish language version of the CFI (89) and has good internal consistency (86). Both measures use criticism/hostility and EOI subscales and are reported dimensionally, with higher scores indicating higher parent-reported and individually perceived levels of criticism/hostility and EOI.

3.4.3 Attachment outcomes

There was also variability in attachment measures. Three studies used the SSP to assign child attachment categories (secure, insecure-avoidant, insecure-ambivalent,

disorganised) using standardised procedures (47,81,84), with one of these studies also using a standardised mother-child observation procedure to reassess attachment category when children were aged 6 years (47). Two studies used the Attachment Q-Sort (AQS) to assess child attachment security (78,85); trained observers watch infant-mother interactions for 1 to 2 hours then sort statements about the interaction along a 9-point scale from “very much unlike the child” to “very much like the child”. Their ratings are then correlated with an “ideally attached” rating and that correlation used to indicate attachment security. It is worth noting that Heckelman (1993) had mothers and observers complete the AQS, but only the mothers’ ratings were used in data analysis due to the observers’ low inter-rater reliability. Two studies used the Manchester Child Attachment Story Task (MCAST) to assign child attachment classification (79,82), a doll-play story completion task with four story stems designed to evoke children’s attachment representations; a facilitator introduces the story stems and asks the child to complete them using dolls. The child’s responses are recorded and later coded for a categorical “attachment strategy” (e.g., secure, avoidant, ambivalent), as well as a level of disorganisation. Both studies which used the MCAST followed standardised coding procedures. Only one study used the Child Attachment Interview (CAI) to assign an attachment categorisation (secure, dismissing, preoccupied, disorganised) and standard procedures were used (80). One study used a self-report measure, the Inventory of Parent and Peer Attachment (IPPA; 86), which has subscales of “trust”, “communication” and “alienation”. The IPPA is a dimensional measure; higher total scores indicate higher attachment security. It was completed by adolescents who rated their attachment to their mothers and fathers. Mothers’ own attachment representations were also assessed in one study using the self-report

Perceptions of Adult Attachment Questionnaire (PAAQ; 78), which has eight subscales derived from 60 items, six of which load onto one general attachment factor.

3.4.4 Study findings

3.4.4.1 High vs. low EE and child attachment

Four of the nine studies reported on the associations between dichotomised high vs. low EE mothers and children's categorical attachment styles. Overall, the evidence that high EE is associated with insecure attachment styles is mixed, with two studies reporting associations between high maternal EE and attachment disorganisation, one study reporting a significant relationship between high maternal EE and attachment security, and another study rejecting this finding. In their sample of children with externalising disorders and their mothers, Green et al. (2007) reported that very high maternal EE was associated with pervasive disorganised attachment representations in children (χ^2=11.1, *p*=.001), but this effect was specific to pervasive rather than episodic attachment disorganisation (χ^2=1.7, *p*=.2, *ns*) as there was no linear relationship between disorganisation and EE categorisation (*F*=1.12, *p*=.36, *ns*) (79). In a community sample of German children and mothers, Jacobsen et al. (2000) found that maternal EE categorisation (high vs. low) was significantly associated with attachment security when attachment classifications were dichotomised into secure vs. insecure ($\chi^2(1)$=4.23, *p*<.05), with seven of the eight mothers rated as high EE having a child with an insecure attachment representation as assessed at sixth year follow-up (47). They also found a significant association between high maternal EE and attachment disorganisation as rated at sixth year follow-up ($\chi^2(1)$=6.40, *p*<.05), reporting a significant logistic regression model where maternal EE status and current family stress exerted significant effects on sixth year attachment disorganisation.

Dichotomising mothers into high and low EE categories on the basis of three or more criticisms in the CFI, Heckelman (1993) found a significant difference in child attachment score across the two groups ($t(32)=2.57$; $p< .02$), with the children of high EE mothers scoring lower on the mother's AQS (85). However, Butler et al. (2001) found no statistically significant correlations between mothers' EE status and children's SSP attachment classifications in a sample of neurologically and non-neurologically impaired children (84). Chi-squared tests to assess the direct association between high EE status and attachment classifications revealed no significant relationships, and maternal high EE status was only marginally associated with insecure attachment when attachment styles were dichotomised into secure vs. insecure ($\chi^2(1,70)=3.6$, $p=.057$, *ns*). Only one study looked at overall EE categorical status (high vs. low) and associations with dimensional measures of attachment. Using path analysis to investigate associations between maternal depression, maternal EE status and child attachment security and dependency, Davis (2014) found maternal EE status was not significantly associated with attachment (78). Taken together, these findings indicate a potential tentative link between high maternal EE and attachment disorganisation, but evidence that high maternal EE is associated with overall attachment insecurity appears more contradictory.

3.4.4.2 EE-criticism and attachment

Four of the nine studies reported on associations between categorical ratings of mother's criticism and child attachment status. Butler (2001) reported that three-level maternal criticism categorisation (high, borderline, low) in the FMSS was not significantly associated with any of the four SSP attachment classifications (84). Using the same three-level ratings, Davis (2014) found that maternal FMSS criticism

about self, mother, and child were not significantly associated with attachment security or dependency (78). Savile (2014) also used a three-point categorisation system for coding FMSS maternal criticism and reported no significant differences in maternal criticism when the sample was dichotomised into secure vs. insecure attachment, nor was EE-criticism associated with attachment classification in multivariate analysis (82). However, using a dichotomous rating of high vs. low FMSS criticism about self and child, Gravener et al. (2012) reported that FMSS self-criticism was a partial mediator of the relationship between maternal depression and child attachment status (secure vs. insecure) with the direct effect of maternal depression on child attachment security remaining significant, indicating that highly self-critical mothers had a significantly higher probability of having children who were insecurely attached (β=.369, p=.025; Odds ratio=1.74) (81). This finding was perhaps surprising, given that maternal FMSS criticism of the child was not significantly associated with child attachment security, nor was it a significant mediator of the association between maternal depression and child attachment security.

Three studies used a continuous rather than categorical approach to explore the associations between parental EE-criticism and attachment security in children. Heckelman (1993) reported a significant correlation between frequency of criticisms in the mother's CFI and the mother's AQS score for their infant ($r(33)=-.38$; $p<.05$), however, this difference was non-significant when the sample was dichotomised on the basis of secure vs. insecure attachment ($t(32)=1.32$; $p=.19$, *ns*), and it should be noted that mothers scoring high in criticism in the CFI may have rated their children's attachment more negatively (85). Heckelman (1993) also dichotomised the sample on the basis of weekly face-to-face contact, finding no significant associations between criticism and attachment security in mother-child dyads who spent more than the

median amount of face-to-face weekly contact, but a significant negative correlation between criticism and attachment security for mother-child dyads who spent below the median amount ($r(16)=-.56$; $p<.02$). When the sample was dichotomised on the basis of secure vs. insecure attachment, Scott et al. (2011) reported significant differences in the frequency of FMSS negative comments made by the mothers of securely ($M=3.39$, $SD=2.77$) vs. insecurely ($M=4.43$, $SD=2.68$) attached young people ($F(1,120)=7.07$, $p<.01$) (80). Using self-report measures completed by young people and their parents, Nalbant et al. (2020) reported that linear regressions between mother-child attachment security and perceived criticism and hostility were significant, with IPPA-Mother predicting 44.3% of the variance in the anorexic adolescent sample's perceived criticism and hostility (86). They also found significant negative correlations in the AN adolescent group between attachment security to the father and the father's self-reported criticism and hostility ($r=-.476$, $p<.05$) and the adolescent's perceived levels of criticism and hostility ($r=-.624$, $p<.01$).

In summary, different results were obtained based on whether EE-criticism was measured in a categorical or continuous way, with categorical studies broadly reporting non-significant effects and continuous studies reporting significant effects.

3.4.4.3 EOI and child attachment

Three studies examined the relationship between categorical ratings of parents' EOI and children's attachment security, with no study finding significant associations. Butler (2001) and Heckelman (1993) reported that EOI categorisation (high, borderline, low) was not significantly associated with any of the four SSP attachment classifications (84,85). Using self-report measures, Nalbant et al. (2020) also found

no significant association between perceived or parent-rated EOI and attachment security to either parent (86).

3.4.4.4 Other EE sub-domains and attachment

Though high or low EE categorisation is often made based on the criticism and EOI ratings in both the FMSS and CFI, several other domains of EE are commonly coded. Three studies completed analyses on these in association with child attachment security or classification. Heckelman (1993) reported a positive correlation between warmth and attachment security which neared significance ($r(33)=.33$; $p=.058$, *ns*), but hostility and positive remarks were not significant predictors of attachment (85). Savile (2014) found no significant differences between attachment classification and levels of warmth or criticism in mothers' FMSS (82), and Scott et al. (2011) reported a non-significant association between mothers' FMSS positive comments and secure ($M=7.68$, $SD=4.32$) vs. insecure ($M=6.71$, $SD=3.67$) attachment ($F(1,120)=2.80$, ns) (80). Taken together, these studies indicate that these EE sub-domains do not appear to be associated with children's attachment.

3.4.4.5 Mothers' own attachment status

Only one study investigated the associations between mothers' own attachment and EE status. Davis (2014) found that there were significant associations between mothers' responses to a self-report attachment measure and their EE status. High EE mothers reported feeling more rejected ($F=10.254(2,193)$ $p<.001$), vulnerable ($F=5.525(2,184)$ $p=.005$), and angry ($F=26.356(2,184)$ $p<.001$), and less loved ($F=14.456(2,193)$ $p<.001$) and forgiving ($F=8.623(2,183)$ $p<.001$) on the PAAQ than mothers designated borderline or low EE (78). They also reported higher levels of role

reversal (F=5.356(2,193) p=.005) and lower levels of enmeshment (F=3.992(2,193) p=.020). Davis (2014) also reported differences in PAAQ self-report based on whether mothers were assigned high EE status based on criticism or EOI (see Table 1).

3.4.4.6 Findings across developmental stages

Results varied across developmental stages and will be divided and presented here in three groups; infancy and toddlerhood; childhood; and adolescence.

Four studies sampled mother-infant or mother-toddler dyads, with two studies obtaining significant results. Sampling mother-toddler dyads, Gravener et al. (2012) reported a significant correlation between FMSS self-criticism and attachment insecurity, finding that self-criticism mediated the relationship between mother's depression and child attachment security and dependency (81). Also sampling mother-toddler dyads, Heckelman (1993) found that frequency of maternal criticism in the CFI correlated with child AQS score (85). Butler (2001) and Davis (2014) found no significant associations between EE and attachment using mother-infant and mother-toddler samples (78, 84).

Three studies reported on associations in childhood, with two studies reporting significant associations between maternal EE and attachment disorganisation. Jacobsen et al. (2000) reported that maternal EE status was significantly associated with attachment security and disorganisation, assessed when children were six years old (47). These findings were partly replicated by Green et al. (2007), who reported that very high maternal EE status was significantly and specifically associated with pervasive attachment disorganisation when children were aged 7 years (79).

However, no significant associations were reported by Savile (2014) in mother-child dyads where average child age was 6 years (82).

Only two studies looked at associations between EE and attachment in adolescence. Scott et al. (2011) reported that there were significant associations between FMSS negative comments and attachment security across three groups of mother-child dyads with mean child ages ranging from 11.0 to 14.2 years (80). Significant associations were also reported by Nalbant et al. (2020) in a group of adolescent girls diagnosed with AN with a mean age of 15.3 years (88). Nalbant et al. (2020) found that adolescents' self-reported attachment security with mothers significantly predicted perceived criticism and hostility from parents, with insecurely attached adolescents perceiving higher levels of EE.

3.4.5 Quality appraisal

Final quality appraisal judgements are presented in Figures 2 and 3. Methodological quality for the included studies was mixed. In several studies, although the same outcome measure was used, the different scoring procedures limit the comparability of the results across studies, particularly given that several studies may have used the same EE measurement method but differed in attachment measurement. Another consideration is that many studies used measures of attachment which required observation and coding of mother-child behaviour by trained coders. Coders having prior knowledge of other study data regarding a dyad (e.g., EE status, maternal depression status) could have influenced the coders interpretation of recordings and biased their coding of maternal communication, child behaviour or mother-child interaction unless they were blinded to participant status. However, it was unclear in four studies whether comprehensive blinding had occurred, leading to questions about

the impartiality of ratings assigned in those studies, increasing the risk of detection bias in results. Observational measures can also be susceptible to cultural and/or ethnicity bias, a limitation acknowledged by Butler (84).

All outcomes described in the studies were included in the results, therefore the first and second authors judged all papers as low risk for selective outcome reporting, however, it should be noted that *a priori* protocols were unavailable, making it unclear whether all initially planned outcomes were reported in the final papers. The body of evidence was also rated as having a substantial problem with the potential for bias due to confounding. Seven studies either did not report taking measures to balance uneven distributions of participants across comparison groups or did not take these measures at all. Several studies divided their samples into comparison groups post-hoc using attachment or EE status, and did not report having undertaken statistical methods to account for the disparity in numbers of participants across groups, which could have influenced the findings. Furthermore, five studies were rated as having a high or unclear risk of bias with regards to potential confounding variables not being accounted for in the study design or analysis. Overall, six of the nine studies were rated as believable, accounting for the methodological strengths and outstanding risk of bias. Three of the nine studies were rated as unclear for overall believability.

	1. Selection Bias: Do the inclusion/exclusion criteria vary across the comparison groups of the study?	2. Selection Bias/Confounding: Does the strategy for recruiting participants into the study differ across groups?	3. Selection Bias/Confounding: Is the selection of the comparison group inappropriate, after taking into account feasibility and ethical considerations?	4. Detection Bias: Was the outcome assessor not blinded to the intervention or exposure status of participants?	5. Detection Bias/Confounding: Were valid and reliable measures, implemented consistently across all study participants, used to assess inclusion/exclusion criteria, intervention/exposure outcomes, participant health benefits and harms, and confounding?	6. Selective Outcome Reporting: Are any important primary outcomes missing from the results?	7. Overall Assessment: Are results believable taking study limitations into considera ion?	8. Confounding: Any attempt to balance the allocation between the groups or match groups?	9. Confounding: Were important confounding variables not taken into account in the design and/or analysis?
Davis, 2014	?	?	✓	?	✓	✓	?	?	?
Gravener et al. 2012	✓	×	✓	?	?	✓	?	×	✓
Butler, 2001	✓	✓	✓	✓	?	✓	✓	×	×
Heckelman, 1992	✓	✓	✓	?	?	✓	?	×	×
Jacobsen et al. 2000	N/A	N/A	N/A	✓	✓	✓	✓	N/A	?
Savile, 2014	✓	✓	✓	?	✓	✓	✓	×	✓
Green et al. 2007	✓	✓	✓	✓	✓	✓	✓	?	×
Scott et al. 2011	✓	✓	✓	?	✓	✓	✓	×	✓
Nalbant et al. 2020	?	×	?	N/A	✓	✓	✓	✓	✓

Figure 2. Cross-tabulation summarising quality appraisal of included studies using the revised RTI-IB (73)

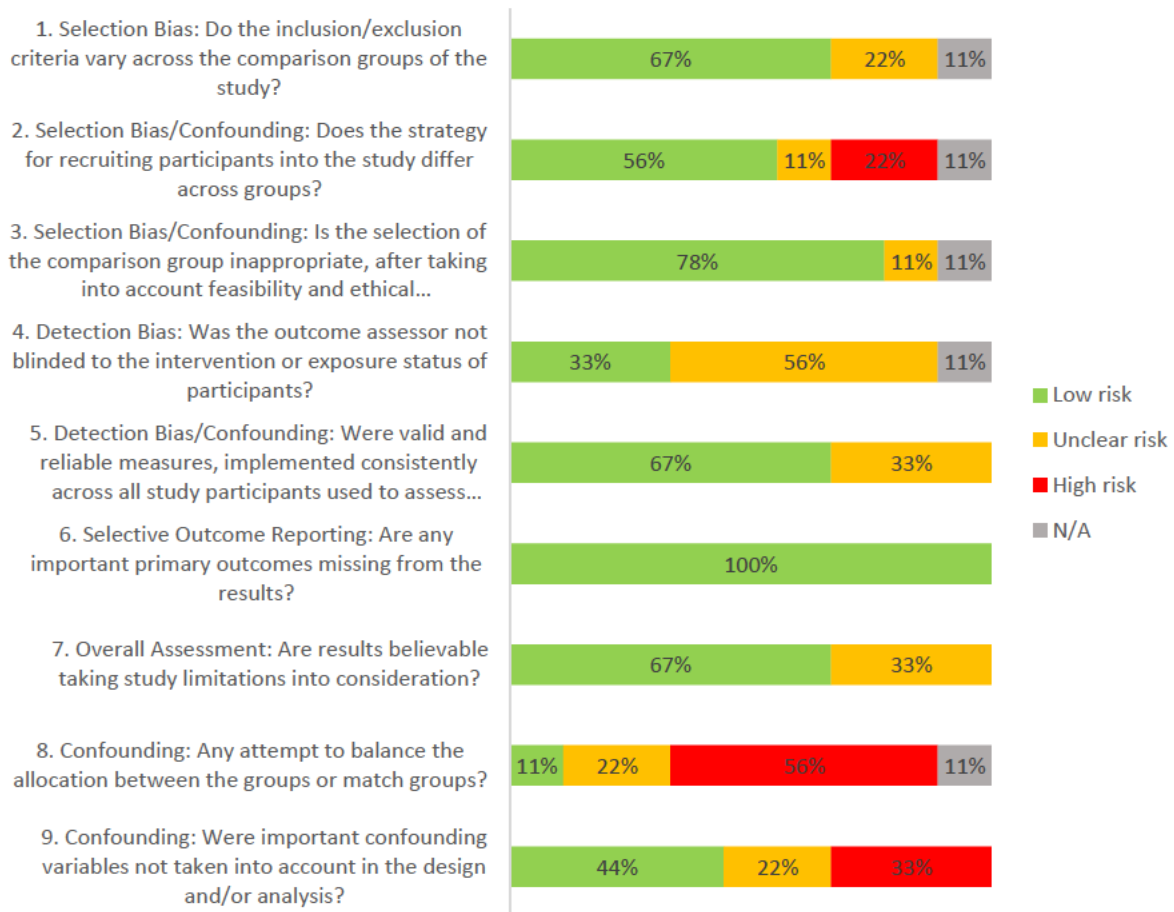

Figure 3. Summary of quality appraisal by item in included studies using the revised RTI-IB (73)

3.5 Discussion

3.5.1 Summary of findings

The nine included studies paint an unclear picture of the associations between EE and attachment, making it challenging to draw conclusions as to whether such an association exists. Two studies reported significant associations between attachment disorganisation and “high EE” mothers (47,79), indicating that mothers rated as higher in criticism, hostility, and/or EOI are more likely to have children with greater levels of attachment disorganisation. This fits with the broader theoretical understanding of

attachment disorganisation, whereby the child perceives the caregiver as both a feared stimulus and the sole source of distress reduction, leading to confused or contradictory attachment strategies (66). Mothers who appear hostile or critical to their children may evoke feelings of fear while also being the primary attachment figure for the child. However, whether hostility, criticality, or other parenting behaviours are adequately captured or measured in families of infants, children, and adolescents using generally accepted EE methodology is unclear. Outside of attachment disorganisation, findings are more contradictory; Butler (2001) and Davis (2014) found no significant associations between attachment security and maternal EE status, whereas Heckelman (1992) reported that high EE mothers were more likely to have children who scored lower on attachment security than low EE mothers, and self-reported attachment security to mothers was negatively correlated with perceived criticism and hostility in the Nalbant et al. (2020) study.

Specific exploration of EE sub-domains also resulted in unclear findings, with most studies failing to find a significant association. When examining EE-criticism, all three studies which used a categorical coding approach reported non-significant associations (78,82,84). On the contrary, two studies using a continuous assessment of EE-criticism (85,86) found significant associations between higher levels of criticism and attachment insecurity. One study found that it was not child-focused criticism but mother's self-criticism which predicted child attachment security and dependency (81). Although the association between criticism and insecure attachment makes theoretical sense in the context of attachment theory, the evidence collated here provides limited support, and the reported associations may have been contingent on the coding methods used rather than a robust effect observed across studies and measurement methods.

EOI was not associated with attachment categorisation or security in any of the three studies which reported on it (84–86). EOI remains a disputed sub-domain of EE as applied to families of children and young people; indeed, some research indicates that higher levels of EOI may be protective for young people (90). Nonetheless, no significant associations were reported in the included studies, and no convincing associations were established between other EE sub-domains and attachment either. Contrary to theoretical assumptions, the EE sub-domains of warmth and positive comments were not significantly associated with attachment (80,82,85). This perhaps indicates either that EE measurement methods do not capture the same warmth construct as other commonly used measurement methods in attachment research, or that other factors are more important than praise and warmth, such as maternal sensitivity (91–93).

Synthesising the results using developmental stage, the evidence also appeared mixed, though significant associations were more frequently reported with increasing age of young people in the sample. Both studies reporting significant associations between maternal EE and attachment disorganisation sampled mother-child dyads in which children were aged between 6 and 7 years on average, and both studies using adolescent samples reported significant associations between negative comments or criticism and attachment security. However, there was significant discrepancy between the adolescent studies, both in terms of how EE and attachment were measured and in terms of study population, with Scott et al. (2011) using observer-rated measures and a mixed sample recruited across health and community settings, and Nalbant et al. (2020) using self-report measures in a sample of adolescent girls diagnosed with AN. It may be that the contradictory findings in studies using infant and toddler samples provide evidence of the difficulties applying the EE

construct to families of very young children. However, it could also be the case that, if an association exists between EE and attachment, the effect becomes more pronounced as young people age and gain more exposure to toxic stress through insecure attachment relationships with caregivers and maladaptive communication patterns from those same caregivers. Nonetheless, from the body of research reviewed, it appears that no clear conclusions can be drawn about the nature or direction of such an association, nor even if such an association exists.

3.5.2 Limitations

The evidence reviewed has several limitations. It may be that traditional measures of EE do not adequately capture the family emotional environment as it is experienced by young people, something which may be overcome using self-report measures such as the LEE (14,94,95) as an adjunct to observer-rated measures. It is also possible that EE outcomes do not correspond to real-life parenting behaviour which is important in influencing the security of caregiver-child attachment. Robust evidence indicates that EE is associated with parental attributions, with caregivers who attribute higher levels of responsibility for and controllability of difficulties to their family member expressing higher levels of EE (96–98). What is less clear is whether EE and these attributions lead to more hostile, critical, or insensitive parenting practices, which then influence attachment security. A recent systematic review found significant associations between FMSS and observed parent-child interactions, perhaps demonstrating concordance between this measure and actual parenting behaviour (99). The question of how EE relates to parenting behaviours may be addressed by the broader review from which this study is drawn.

It may also be the case that the EE construct is poorly optimised for families of children and young people (15), though several adaptations and measures have been developed and validated specifically for this purpose (for instance, the Preschool Five Minute Speech Sample; PFMSS). Of the included studies, four used adapted coding systems to make the scoring procedures more appropriate for dyads including a young child. Davis (2014) used the PFMSS coding manual, Heckelman (1992) changed how EOI was scored to reflect appropriate levels of protectiveness and involvement in mother-infant dyads, Jacobsen et al. (2000) adjusted scoring in line with previous research with children and young people by collapsing borderline scores into the high category, and Scott et al. (2011) used a previous adjustment in which the frequency of positive and negative comments are scored (100). The variability in these adaptations again makes it difficult to compare results across studies and illustrates the need for more standardised procedures when using EE outcome measurement in families of children and young people.

A further limitation is that many of the included studies treated attachment insecurity as a homogenous variable when completing data analyses, either by using measures of attachment which result in continuous scores (e.g., the AQS), or by collapsing insecure attachment categories from the SSP or CAI (e.g., insecure-ambivalent, insecure-avoidant, disorganised) into one insecure group for the purpose of data analyses. This latter method could be considered particularly problematic both statistically and theoretically. It may be that observed significant effects would not have reached significance had the analyses been conducted using individual insecure attachment categorisations, meaning that this review has perhaps overstated the possible relationship between EE and attachment insecurity. Furthermore, attachment literature makes clear the distinctions between avoidant, ambivalent and disorganised

attachment styles in terms of relationship quality and proximity-seeking behaviours and strategies. To homogenise these in data analyses ignores these distinctions and may lead to overlooking a unique association between EE and a particular attachment style, though in some of the reviewed papers it appears that significant associations were only obtained when attachment groups were homogenised. Another significant variation between studies was that of sample population, with some studies recruiting exclusively from the community, some exclusively from clinical populations and some recruiting mixed samples for the purpose of comparison. However, the two studies which reported significant associations between attachment disorganisation and maternal EE (47, 79) drew their samples from clinical and community populations respectively, perhaps indicating that these effects are not limited to one setting. It is notable that eight of the nine studies took place in Western cultures, with mostly Caucasian participants. This may introduce an element of cultural or ethnicity bias to the results here presented, and reflects a broader trend in both the EE and attachment literature, though cross-cultural validation studies exist in both fields (101,102).

This review represents a methodologically rigorous, replicable approach to identifying and collating the existing literature on this topic. Search terms were developed to be inclusive and the wide search strategy reduced the likelihood of missing relevant papers. Furthermore, the second author completed data extraction and risk of bias assessments on a randomly selected sub-set of the included studies, and inter-rater reliability on the quality appraisal tool was good. Steps were taken to reduce the likelihood of publication bias through the inclusion of grey literature; indeed, four of the included studies were unpublished theses. However, the inclusion/exclusion criteria may still have introduced an element of publication bias as articles must have had a

full-text English translation available to have been included; it is therefore possible that potentially relevant papers in other languages were missed.

A further limitation of this review is its size. As only nine studies met inclusion criteria, the evidence base is limited, as are the conclusions that can be drawn from the studies presented. Furthermore, given that only one of the studies was longitudinal in design (47), and that study did not report on longitudinal associations between EE and attachment, conclusions about causality cannot be inferred from the body of evidence as it currently exists. It is well established that much early research into attachment focused on the infant-mother relationship, to the neglect of other potentially influential attachment relationships (34). The evidence amassed here demonstrates a similar issue; most samples consisted of mother-child dyads and there was a noticeable skew towards early life.

Overall, when accounting for the methodological issues in the evidence and the contradictory research findings presented, no clear direct associations have been established between parental EE and children's attachment, despite the apparent similarities between the two constructs. This may be due to the measurement issues outlined above; alternatively, it is possible that such associations do exist and are indirect. The reviewed literature indicates that both EE and attachment are influential factors in youth psychopathology, but other variables may also mediate or moderate these relationships, such as socio-economic deprivation (103) or parental psychopathology (104).

3.5.3 Implications for future research and clinical practice

This review has highlighted that considerable heterogeneity exists in EE measurement in families of young children, with limited use of standardised approaches. It would be advantageous if future research on this topic used comparable, standardised, and well-validated measures of EE which are developmentally appropriate for families of infants, children, and adolescents. Furthermore, ensuring that coders of observational measures of EE and attachment are blinded to the clinical or comparison group status (i.e., secure vs. insecure attachment, high vs. low EE) would reduce the likelihood of detection bias and prevent coding from being influenced by preconceptions about participant characteristics or group status, as might ensuring research teams are cross-cultural and ethnically diverse.

As noted above, most included studies were cross-sectional by design, and the one longitudinal study did not report longitudinal associations between EE and attachment. Future studies of longitudinal design exploring the associations between EE and attachment could provide a methodologically rigorous new approach to this area, allowing for an investigation of the stability of EE and attachment across time and determining whether persistent parental EE across childhood is associated with insecure attachment as theory may suggest.

Given that no convincing relationships between EE and attachment are reported, there are few clinical recommendations that can be made based on this review. Nonetheless, practitioners would benefit from bearing in mind both EE and attachment in their work with young people, given that both are reported to have significant associations with negative health outcomes in young people.

3.6 Summary

Both parental EE and attachment insecurity are associated with psychological disorder in children and adolescents. This systematic review aimed to explore the associations between parental EE and attachment in families of young people. A rigorous online search identified nine eligible studies. The results were mixed with no clear associations, save the potential connection between high maternal EE and attachment disorganisation. The evidence base as it stands suffers from methodological flaws making comparisons challenging to draw and effects hard to detect.

Ethical approval: For this kind of study, ethical approval is not required.

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4 Preface to empirical project

The following empirical project further explores the themes of expressed emotion (EE) and attachment in the context of caregiver-child dyads by investigating the associations between perceived EE, attachment security, reflective functioning, and self-harm in late adolescence using a quantitative design. This is a departure from the initially planned thesis project, which was significantly affected by the COVID-19 pandemic of 2020.

The initial project proposed to explore dyadic communication processes between adolescents and their caregivers when talking about self-harm. This was identified as a gap in knowledge, despite previous research indicating substantial discrepancy between common reactions from parents after a disclosure of their child's self-harm and adolescent self-reported preferred or hoped-for reactions. The original project proposed to answer the research question "How do adolescents and their caregivers talk about self-harm?" Grounded theory methodology was selected to qualitatively explore adolescent disclosures of self-harm in caregiver-adolescent dyads.

The original project received ethical approval from the South East Scotland Research Ethics Committee on March 6th, 2020. Shortly after this, a national lockdown was announced and an urgent halt to all ongoing research projects imposed, pending subsequent redesign or a change in lockdown restrictions. Given concerns about conducting the interviews digitally in terms of the difficulty of maintaining interview confidentiality while the dyads were living in the same household under lockdown conditions, the decision was taken to redesign the project to facilitate its completion during the ongoing uncertainty of the pandemic. The study presented below is the result of this redesign.

5 Empirical Study

Exploring the associations between expressed emotion, attachment, reflective functioning, and self-harm in late adolescence: a mediation analysis

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This chapter has been prepared in accordance with the author guidelines for the international peer-reviewed *Journal of Youth and Adolescence* (see Appendix D).

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5.1 Abstract

Adolescent self-harm is associated with negative health outcomes and increased suicide risk. Associations exist between self-harm and expressed emotion (EE), attachment insecurity and reflective functioning, but the relationships between these variables and how they affect self-harm are poorly understood. This study evaluates a theoretical model in which perceived caregiver EE exerts an indirect effect on adolescent self-harm through attachment insecurity and reflective functioning. 377 adolescents completed an online survey. Statistical analyses found significant associations between perceived EE and attachment insecurity, and reflective functioning and self-harm. Significant indirect effects of perceived EE on adolescent self-harm through attachment anxiety and reflective functioning were found, but only in relation to female caregivers. These findings encourage family-based approaches to preventing and treating adolescent self-harm.

Key words: adolescent, self-harm, mentalization, expressed emotion, attachment

5.2 Introduction

Adolescent self-harm is a major public health concern across the UK, with high levels of public interest and policy focus (HM Government, 2017; Scottish Government, 2011, 2018; Townsend, 2019). This is understandable, as research shows that self-harm is a strong predictor of repeat self-harm, suicide attempt and completed suicide, particularly when onset occurs earlier in life (Andover et al., 2012; O'Connor et al., 2018; Chan et al., 2016; Hawton et al., 2003). Self-harm is also associated with other negative outcomes, including increased all-cause mortality (Morgan et al., 2017), alcohol and substance use, non-violent and violent crime, and psychiatric hospitalisation (Ohlis et al., 2020), depression, anxiety, and low self-esteem (Hawton, 2002), and eating disorders (Koutek et al., 2016). Furthermore, self-harm, particularly repeat self-harm, is associated with hospital admission (Hawton et al., 2007) and greater costs within the healthcare system (Sinclair et al., 2011). Research indicates that the family environment is influential in the onset, maintenance, and prevention of self-harm in youth (Michelson & Bhugra, 2012). Better understanding of the development of adolescent self-harm in the family context is therefore warranted, to inform public health strategies and identify targets for clinical intervention.

The term self-harm refers to a variety of behaviours, and there is debate over how to best conceptualise self-injurious acts. A popular definition is non-suicidal self-injury (NSSI), defined as deliberate, direct destruction or alteration of bodily tissue which is socially unacceptable and without suicidal intention (Brown & Plener, 2017; Lloyd-Richardson et al., 2007). NSSI has received substantial research attention, with theorists arguing for its recognition as a distinct clinical disorder (Muehlenkamp & Ross, 2005), recognition which was granted with the publication of DSM-V criteria for NSSI disorder (American Psychiatric Association, 2013). However, the conceptualisation of NSSI as self-harm without suicidal intent has been criticised as a false distinction (Kapur et al., 2013), as research indicates suicidal intent is dimensional (Liu et al., 2015) and there are strong associations between NSSI and subsequent or co-occurring suicidal behaviour (Hawton et al., 2012), leading to the question of whether self-harm can truly be considered non-suicidal. Furthermore, some have expressed concern that diagnosis may stigmatise young people for a common adolescent behaviour which often ceases with age (De Leo, 2011; Moran et al., 2012). In this study, non-fatal self-harm is conceptualised using the inclusive definition of "self-poisoning or self-injury, irrespective of motivation or extent of suicide intent" (Teuton et al., 2014, p6).

Self-harm is common in adolescence and often reduces with increased age (Geulayov et al., 2016; Plener et al., 2015; Stallard et al., 2013), with some studies reporting an increasing prevalence in adolescence in recent years (Griffin et al., 2018; McManus & Gunnell, 2020; Morthorst et al., 2016; Tørmoen et al., 2020), possibly due in part to contextual sociocultural factors, such as increasing media digitalisation and changes to social interaction in young people. Average onset is thought to be between 12 to 14 years (Cipriano et al., 2017), with a higher incidence reported in females than in males (Klonsky & Muehlenkamp, 2007; O'Connor et al., 2018), though Klonsky et al. (2014) suggest that rates of self-harm across genders may be similar but methods differ, with females more likely to cut and males more likely to burn or hit. A recent large-scale study in England provided further evidence that females self-harm more frequently than males, with results indicating that 19.7% of females aged 16 to 24 reported at least one incident of lifetime self-harm, as opposed to 7.9% of same-age males (McManus et al., 2019); however, women who disclosed self-harm were twice as likely to disclose having had medical or psychological service contact, perhaps indicating men who self-harm are less likely to report it or seek help. Though prevalence estimates vary, large-scale studies of adolescents report prevalence rates of 13.8 to 16% for at least one lifetime incident of self-harm (O'Connor et al., 2009, 2018).

5.2.1 Self-harm and the family environment

Given self-harm's association with adolescent distress, negative health outcomes and mortality, a substantial body of research exists examining potential risk factors for its development. It is likely that adolescent self-harm results from the interplay of multiple biopsychosocial risk factors (Cipriano et al., 2017; Fox et al., 2015), and one repeated finding is that there is a connection between young people's familial relational experiences and environment, and self-harm (Fortune et al., 2016). Parental divorce or death, witnessing inter-parent physical or psychological abuse, and experiencing parental maltreatment are all associated with increased risk of adolescent self-harm (Martin et al., 2016), as are emotional neglect and abuse from parents (Sim et al., 2009). Furthermore, the way in which parents communicate with their adolescent children, or how those communications are perceived by adolescents, is also relevant. Victor et al. (2019) found that in a longitudinal study with a large urban sample of adolescent girls, harsh punishment was found to increase the likelihood of self-harm, whereas positive parenting behaviours (e.g., providing verbal praise and hugs) reduced it over time. Adrian et al. (2018) reported that adolescents whose parents were rated as high in invalidating responses, and who match or escalate conflict, were also more likely to self-harm than adolescents whose parents provided validating responses.

Another construct with potential relevance for the family environment and adolescent self-harm is expressed emotion (EE), a measurement of family emotional climate first developed for researching family processes associated with recovery and relapse in schizophrenia (Brown et al., 1972). Historically, EE has been measured using the Camberwell Family Interview (CFI; Vaughn & Leff, 1976) and the Five Minute Speech Sample (FMSS; Magana Amato et al., 1986), in which close family members speak about a relative with a mental disorder. Their responses are recorded and subsequently coded by trained observers for communication patterns indicative of high levels of EE, usually criticism, hostility, emotional over-involvement (EOI), warmth, and positive comments (Brown, 1985; Hooley & Parker, 2006). From these codes, observers determine whether a family exhibits high, low, or borderline EE, as well as describing something of the family member's attitude towards their relative (e.g., very critical, emotionally over-involved, etc). High levels of parental EE, in particular high levels of criticism, are associated with higher rates of relapse and poorer treatment response in

individuals diagnosed with schizophrenia, psychosis, and at-risk mental state (Alvarez-Jimenez et al., 2012, Izon et al., 2018, Wearden et al., 2000).

The EE construct has also received increasing research interest in other populations. Peris & Miklowitz (2015) conducted a narrative review of papers exploring the associations between parental EE and youth psychopathology, reporting that high levels of parental EE predict the clinical course of and treatment response for paediatric bipolar, depressive, and anxiety disorders. Parental EE, particularly criticism and hostility, is also associated with greater externalising behaviour in children with autism spectrum disorder (Bader & Barry, 2014), and with reduced likelihood of symptom remission for young people with attention deficit hyperactivity disorder (Musser et al., 2016). A systematic review by Duclos et al. (2012) also indicates that parental EE appears to have predictive value for outcome and compliance with treatment in patients diagnosed with eating disorders. However, as Duclos et al. (2012) and Peris & Miklowitz (2015) note, there are some conceptual issues with applying the EE construct to adolescent populations. There is great variability across studies in rates of families categorised as high EE, therefore it is difficult to know whether EE represents normative family relational patterns when dealing with mental disorder in children, or whether it represents a specific maladaptive relational pattern which contributes to the development and maintenance of disorder. Furthermore, EE measurement methodologies were developed in the context of adult mental health, and it is challenging to know how best to adapt these measures for younger populations. For instance, some studies indicate that EOI may be appropriate, or even protective, for younger children who are more reliant on their caregivers and require a higher level of support and parental involvement than adolescents or adults who are developmentally more autonomous (Han & Shaffer, 2014; Psychogiou et al., 2007). Finally, there is significant disparity in EE measurement across studies, with different methods having mixed levels of concordance with each other. Some measures rely on coding of family members' verbal responses, whereas other measures, such as the Perceived Criticism measure (PCM; Hooley & Teasdale, 1989) and the Level of Expressed Emotion scale (LEE; Cole & Kazarian, 1988), rely on self-report from the individual and family members, capturing perceived EE rather than observer-rated EE, which makes comparisons across studies challenging (Hooley & Parker, 2006).

Despite the above considerations, emerging evidence indicates a connection between parental EE and self-harm behaviour in youth and adolescence (Michelson & Bhugra, 2012). Allison et al. (1995) found

associations between suicidality and a proximal measure of EE in a sample of 307 Australian high-school students using the Influential Relationships Questionnaire (Kazarian & Baker, 1987). Perceived parental criticism and overprotection were associated with self-harm and overall suicidality, with perceived parental EE and adolescent hopelessness making significant unique contributions to suicidality, though it is important to note this study did not control for adolescent mental health status. Wedig & Nock (2007) found that high overall EE and EE-criticism in parents' FMSS was significantly positively associated with self-injurious thoughts and behaviours, including NSSI and suicidal ideation, plans, and attempts in a sample of 36 adolescents recruited from community and outpatient mental health services. This association was at least partially independent of adolescent psychological disorder.

In a sample of 67 participants, Santos et al. (2009) found that young people hospitalised for parasuicidal behaviour were significantly more likely to have family members rated as high EE than controls, and there was a positive association between high EE and repeat parasuicidal behaviour at the nine-month follow up. It should be noted, however, that adolescents in the parasuicidal group also scored higher for depressive symptomatology, which also correlated positively with EE ratings. Hack & Martin (2018) explored the associations between NSSI and perceived EE (pEE) using the Family Emotional Involvement and Criticism Scale (FEICS; Shields et al., 1994) in a cross-sectional study of 264 Australian first year psychology students. They reported that those who disclosed self-injury reported significantly higher EE in their families than those with no NSSI history, and that those currently engaging in NSSI reported higher family EE than those who reported historic but not current NSSI. In a sample of 204 primary school children, James & Gibb (2019) found that girls aged 7 to 11 years whose mothers were rated as high in FMSS EE-criticism were significantly more likely to have a lifetime history of NSSI; however, this effect was not significant for boys.

Taken together, evidence indicates there are associations between EE and self-harm in adolescence and young adulthood; moreover, significant effects have been reported across studies which used observer-rated and self-reported, or "perceived", EE measurement methods, and across studies which controlled for adolescent mental health status. Several theoretical approaches could contribute to understanding the apparent association between EE and adolescent self-harm. In their review of EE and youth psychopathology, Peris & Miklowitz (2015) discuss how toxic family stress may provide a

framework for this connection, stating that EE could be both a parental response to chronic toxic stress in the family environment as a result of socioeconomic deprivation, abuse, or psychopathology, and a source of toxic stress itself for young people. Self-harm is theorised to be an experientially-avoidant coping strategy used by adolescents to regulate emotions (Brereton & McGlinchey, 2020; Guerreiro et al., 2013); it makes theoretical sense that young people in aversive family environments would be more at risk of developing self-harm as a coping mechanism.

Another potentially relevant theoretical approach is the Four Functions Model (FFM) of NSSI (Bentley et al., 2014; Nock, 2009, 2010), which posits that self-harm serves both positive and negative intra-personal (or automatic) and interpersonal (or social) functions, increasing desired cognitive or affective states (e.g., a sense of coping) and decreasing negative ones (e.g., distraction from low mood or aversive cognitions) while at the same time increasing desired social experiences (e.g., the provision of care) and decreasing aversive social experiences (e.g., the absence of care). In the context of high parental EE, the FFM might suggest that young people use self-harm as a coping mechanism to regulate their emotions while signalling to caregivers a need for support. This may feed into a negative recursive cycle, however, as attributional models of EE suggest that caregivers who are rated as high in EE attribute higher levels of personal control and responsibility to their relative's unwanted behaviour (Barrowclough & Hooley, 2003), which may serve to perpetuate a negative family emotional climate, increasing criticism on the part of the caregiver and reinforcing self-harm in the adolescent as an intra- and inter-personal coping response.

5.2.2 Other factors associated with adolescent self-harm

EE and adolescent self-harm appear to be linked, but as already highlighted, there are many factors associated with adolescent self-harm which may also play a role (Fliege et al., 2009; Gratz, 2003). Two factors which may be linked with both EE and self-harm according to the FFM theory are attachment security and reflective functioning (RF).

Attachment refers to an enduring emotional or psychological bond that exists between two individuals (Bowlby, 1969). Attachments develop in the context of the caregiver-child relationship, and are typically characterised as secure or insecure (Ainsworth et al., 2015; Ainsworth & Bell, 1970), with insecure attachments varying in levels of anxiety (characterised by difficulty soothing distress and worries that

caregivers will not be available when needed) or avoidance (characterised by self-reliance and maintaining distance from a rejecting or unreliable caregiver). This has relevance for adolescent self-harm, because according to attachment theory, the attachment relationship is central to the development of emotion regulation and coping skills, with securely attached individuals more likely to engage in adaptive affect regulation strategies, such as cognitive or behavioural strategies, or seeking social support, whereas individuals with anxious or avoidant attachments (or higher attachment insecurity) are more likely to use maladaptive coping, such as self-harm, substance use, and social isolation (Kimball & Diddams, 2007).

Many studies have indicated that attachment insecurity is associated with increased lifetime prevalence and repetition of self-harm (Falgares et al., 2017; Gratz et al., 2002; Molaie et al., 2019; Rogier et al., 2017; Victor et al., 2019), with some studies indicating that it is attachment anxiety specifically that is associated with the onset and frequency of self-harm in adolescents (Tatnell et al., 2014), college students (Kharsati & Bhola, 2016), and adult inpatients (Gormley & Mcniel, 2010), whereas attachment avoidance predicted self-harm in a population of individuals diagnosed with borderline personality disorder (BPD; Critchfield et al., 2008). It also remains unclear whether specific attachment relationships (e.g., maternal/paternal attachment) are more influential in this association. As noted by Marquardt & Suljevic (2016), attachment research has typically focused on mother-child attachment, despite research indicating that fathers have a unique role to play in child psychosocial development. The evidence that does exist is contradictory, with some research indicating that father-child attachment is more influential in the development of self-harm (Hallab & Covic, 2010), other studies reporting that mother-child attachment is more influential (Glazebrook et al., 2015), and some finding that both are involved but the effects are mediated differentially for mothers and fathers (Tao et al., 2020).

Given that insecure attachment relationships form in the context of the caregiver-child interactions and EE is a measurement of hostile, critical, and emotionally over-involved parental attitudes, it seems theoretically plausible that a young person's pEE from their caregiver and the level of attachment security they feel towards that caregiver are linked. Indeed, a small number of studies have reported tentative associations between parental EE classification and sub-domains (both perceived and observed) and attachment insecurity and disorganisation in children and adolescents (Gravener et al., 2012; Green et al., 2007; Jacobsen et al., 2000; Nalbant et al., 2020; Scott et al., 2011), as well as

associations between parental EE and adolescent self-harm (Allison et al., 1995; James & Gibb, 2019; Santos et al., 2009; Shields et al., 1994; Wedig & Nock, 2007). It may also be the case that perceived EE measures can provide information about an individual's internal working model of their caregiver (Bretherton & Munholland, 2008), or the mental representation that the individual has of their specific attachment experiences.

It seems likely, then, that EE, attachment insecurity and self-harm are linked. Another construct with potential influence over these connections is that of mentalization, or RF. RF refers to the capacity to understand behaviour in oneself and others as motivated by inner states and experiences, such as thoughts and feelings (Fonagy et al., 1998). Like attachment security, RF is thought to develop in the context of infants' early social experiences with primary caregivers and is involved in the development of emotional regulation, self-concept, and understanding intentions in the self and others (Fonagy et al., 2004). Similar to attachment security (Verhage et al., 2016), RF appears to be generationally transmitted. Recent research indicates that parents' RF levels are significantly positively correlated with RF in their children (Ensink et al., 2015, 2016). This transmission appears stable into later life, as associations have been reported in studies using parent-child dyads from infancy to adolescence (Benbassat & Priel, 2012; Rosso et al., 2015). High parental RF is associated with caregiving quality and child attachment security, and children of parents with low RF are more likely to display emotion dysregulation, externalising behaviour, anxiety, attachment insecurity, and lower RF levels themselves (for a narrative review, see Camoirano, 2017). Furthermore, Bizzi et al. (2019) reported that attachment insecurity was associated with reduced RF in a clinical sample of children with somatic and behavioural disorders. These findings have relevance for children's mental health throughout life, as both attachment security and RF are implicated in the ability to self-regulate affect and develop social relationships, with lower levels of both reported to be linked with the development of psychopathology (Katznelson, 2014; Mikulincer & Shaver, 2012). RF is often found to be low in clinical populations of individuals with various psychopathologies, particularly in individuals diagnosed with BPD (see Katznelson, 2014), for which self-harm is a core diagnostic criterion (American Psychiatric Association, 2013).

Considering the rising prevalence and related outcomes of self-harm in adolescence, a fuller understanding of the aetiology of self-harm is necessary to develop timely and effective preventative

public health strategies and to identify targets for clinical interventions. As outlined above, associations have been reported between adolescent self-harm and EE (Allison et al., 1995; James & Gibb, 2019; Santos et al., 2009; Shields et al., 1994; Wedig & Nock, 2007), attachment insecurity (Glazebrook et al., 2015; Kharsati & Bhola, 2016; Rogier et al., 2017, 2017; Tatnell et al., 2014), and RF (Badoud et al., 2015; Bo & Kongerslev, 2017; Rossouw & Fonagy, 2012). There also appear to be relationships between attachment security and RF (Camoirano, 2017; Katznelson, 2014) and EE and attachment security and disorganisation (Green et al., 2007; Jacobsen et al., 2000; Scott et al., 2011). To our knowledge, only one other study has explored the associations between EE, attachment, and mentalization. In a sample of carers of people with long-term mental health difficulties, Cherry et al. (2018) found that the criticism/hostility EE sub-domain was significantly predicted by the carer's attachment avoidance, and their ability to deal with others' emotions (a facet of mentalization as conceptualised in the emotional intelligence construct); however, this study was completed with an adult population and relied on self-report from the carers only. Taken together, the evidence indicates that EE increases the risk of adolescent self-harm, but further research is required to understand the mechanisms through which this effect occurs. Research indicates both attachment insecurity and RF are related to self-harm in adolescence; what is not well understood is how these variables might relate to each other, nor how they each exert an effect over self-harm in adolescence.

5.3 Hypotheses

This study tested a theoretical model of self-harm, in which higher levels of adolescent pEE are hypothesised to result in higher levels of attachment insecurity. In turn, attachment insecurity reduces the adolescent's RF capacity, which leads to self-harm as an emotion regulation strategy and communication strategy to caregivers to which the adolescent is insecurely attached (see Figure 1). In this model, it is hypothesised that pEE, attachment insecurity and RF will each exert a direct influence on adolescent self-harm, as has been reported in previous literature. It is further hypothesised that there will be indirect mediating effects of pEE on self-harm through attachment insecurity and RF. As it is unclear from the extant literature whether maternal or paternal attachment insecurity is more influential in the development of self-harm, this study will examine the influence of caregiver gender on the proposed model. Furthermore, as the literature reported contradictory findings as to whether attachment anxiety or attachment avoidance is most associated with self-harm, these will

be analysed separately within the model to determine whether the effect is carried through either or both. Given the well-established links between self-harm and mental health difficulties, adolescent depression and anxiety will be controlled for as covariates, as will age, given the reported decrease in prevalence of self-harm with increased age. Whether or not adolescents are still living with their caregivers will also be controlled for as a covariate, to determine whether these effects persist after adolescents leave the family home. Whether or not caregivers are identified as biological parents will also be controlled for as covariates, to determine whether the hypothesised effects are non-specific to biological parent-child dyads.

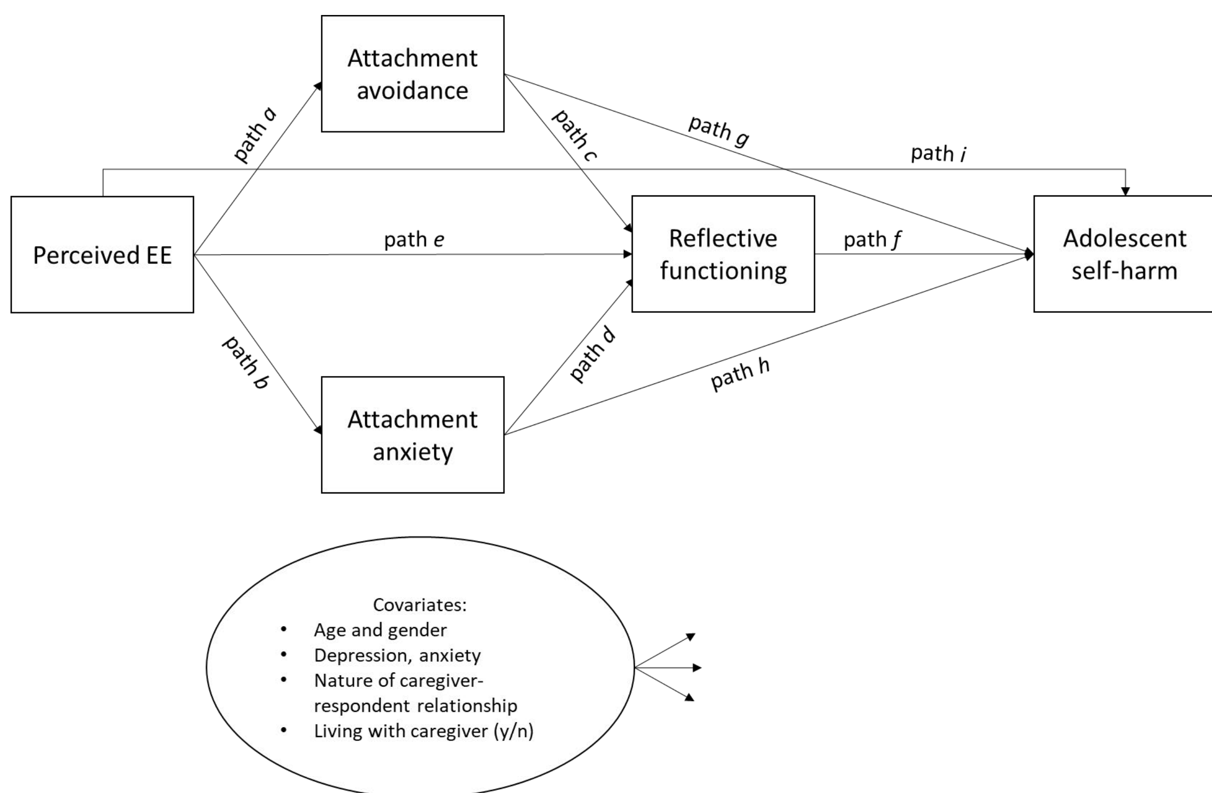

Figure 1. Diagrammatic representation of theoretical model of self-harm.

This study aims to answer the following primary research questions:

1. What are the relationships between pEE, attachment insecurity, RF, and self-harm in the general late adolescent population?
2. Are these hypothesised relationships influenced by caregiver gender?
3. Does attachment anxiety or attachment avoidance predict self-harm in late adolescence?

After consideration of the evidence reviewed above, the following primary hypotheses will be tested:

1. pEE, attachment insecurity, and RF will each have direct effects on self-harm in late adolescence.
2. The effect of pEE on self-harm will be mediated by attachment insecurity (either attachment anxiety, avoidance, or both), and RF.
3. The hypothesised direct and indirect effects will be moderated by adolescent depression and anxiety, age, gender, caregiver gender, whether the caregiver is the adolescent's biological parent, and whether the adolescent resides with the caregiver.

5.4 Methods

5.4.1 Study design

This study used a single-stage population-based cross-sectional survey design. Internet mediated research (IMR) was selected as a fast, inexpensive method of quantitatively exploring the relationships between the variables of interest, in the hope that the results could form the basis of future cohort or longitudinal projects (Setia, 2016). The survey was designed with consideration of the British Psychological Study Ethical Guidelines (British Psychological Society, 2017) and broader literature on IMR in mental health practice (Bartell & Spyridakis, 2012; Hoerger, 2010; Kraut et al., 2004; Pitman et al., 2015), and included a withdrawal button, details of support services and websites to help manage participant distress, and brief versions of measures to reduce participant burden. The web-based survey software Qualtrics XM (Provo, UT, https://www.qualtrics.com) was used to create, publish, and distribute the survey, and collate responses. This tool was selected as the preferred survey tool of the College of Arts, Health and Social Sciences at the University of Edinburgh, with robust and fully compliant data and use agreements to protect researchers, respondents, and their data. A final favourable ethical opinion was obtained from the University of Edinburgh School of Health in Social Science Ethics Committee on October 16th, 2020 (see Appendices E and F).

5.4.2 Participants

People aged 16 to 24 years were eligible to participate. This age range was selected in keeping with modern conceptualisations of the late adolescent developmental period (Sawyer et al., 2018) and with legal guidelines on capacity to provide fully informed consent for research participation, which is

assumed in Scotland from 16 years onwards. As this study aimed to investigate adolescent self-harm in a community sample, no other inclusion or exclusion criteria were stipulated beside age and consent.

Consideration was given to the challenges of conducting IMR using open survey links in terms of validating participant characteristics and eligibility. To try to ensure only the target population was recruited, the participant information sheet clearly stated that only 16- to 24-year-olds should take part (see Appendix G), and the survey itself contained a required item asking individuals to confirm that their current age was between 16 to 24 years. Any respondents indicating they were outside this age range were redirected to the survey debrief page without viewing survey content (see Appendix J). Furthermore, in the demographics questionnaire (see Appendix I), participants were asked to reconfirm their age and any participants selecting "Younger than 16" or "Older than 24" were redirected in the same way. While limited, this approach identified four respondents who were excluded by age, indicating that some level of screening was effective.

A total of 752 respondents clicked the survey link. Of these, 377 were retained for initial analyses. Participants were excluded if they declined consent, were ineligible to participate due to age, or were missing a high level of data in their responses (recorded on Qualtrics as 71% survey completion as this indicated respondents had not completed any caregiver-focused questionnaires). Analyses were planned to take place using the respondents' self-reported data and the data they provided about their first identified caregiver, however, descriptive statistics revealed that most participants gave data for two caregivers (n=274, 72.68%), with most firstly identified caregivers being female (n=348, 92.71%), and most secondly identified being male (n=211, 77.01%). For this reason, the decision was taken to split the dataset into two subsets of 356 and 208 participants, with one dataset collating all responses concerning female caregivers and the other collating all responses concerning male caregivers (see Figure 2). This meant participants who provided data on two caregivers potentially contributed to both female and male caregiver datasets. These two datasets were used in the subsequent path analyses to test the serial mediation models for female and male caregivers separately.

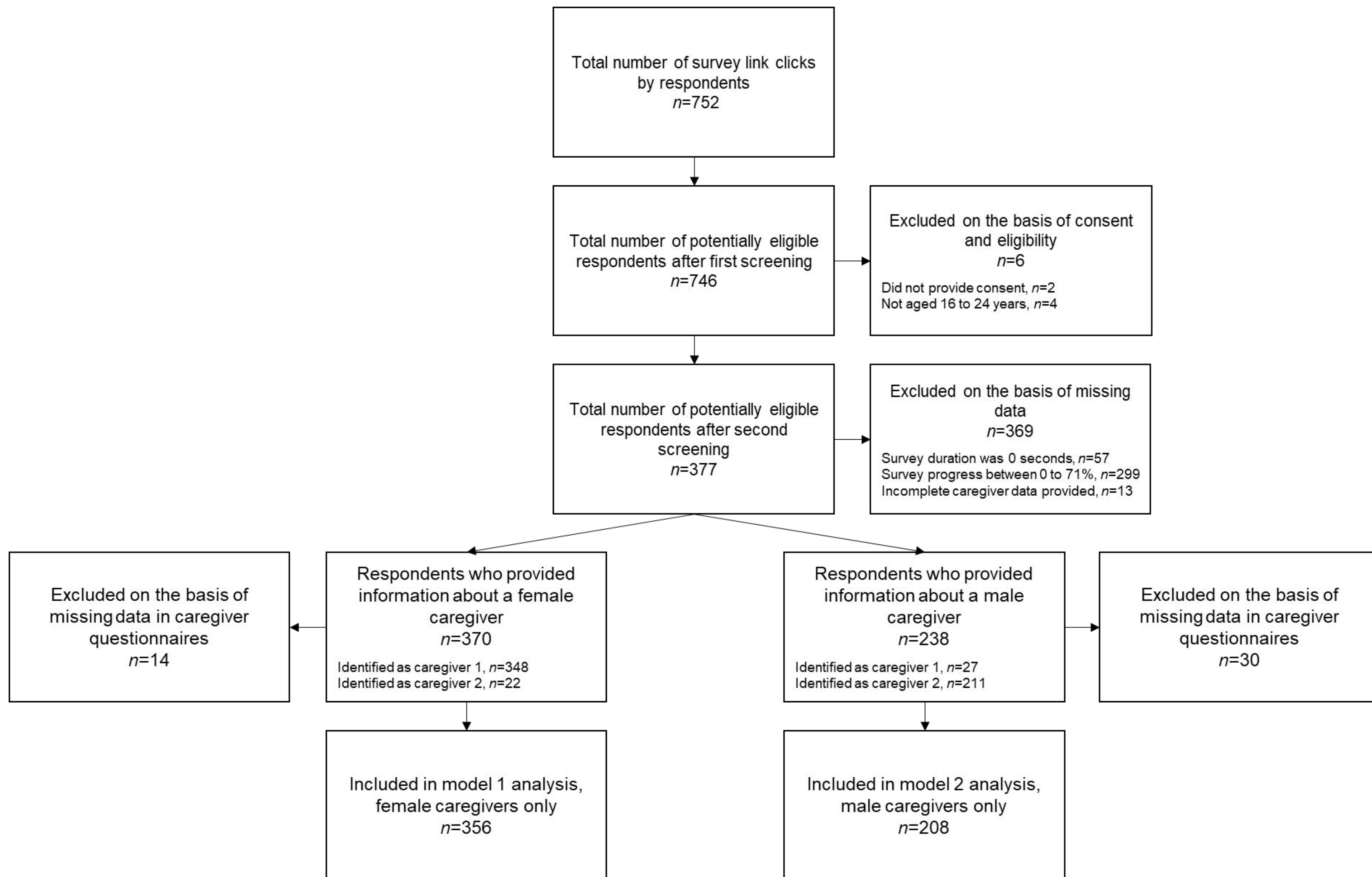

Figure 2. Flow chart illustrating participant flow through the data analysis process.

5.4.3 Procedure

After obtaining ethical approval, the survey link was published on October 19th, 2020 and distributed using a variety of means to maximise the likelihood of engagement with a representative sample of the target population. Two targeted Facebook advertisements were used, targeting young people aged 16 to 24 years living in the UK and Ireland (see Appendix K). The researcher also shared and promoted the survey link and associated social media pages within their own social circles. Several charities and organisations were approached and assisted by posting the link on relevant social media pages, websites, and forums (e.g., Penumbra, 6VT Youth Café, National Self-Harm Network Forum). Snowball sampling was also made possible on the debrief page, whereby respondents could copy the survey link to share with other potential participants via social media should they wish.

The survey contained a participant information sheet which clearly outlined the study rationale, as well as the data protection procedures used. Participants were advised of their right to withdraw at any time during the survey by pressing the withdrawal button. Participants were also made aware that any partially completed responses which were not withdrawn would be recorded after a week of inactivity and retained for data analysis if there was sufficient data provided, and that once the survey had been submitted, it would be fully anonymous and therefore unable to be withdrawn. Participants were asked to provide consent for these procedures prior to participation. Participants completed a digital consent form before viewing survey content. Participants then completed the demographics questionnaire and chose whether they wished to provide data regarding one or two of their childhood primary caregivers, described by the survey as the person or people whom they felt were their most important caregiving figure(s), or the adult person or people with whom they spent the most time. Participants were asked to give a nickname(s) for their caregiver(s), which was used to personalise subsequent questionnaires to the individual caregiver being reported on, making it clear to participants for which caregiver they were providing answers. Participants then proceeded to answer the self-report questionnaires.

5.4.4 Power calculation

The intended method of statistical analyses was path analysis of a serial mediation model; as such, an *a priori* power calculation was computed to determine an appropriate sample size for which to aim. Current best practice recommendations for estimating sample size and power for mediation analyses

suggest using Monte Carlo power analysis (Muthén & Muthén, 2002; Thoemmes et al., 2010) and to test indirect effects using bootstrapped confidence intervals (Zhang, 2014). Performing Monte Carlo power analyses can be difficult, however, as it requires all population parameters to be specified for the model of interest, and the parameters may not be known (Schoemann et al., 2017). It is also computationally intensive and specific software skills are required (e.g., R, Mplus). The free web-based application developed by Schoemann et al. (2017) was therefore used to expedite this process.

The web application was set up to estimate the sample size required for a mediation model with two serial mediators, with a conventional target power level of 0.8 and confidence intervals set at 95%, corresponding to α=.05. The range of possible sample sizes was set between 50 and 800. In line with recommendations by Mundform et al. (2011), the number of replications for the Monte Carlo power analysis was set to 5000, with 20,000 draws per replication (Schoemann et al., 2017). To generate data for the model in the web application, users must enter values that allow the application to compute a covariance matrix for all variables in the model. For the purposes of sample size calculation, correlation effect sizes of 0.3, considered medium by convention (Cohen, 1969), were assumed between all variables. Using the above assumptions, a minimum sample of n=276 was recommended to achieve sufficient power to identify significant direct and indirect effects.

5.4.5 Measures

The descriptive statistics and internal consistencies of self-report measures are presented in Table 3.

5.4.5.1 Demographics questionnaire

A customised demographics questionnaire was designed by the researcher and approved by the University of Edinburgh School of Health in Social Science Research Ethics Committee. Participants were asked for their age, gender identity, the number of caregivers for which they wished to provide questionnaires, and nicknames for these caregivers to customise the survey (e.g., “mum”, “dad”, etc) to avoid confusion over which caregiver the respondents were being asked to provide answers and make the survey as easy to respond to as possible. Participants also answered multiple-choice questions about the gender identity of their caregiver(s) and relationship(s) to the participant (e.g., biological parent, adoptive/foster parent, or guardian, etc.), as well as whether they still lived with their identified caregiver(s), and the relationship status of their caregiver(s).

5.4.5.2 *Reflective functioning*

RF was assessed using the Reflective Functioning Questionnaire for Youth, Short Version (RFQY-6; Fonagy et al., 2016; Ha et al., 2013; Sharp et al., 2009). RFQY is a 46-item self-report questionnaire which has demonstrated adequate internal consistency and reliability, and convergent validity in adolescent samples (Badoud et al., 2015; Ha et al., 2013). To reduce participant burden, the abbreviated 8-item version was used in the survey, using adapted wording to make items more accessible to adolescents (Sharp et al., 2009). RFQ-8 is usually scored on two sub-scales, which are computed using two unique and four shared items across the 8-item measure, which are reverse-scored as necessary to compute each subscale. These two subscales are *hypomentalizing*, or uncertainty about mental states (RFQu), and *hypermentalizing*, or certainty about mental states (RFQc) (Fonagy et al., 2016). However, recent confirmatory factor analyses (CFA) by Müller et al. (2020) and Spitzer et al. (2020) using the German language version of RFQ-8 in large community and clinical samples reported that the measure appears to capture a unidimensional construct, specifically, uncertainty about mental states or hypomentalizing, rather than identifying both RFQu and RFQc constructs. Müller et al. (2020) and Spitzer et al. (2020) recommend a reduced 6-item version of the RFQ-8, due to low factor loading for item 7, and high inter-item correlation for items 3 and 4. Furthermore, Müller et al. (2020) reported that the use of either the 6- or 8-item version resulted in similar outcomes in the CFA and found significant correlations between RFQ-6 and RFQ-8 scores in both their samples (r=.98 and r=.99), a finding which was replicated in this study (r=.97). Given these considerations, statistical analyses were completed in this study using the scoring procedures for the 6-item version detailed by Müller et al. (2020) and Spitzer et al. (2020). The usual transformation of scores was not computed and a mean score was derived for all items except 4 and 7, ranging from 1 to 7, with higher scores indicating higher levels of uncertainty about mental states.

5.4.5.3 *Adolescent mental health*

Adolescent depression was assessed using the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). PHQ-9 is a 9-item self-report measure developed as a screening tool for depressive symptoms in the general population. PHQ-9 has demonstrated adequate reliability, convergent/discriminant validity, robustness of factor structure and responsiveness to change in a Scottish primary care sample (Cameron et al., 2008) and a sample of patients receiving e-CBT for depression (Titov et al., 2011).

PHQ-9 has been validated for use with adults and adolescents as young as 13 years (Richardson et al., 2010). It is also quick to complete and free to use. Respondents rate how frequently they have experienced a range of depressive symptoms over the past two weeks, scoring on a scale of 0 to 3, resulting in a range of possible scores from 0 to 27. Higher scores indicate a greater frequency and severity of depressive symptomatology.

Adolescent anxiety was assessed using the Generalised Anxiety Disorder questionnaire (GAD-7; Spitzer et al., 2006). The GAD-7 is a 7-item self-report measure developed as a screening tool for generalised anxiety disorder symptoms which has been validated for use with adolescents as young as 12 years (Mossman et al., 2017). The GAD-7 reported good reliability, as well as criterion, construct, factorial and procedural validity (Spitzer et al., 2006), with cross-cultural validation of its reliability and validity for use with adolescents (Adjorlolo, 2019; Tiirikainen et al., 2019). Respondents rate how often they have experienced a range of anxious symptoms over the past two weeks, scoring on a scale of 0 to 3, resulting in a range of possible scores from 0 to 21. Higher scores indicate a greater frequency and severity of generalised anxiety disorder symptomatology.

5.4.5.4 Adolescent self-harm

Adolescent self-harm was assessed using the self-harm subscale of the Risk-Taking and Self-Harm Inventory for Adolescents (RTSHIA-SH; Vrouva et al., 2010). RTSHIA is a self-report measure with two subscales assessing an individual's risk-taking (9 items) and self-harm behaviour (18 items). The self-harm and risk-taking subscales evidenced high internal consistency, test-retest reliability and sufficient validity in samples of adolescent participants (Vrouva et al., 2010; Xavier et al., 2019). In this study, only the self-harm subscale was used. Respondents were asked to rate how often they have engaged in different self-harm behaviours, scoring on a scale of 0 to 3, resulting in a range of possible scores from 0 to 54. Higher scores indicate a greater lifetime frequency of self-harm behaviours.

5.4.5.5 Attachment insecurity

Attachment anxiety and avoidance were assessed using the Experiences and Close Relationships – Relationship Structures questionnaire (ECR-RS; Fraley et al., 2011). ECR-RS is a 9-item self-report measure designed to assess individuals' attachment security on two dimensions, attachment anxiety and attachment avoidance, with higher scores on each dimension indicating a greater levels of

attachment insecurity. It is usually administered four times for attachment to mother, father, romantic partner and friend, though recently Fraley and colleagues have introduced a "global" assessment about individuals' feelings about their close relationships with others in general. ECR-RS has been validated for use with adolescents as young as 15 years (Donbaek & Elklit, 2014) and reports good reliability and factor structure (Fraley et al., 2011). In the present study, participants were presented with personalised ECR-RS questionnaires for each identified caregiver, as well as being asked to answer the global version of the ECR-RS, providing up to a total of three subscales of attachment anxiety and avoidance for participants who answered the ECR-RS global version and an ECR-RS for two caregivers. Respondents rate how strongly they agree with the nine items on a scale of 1 to 7. The attachment avoidance subscale is computed by reverse scoring items 1 to 4, then taking the mean score of items 1 to 6, resulting in a possible range of scores from 1 to 7. The attachment anxiety subscale is computed by taking the mean score of items 7 to 9, resulting in a possible range of scores from 1 to 7. Higher scores indicate higher levels of attachment anxiety or avoidance.

5.4.5.6 Perceived expressed emotion

pEE was assessed using the LEE (Cole & Kazarian, 1988; Hale et al., 2007). The LEE is a self-report measure designed to assess pEE in the family from the respondent's perspective. It has undergone substantial revision over the years, from the original 60-item measure (Cole & Kazarian, 1988) to a 33- or 38-item measure depending on whether an additional measure of perceived criticism is included (Gerlsma & Hale,1997). Hale et al. (2007) investigated the factor structure of the 38-item LEE with an adolescent sample, finding that the LEE's original four-factor structure applied to adolescents as it does to adults. These four subscales are perceived lack of emotional support (pLES), perceived intrusiveness (pIN), perceived irritability (pIR) and perceived criticism (pC), as well as providing a total score for pEE. Hale et al. (2007) reported good internal consistency and significant inter-correlations between the subscales, concluding that the LEE may be a useful tool for measuring adolescent pEE. Similar results were obtained for the shortened 33-item scale by Nelis et al. (2011), which omits the pC subscale. The current study used the 38-item version of the LEE described by Hale et al. (2007). Respondents were rate how strongly they agree with 38 statements about their specified caregiver(s) on a scale of 1 to 4, with several items being reverse scored, resulting in a possible range of scores from 38 to 152. Higher scores indicate higher levels of pEE. Participants completed the LEE for each caregiver they identified

at the start of the survey. For the purposes of this study, only the total pEE score was used in statistical analyses.

The Perceived Criticism Measure (PCM; Hooley & Miklowitz, 2017; Hooley & Teasdale, 1989) was also completed by participants for each caregiver they identified. The PCM was selected as an additional simple measure of pC, consisting of four Likert scales from 1 to 10 asking individuals to rate how critical they perceive the family member to be, how critical they perceive themselves to be of their family member, and how upset they and their family member get when the other criticises them, with higher scores indicating higher levels of pC and distress. It is recommended that the four items are treated separately, and a total score not be computed (J. Hooley, personal communication, July 30th, 2021). The PCM was included due to its simplicity and ease of completion, coupled with reported correlations with the CFI (Hooley & Parker, 2006).

5.4.6 Data analysis plan

Statistical analyses were conducted using IBM SPSS Statistics for Windows (Version 25), with serial mediation analyses conducted using path analysis in IBM SPSS Amos (Version 25) (Arbuckle, 2017), with full information maximum likelihood (FIML) estimation. Preliminary analyses were performed using descriptive statistics and correlational analyses in SPSS. A hierarchical model was constructed in which each variable was regressed on the variable preceding it (see Figure 1). In this model, pEE as measured using the total LEE score was the exogenous variable, and adolescent self-harm as measured using the total RTSHIA-SH score was the endogenous variable. Attachment anxiety and attachment avoidance as measured using the caregiver-specific ECR-RS subscales were entered as the first mediator, and RF as measured by the RFQY-6 total score was entered as the second mediator. Significance testing occurred at the α=.05 level. Bootstrapping with bias corrected confidence intervals was used to test the direct and indirect effects for significance, with 10,000 resamples used (Puth et al., 2015).

As described in Section 5.4.2, the decision was taken to divide the original dataset into two caregiver gender-specific datasets so that separate path analyses could be completed for female and male caregivers. The hierarchical serial mediation model was tested against these two datasets. To ensure that direct and indirect effects were not under- or over-estimated, all covariates were regressed onto all

variables to control for their effects within the model and were all correlated with each other. Covariates included the age and gender identity of the participant, whether the caregiver was the participant's biological parent and whether the participant was living with the caregiver for most of an average week (i.e., four or more days) at the time of survey completion. Categorical covariates were dichotomised for correlational and regression analyses, so that gender became "cis female/non cis female", caregiver-respondent relationship became "biological parent/non-biological caregiver", and living with caregiver became "yes/no".

Missing data were primarily associated with non-completion of a second caregiver dataset due to having only selected one caregiver about which to provide responses, or with the PCM measure, which was likely an artefact of how this measure was inputted into the survey software. The PCM was set up as a sliding scale question on Qualtrics XM, with a default score of 5 on the Likert scale. However, a response was not recorded if a participant did not manually adjust the scale to select another number or to return the slider to a score of 5. This meant that there was no way to distinguish between participants who had skipped the question and participants who agreed with the default score of 5 and did not manually adjust the slider, resulting in high levels of missing data on this questionnaire. In the datasets used for path analysis, missing data were missing completely at random for both the female caregiver dataset (Little's MCAR test: $\chi^2(70, n=356)=61.33, p>.05$) and male caregiver dataset (Little's MCAR test: $\chi^2(102, n=208)=97.26, p>.05$), indicating that statistical imputation using FIML estimation would be appropriate (Schafer & Graham, 2002).

5.5 Results

5.5.1 Descriptive statistics

Tables 1 and 2 summarise the characteristics of participants and the caregiver data provided by them. Respondents had a mean age of 18.21 years and mostly identified as cis female, with a minority of participants identifying as non-cisgender (e.g., non-binary, transgender, genderfluid, genderqueer, agender) or cis male. Most participants were living at home with both their caregivers or their firstly identified caregiver, and most caregivers were biological parents. Participants overwhelmingly identified a female caregiver as their first caregiver in the survey. Of those who provided responses for two caregivers, most participants identified their second caregiver as male.

Table 3 summarises descriptive characteristics for outcome measures used in the survey. The internal consistencies of all measures ranged from acceptable to excellent, with the lowest being the RFQY-6 (α=.70) and the highest being LEE total score for female caregivers (α=.97). Table 4 presents comparisons of the obtained mean scores with previously reported results, revealing that the obtained scores were elevated for all key variables in comparison to previous studies, including depressive and anxiety disorder symptomatology, RF uncertainty, self-harm, attachment insecurity, and pEE.

The revised scoring procedures for RFQY-6 make comparisons challenging, as the usual recoding procedures were not applied, and an abbreviated version used to obtain a total score. The two studies which have previously used the RFQ-6, both reported a lower mean score in their samples than was found in this study (Spitzer et al., 2020; S. Müller, personal correspondence, February 15th, 2021) indicating greater levels of uncertainty about mental states in our sample. The obtained mean score for the PHQ-9 fell into the moderate-to-severe clinical range, above the clinical cut-off score of ≥10 (Levis et al., 2019), and was comparable to means obtained in clinical rather than community populations. Similar comparisons can be made for the GAD-7; in the present study, the mean exceeded the clinical cut-off score of ≥10 (Spitzer et al., 2006) and was comparable to previous studies using clinical samples. As shown in Table 5, RTSHIA-SH was also elevated in comparison to previous community and clinical sample means. ECR-RS scores also appeared elevated in comparison with other studies using adolescent and adult populations in which mother, father, and global attachment anxiety and avoidance scores were computed, indicating a higher level of attachment insecurity in the present study. Fewer comparisons are available for the LEE, as the measure itself has undergone substantial revision (Hooley & Parker, 2006). Nonetheless, LEE scores provided by our sample exceeded those given by a clinical sample of adolescents with anorexia nervosa (Moulds et al., 2000) and Hale et al. (2007) reported a mean total score (rather than total score) of 1.65 (SD=.37), again lower than that obtained in this sample for both female and male caregivers (M_{female}=2.40, SD=.72; M_{male}=2.35, SD=.70). The PCM is also difficult to compare across studies due to the variability in its use and content over the years. The current version of the scale consists of four items, however, many previous studies have used only one or two (Gerlsma et al., 2014; Hooley & Teasdale, 1989). Nonetheless, what comparisons were available indicated a higher degree of pC in our sample than previously reported.

Table 1

Participant demographic characteristics

Demographic characteristics	**Descriptive statistics**
Age in years, mean (SD, range)	18.21 (±2.49, 16-24)
Gender identity, *n/N* (%)	
Cis female	319 / 377 (84.6%)
Cis male	18 / 377 (4.8%)
Non-cisgender	35 / 377 (9.3%)
Not reported	5 / 377 (1.3%)
Usual residence *n/N* (%)	
Family home with both carers	142 / 377 (37.7%)
Family home with first carer	127 / 377 (33.7%)
Family home with second carer	11 / 377 (2.9%)
Rented accommodation	43 / 377 (11.4%)
Student accommodation	27 / 377 (7.2%)
Own purchased property	10 / 377 (2.7%)
No fixed accommodation	4 / 377 (1.1%)
Other	13 /377 (3.4%)
No. of caregivers in survey, *n/N* (%)	
One	103 / 377 (27.3%)
Two	274 / 377 (72.7%)

Table 2

Caregiver demographic characteristics

Demographic characteristics	**Caregiver 1**	**Caregiver 2**
Gender identity, *n/N* (%)		
Cis female	348 / 377 (92.3%)	22 / 274 (8.0%)
Cis male	27 / 377 (7.2%)	211 / 274 (77.0%)
Non-cisgender	1 / 377 (0.3%)	1 / 274 (0.4%)
Not reported	1 / 377 (0.3%)	40 / 274 (14.6%)
Relationship to participant, *n/N* (%)		
Biological parent	359 / 377 (95.2%)	223 / 274 (81.4%)
Adoptive parent	6 / 377 (1.6%)	4 / 274 (1.5%)
Foster parent	2 / 377 (0.5%)	0 / 274
LGBT+ parent	1 / 377 (0.3%)	0 / 274
Guardian	4 / 377 (1.1%)	2 / 274 (0.7%)
Other family member	1 / 377 (0.3%)	5 / 274 (1.8%)
Parent’s partner or stepparent	1 / 377 (0.3%)	21 / 274 (7.7%)
Not reported	3 / 377 (0.8%)	19 / 274 (6.9%)
Living with participant, *n/N* (%)		
Yes	271 / 377 (71.9%)	155 / 274 (56.6%)
No	105 / 377 (27.9%)	119 / 274 (43.4%)

Table 3

Descriptive statistics for main study variables

Variable	***n***	**Mean (*SD*)**	**Min**	**Max**	**Cronbach's alpha (α)**
RFQY-6	377	4.92 (1.05)	1.67	7.00	0.70
PHQ-9	377	17.76 (6.64)	0.00	27.00	0.88
GAD-7	377	14.02 (5.61)	0.00	21.00	0.89
RTSHIA-SH	377	25.41 (11.10)	0.00	51.00	0.88
ECR-RS					
Global attachment avoidance	377	4.99 (1.26)	1.33	7.00	0.85
Global attachment anxiety	377	5.90 (1.34)	1.00	7.00	0.87
Female caregiver attachment avoidance	356	4.60 (1.60)	1.00	7.00	0.91
Female caregiver attachment anxiety	356	2.99 (1.91)	1.00	7.00	0.89
Male caregiver attachment avoidance	208	5.14 (1.64)	1.00	7.00	0.92
Male caregiver attachment anxiety	208	3.32 (2.09)	1.00	7.00	0.88
LEE					
Female caregiver	356	91.19 (27.25)	41.00	149.00	0.97
Male caregiver	208	89.29 (26.63)	41.00	149.00	0.96
PCM					
Female caregiver					
1. Child to caregiver criticism	336	4.58 (2.45)	1.00	10.00	n/a
2. Caregiver to child criticism	344	6.11 (2.88)	1.00	10.00	n/a
3. Child distress at criticism	351	7.99 (1.94)	1.00	10.00	n/a
4. Caregiver distress at criticism	342	6.57 (2.65)	1.00	10.00	n/a
Male caregiver					
1. Child to caregiver criticism	193	5.17 (2.61)	1.00	10.00	n/a
2. Caregiver to child criticism	200	6.16 (3.00)	1.00	10.00	n/a
3. Child distress at criticism	205	7.58 (2.56)	1.00	10.00	n/a
4. Caregiver distress at criticism	199	5.42 (2.96)	1.00	10.00	n/a

Abbreviations: RFQY-6 – Reflective Functioning Questionnaire for Youths; PHQ-9 – Patient Health Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Relationships – Relationship Structures; LEE – Level of Expressed Emotion scale; PCM – Perceived Criticism Measure.

Table 4

Comparisons of obtained means to previously reported results

Outcome measure	Comparison study author (year), Sample characteristics	Comparison *n*, Mean (*SD*)	Current study *n*, Mean (*SD*)
RFQY-6	Spitzer et al. (2020) Community sample of German adults, mean age 49.5 years.	*n*=2477 Males (*n*=1166): 2.17 (no SD) Females (*n*=1311): 2.00 (no SD)	*n*=377 4.92 (1.05)
	Müller et al. (2020) Clinical sample of German adults admitted for treatment for psychosomatic disorders, mean age 34.0 years. Community sample of German adults, mean age 24.2 years.	*n*=1427 Inpatients (*n*=861): 3.48 (no SD) Community (*n*=566): 3.65 (no SD)	
PHQ-9	Kroenke et al. (2001) Subset of sample consisting of patients diagnosed with major depressive disorder interviewed by a mental health professional.	*n*=41 17.1 (6.1)	*n*=377 17.76 (6.64)
	Burdzovic Andreas & Brunborg (2017) Community sample of Norwegian middle and high school students, mean school grade 10.2.	*n*=846 5.83 (4.78)	
GAD-7	Spitzer et al. (2006) Subset of sample diagnosed with generalised anxiety disorder interviewed by a mental health professional.	*n*=73 14.4 (4.7)	*n*=377 14.02 (5.61)
	Mossman et al. (2017) Outpatient sample of adolescents meeting DSM-IV-TR criteria for generalised anxiety disorder, mean age 14.8 years.	*n*=40 14.1 (4.3)	
	Tiirikainen et al. (2019) Community sample of Finnish adolescents, mean age 16.49 years.	*n*=111,171 3.94 (4.67)	
RTSHIA-SH	Vrouva et al. (2010) Community sample of adolescents, mean age 15.3 years. Clinical sample of adolescents referred to mental health services for self-harm, mean age 15.8 years.	*n*=604 Community (*n*=553): 3.44 (4.26) Clinical (*n*=51): 15.78 (9.84)	*n*=377 25.41 (11.10)
	Xavier et al. (2019) Community sample of Portuguese adolescents, mean age 15.32 years.	*n*=868 3.45 (5.79)	

ECR-RS	Hünefeldt et al. (2013) Community sample of Italian adolescents, mean age 16.7 years.	*n*=402 Avoidance with mother: 3.10 (1.26) Anxiety with mother: 1.57 (1.24) Avoidance with father: 3.70 (1.45) Anxiety with father: 1.87 (1.54)	*n*=356 Avoidance female caregiver: 4.60 (1.60) Anxiety female caregiver: 2.99 (1.91) *n*=208 Avoidance male caregiver: 5.14 (1.64) Anxiety male caregiver: 3.32 (2.09) *n*=377 Global avoidance: 4.99 (1.26) Global anxiety: 5.90 (1.34)
	Moreira et al. (2015) Community sample of Portuguese adults, mean age 33.58 years.	*n*=236 Avoidance with mother: 2.48 (1.24) Anxiety with mother: 1.82 (1.21) Avoidance with father: 3.12 (1.56) Anxiety with father: 1.82 (1.28) Global avoidance: 2.32 (0.75) Global anxiety: 1.82 (1.08)	
LEE	Moulds et al. (2000) Clinical sample of Australian females with diagnosis of anorexia nervosa, mean age 20.9 years.	*n*=19 Mother: 79.72 (24.53) Father: 83.41 (24.64)	*n*=356 Female caregiver: 91.19 (27.25) *n*=208 Male caregiver: 89.29 (26.63)
PCM	White et al. (1998) Community sample of US undergraduate students, mean age 18.9 years.	*n*=119 Parental criticism: 4.62 (2.10)	*n*=344 Female caregiver criticism: 6.11 (2.88) *n*=200 Male caregiver criticism: 6.16 (3.00)

Abbreviations: RFQY-6 – Reflective Functioning Questionnaire for Youths; PHQ-9 – Patient Health Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Relationships – Relationship Structures; LEE – Level of Expressed Emotion scale; PCM – Perceived Criticism Measure.

5.5.1.1 Correlational analyses

Shapiro-Wilk tests revealed that all continuous data in both female and male caregiver datasets were non-normally distributed, with the exception of self-harm in the male caregiver dataset ($W(187)=.988$, $p=.112$). As a result, Spearman's rho correlations were conducted to explore the relationships between continuous variables. Correlation coefficients for continuous variables in the female and male caregiver datasets are presented in Tables 5 and 6.

In line with hypothesis 1, there were significant positive correlations between the identified predictor variables and adolescent self-harm in both male and female caregiver datasets in the expected directions. The strongest effect was observed between RFQY-6 and RTSHIA-SH in the female caregiver database, which was a moderate effect (Cohen, 1969). The predictor variables were all found to significantly correlate with each other, with the strongest effects being between attachment avoidance and LEE total score in both datasets. In line with hypothesis 3, significant associations were also found between the model variables and covariates. Significant correlations were found between both adolescent depression and anxiety, and the predictor and outcome variables, with the strongest effects being between RFQY-6 and PHQ-9, and RFQY-6 and GAD-7, replicating findings reported by Spitzer et al. (2020) and Muller et al. (2020) in which moderate correlations were found between PHQ-9, PHQ-2, GAD-7, and RFQY-6. PHQ-9 and GAD-7 were also strongly correlated with each other, as has been previously reported (Kroenke et al., 2016). A weak but significant negative correlation was found between age and RTSHIA-SH total score. Significant negative correlations were also observed between age and predictor and outcome variables, apart from attachment avoidance and LEE total score in the female caregiver dataset, and attachment anxiety in the male caregiver dataset. Spearman's rho correlations were also conducted to determine whether the covariates identified *a priori* were significantly associated with the outcome variable. Age was significantly negatively correlated with most predictor variables and with RTSHIA-SH. Significant correlations were also found between RTSHIA-SH and female caregiver relationship as dichotomised into biological parent (1) vs. non-biological caregiver (0) ($r_s=-.16$, $p=.05$, $n=356$) and whether respondents were living with their female caregiver (1) or not (0) ($r_s=-.12$, $p=.02$, $n=356$). These associations were not found for the male caregiver dataset.

Table 5

Spearman's rho correlations and descriptive statistics of variables in female caregiver dataset

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	-													
2. RFQY-6	-.19**	-												
3. PHQ-9	-.25**	.45**	-											
4. GAD-7	-.22**	.47**	.69**	-										
5. RTSHIA-SH	-.16**	.45**	.60**	.48**	-									
6. ECR-RS-GAAv	-.19**	.25**	.45**	.31**	.38**	-								
7. ECR-RS-GAAnx	-.24**	.42**	.48**	.50**	.35**	.19**	-							
8. ECR-RS-FAAv	-.09	.16**	.35**	.21**	.26**	.43**	.16**	-						
9. ECR-RS-FAAnx	-.20**	.26**	.39**	.31**	.39**	.28**	.28**	.40**	-					
10. LEE	-.09	.22**	.34**	.24**	.31**	.30**	.22**	.67**	.51**	-				
11. PCM-1	.04	-.02	-.07	-.12*	-.11*	-.09	-.02	.19**	.14**	.38**	-			
12. PCM-2	-.06	.26**	.28**	.17**	.20**	.20**	.19**	.48**	.45**	.74**	.41**	-		
13. PCM-3	-.14**	.27**	.33**	.30**	.30**	.13*	.27**	.14**	.21**	.29**	.13*	.30**	-	
14. PCM-4	.08	-.04	.03	.01	.11*	.05	.07	.07	.05	.16**	.15**	.11	.16**	-
Mean	18.20	4.93	17.76	14.02	25.35	5.01	5.90	4.61	2.99	91.20	4.58	6.11	7.99	6.57
SD	2.48	1.04	6.65	5.61	11.05	1.26	1.33	1.60	1.91	27.25	2.45	2.88	1.94	2.65
Minimum	16.00	1.67	0.00	0.00	0.00	1.33	1.00	1.00	1.00	41.00	1.00	1.00	1.00	1.00
Maximum	24.00	7.00	27.00	21.00	51.00	7.00	7.00	7.00	7.00	149.00	10.00	10.00	10.00	10.00

Abbreviations: RFQY-6 – Reflective Functioning Questionnaire for Youths, Short Version; PHQ-9 – Patient Health Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Relationships – Relationship Structures; GAAv- Global attachment avoidance; GAAnx – Global attachment anxiety; FAAv – Female caregiver attachment avoidance; FAAnx – Female caregiver attachment anxiety; LEE – Level of Expressed Emotion scale; PCM – Perceived Criticism Measure.

* *p* value <.05

** *p* value <.01

Table 6

Spearman's rho correlations and descriptive statistics of variables in male caregiver dataset

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	-													
2. RFQY-6	-.23**	-												
3. PHQ-9	-.28**	.45**	-											
4. GAD-7	-.27**	.41**	.66**	-										
5. RTSHIA-SH	-.21**	.42**	.62**	.53**	-									
6. ECR-RS-GAAv	-.26**	30**	.48**	.28**	.37**	-								
7. ECR-RS-GAAnx	-.23**	.44**	.51**	.52**	.44**	.26**	-							
8. ECR-RS-MAAv	-.18**	.27**	.29**	.17*	.30**	.32**	.20**	-						
9. ECR-RS-MAAnx	-.10	.30**	.36**	.34**	.37**	.21**	.32**	.57**	-					
10. LEE	-.16*	.27**	.28**	.25**	.35**	.15*	.22**	.73**	.62**	-				
11. PCM-1	-.01	.07	.01	.08	.04	-.02	.14	.42**	.33**	.47**	-			
12. PCM-2	-.11	.20**	.18*	.12	.17*	.15*	.16*	.52**	.46**	.76**	.47**	-		
13. PCM-3	-.01	.24**	.19**	.29**	.19**	.08	.28**	.03	.15*	.006	-.04	.21**	-	
14. PCM-4	.13	-.10	.01	.06	.03	-.15*	.06	-.05	-.002	.07	.31**	.07	.25**	-
Mean	18.38	4.91	17.11	13.75	24.13	4.91	5.89	5.14	3.32	89.29	5.17	6.16	7.38	5.42
SD	2.61	1.04	6.60	5.66	11.08	1.34	1.36	1.64	2.09	26.63	2.61	3.00	2.56	2.96
Minimum	16.00	1.67	0.00	0.00	0.00	1.33	1.00	1.00	1.00	41.00	1.00	1.00	1.00	1.00
Maximum	24.00	6.67	27.00	21.00	51.00	7.00	7.00	7.00	7.00	149.00	10.00	10.00	10.00	10.00

Abbreviations: RFQY-6 – Reflective Functioning Questionnaire for Youths, Short Version; PHQ-9 – Patient Health Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Relationships – Relationship Structures; GAAv- Global attachment avoidance; GAAnx – Global attachment anxiety; MAAv – Male caregiver attachment avoidance; MAAnx – Male caregiver attachment anxiety; LEE – Level of Expressed Emotion scale; PCM – Perceived Criticism Measure.

* *p* value <.05

** *p* value <.01

5.5.2 Mediation analyses

Two serial mediation models were tested using path analysis. Model 1 modelled relationships between pEE from female caregivers and adolescent self-harm, with attachment anxiety and avoidance in the female caregiver relationship and RF as serial mediators. Model 2 had the same structure but drew its data from the male caregiver dataset. The models were built hierarchically, with each variable regressed on the one preceding it, explaining the low degrees of freedom within the model. All covariates were controlled for in both models by regressing them against all included variables. A multiple-index strategy was used to determine model fit (Jackson et al., 2009); Model 1 provided an excellent fit to the data ($\chi^2(1)=.48$, $p=.49$, CFI=1.00, RMSEA=.00), whereas Model 2 demonstrated only a moderate fit to the data ($\chi^2(1)=6.72$, $p=.01$, CFI=.99, RMSEA=.166) and should be interpreted with caution. R-squared statistics showed that Model 1 explained 47.1% of the variance in self-reported adolescent self-harm, 28.0% of the variance in adolescent RF, 48.3% of the variance in female caregiver attachment avoidance, and 28.6% of the variance in female caregiver attachment anxiety. Model 2 explained 48.8% of the variance in adolescent self-harm, 30.1% of the variance in adolescent RF, 53.8% of the variance in male caregiver attachment avoidance, and 43.1% of the variance in male caregiver attachment anxiety. These models will now be discussed in turn.

5.5.2.1 Model 1 – Female caregivers

Table 7 and Figure 3 summarise the results of significance testing for direct effects in Model 1. pEE significantly predicted greater self-reported attachment avoidance (path *a*) and attachment anxiety (path *b*) but did not significantly predict adolescent RF (path *e*) or self-harm (path *i*). In turn, neither subscale of attachment insecurity predicted RF (paths *c* and *d*), though the direct effect of attachment anxiety on RF approached significance (path *d*). Significant direct effects on self-harm were found from RF (path *f*) and attachment anxiety (path *h*), but not attachment avoidance (path *g*). Taken together, this indicates that hypothesis 1 was only partially supported for the female caregiver model. pEE did not exert a direct effect on adolescent self-harm, but attachment anxiety and RF did, with greater levels of attachment anxiety and higher levels of RF uncertainty predicting a greater level of self-harm. Regarding research question 3, it was found that attachment anxiety, not avoidance, was predictive of adolescent self-harm. The pattern of direct effects indicates the possible presence of a mediation relationship along some of the hypothesised pathways, which was then tested as set out below.

Table 7

Results from testing direct effects in the serial mediation model using female caregiver dataset

Direct path	Path label	Estimate	Lower 2.5%	Upper 2.5%	p-value
LEE → ECR-RS-FAAv	*a*	.62	.56	.68	.002**
LEE ECR → ECR-RS-FAAnx	*b*	.40	.32	.48	.001***
ECR-RS-FAAv → RFQY-6	*c*	-.07	-.18	.02	.20
ECR-RS-FAAnx → RFQY-6	*d*	.10	.02	.18	.053┼
LEE → RFQY-6	*e*	.09	-.01	.21	.15
RFQY-6 → RTSHIA-SH	*f*	.19	.12	.26	.001***
ECR-RS-FAAv → RTSHIA-SH	*g*	-.02	-.11	.07	.75
ECR-RS-FAAnx → RTSHIA-SH	*h*	.12	.04	.19	.012*
LEE → RTSHIA-SH	*i*	.05	-.06	.15	.46

Abbreviations: RFQY-6 – Reflective Functioning Questionnaire for Youths, Short Version; PHQ-9 – Patient Health Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Relationships – Relationship Structures; GAAv- Global attachment avoidance; GAAnx – Global attachment anxiety; FAAv – Female caregiver attachment avoidance; FAAnx – Female caregiver attachment anxiety; LEE – Level of Expressed Emotion scale.

┼*p* value <.10

* *p* value <.05

***p* value < 01

****p* value =.001

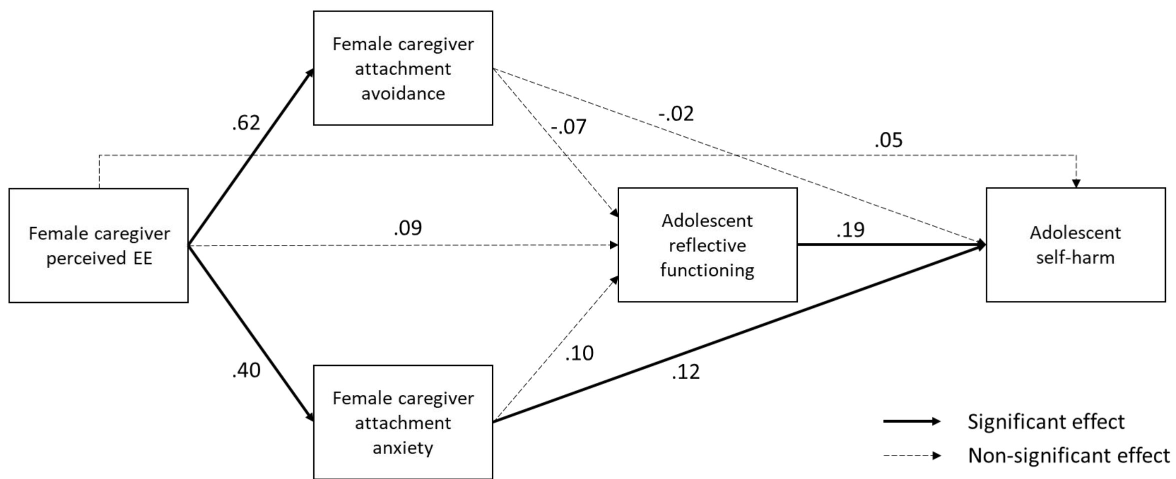

Figure 3. Path diagram of mediation analysis using female caregiver dataset testing indirect effects of pEE on adolescent self-harm via mediators.

Notes: path coefficients represent standardised regression estimates; covariates and residuals have been omitted from diagram for ease of interpretation; covariates were age, PHQ-9 total score, GAD-7 total score, participant gender (cis female/non cis female), participant-caregiver relationship (biological parent/non biological parent), and participant living with caregiver (yes/no).

Table 8 shows the results for testing indirect effects. Results were obtained using the Indirect Effects plugin for IBM SPSS Amos developed by Gaskin & Linn (2018), which provides unstandardised and standardised regression estimates, p-values, and bootstrapped upper and lower confidence intervals (J. Gaskin, personal communication, January 27th, 2021). In Model 1, the obtained results supported a full mediation hypothesis whereby the effect of pEE on self-harm is carried through attachment anxiety (path *b* x *h*) and attachment anxiety and RF (path *b* x *d* x *f*). Separate significant indirect effects were also obtained for pEE on RF through attachment anxiety (path *b* x *d*) and for attachment anxiety on self-harm through RF (path *d* x *f*). Taken together, this provides partial support for hypothesis 2; pEE exerts an indirect effect on self-harm through attachment anxiety, and attachment anxiety and RF. Indirect effect pathways through attachment avoidance were all non-significant.

Significant indirect effects were reported despite the model controlling for the identified covariates, but the obtained results provided partial support for hypothesis 3 as well. There were significant direct effects of PHQ-9 on attachment anxiety (β=.17, 95%CI=.04, .27, *p*=.03), attachment avoidance (β=.21, 95%CI=.12, .30, *p*=.001), RF (β=.21, 95%CI=.10, .33, *p*=.005), and self-harm (β=.46, 95%CI=.35, .56, *p*=.002). There were also significant direct effects of GAD-7 on RF (β=.26, 95%CI=.13, .37, *p*=.001), but not on either attachment anxiety (β=.04, 95%CI=-.07, .14, *p*=.56, *ns*) or avoidance (β=-.09, 95%CI=-.18, .002, *p*=.11, *ns*), nor self-harm (β=.06, 95%CI=-.04, .18, *p*=.31, *ns*). pEE was significantly positively correlated with both PHQ-9 (*r*=.35, 95%CI=.27, .42, *p*=.001) and GAD-7 (*r*=.26, 95%CI=.18, .34, *p*=.001) within the model as well. Taken together, these results indicate that young people who reported higher levels of depression and anxiety will report greater pEE, higher attachment insecurity, lower levels of RF and higher levels of self-harm. There was no significant direct effect of age on self-harm in this model (β=.03, 95%CI=-.04, .11, *p*=.39, *ns*).

Table 8

Results from testing indirect effects in the serial mediation model using female caregiver dataset

Indirect path	**Path labels**	**Indirect effect (SE)**	**Lower 2.5%**	**Upper 2.5%**	**p-value**
LEE → ECR-RS-FAAv → RFQY-6	*a* x *c*	-.05 (.00)	-.004	.000	.20
LEE → ECR-RS-FAAv → RFQY-6 → RTSHIA-SH	*a* x *c* x *f*	-.05 (.00)	-.01	.001	.17
LEE → ECR-RS-FAAv → RTSHIA-SH	*a* x g	-.01 (.02)	-.03	.02	.75
LEE → ECR-RS-FAAnx → RFQY-6	*b* x *d*	.05 (.00)	.000	.003	.046*
LEE → ECR-RS-FAAnx → RFQY-6 → RTSHIA-SH	*b* x *d* x *f*	.04 (.00)	.001	.01	.028*
LEE → ECR-RS-FAAnx → RTSHIA-SH	*b* x *h*	.05 (.01)	.01	.03	.009**
LEE → RFQY-6 → RTSHIA-SH	*e* x *f*	.02 (.01)	.000	.02	.11
ECR-RS-FAAv → RFQY-6 → RTSHIA-SH	*c* x *f*	-.01 (.09)	-.26	.02	.18
ECR-RS-FAAnx → RFQY-6 → RTSHIA-SH	*d* x *f*	.10 (.06)	.02	.23	.036*

Abbrevia ions: RFQY-6 – Reflective Functioning Questionnaire for Youths, Short Version; PHQ-9 – Patient Heal h Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Rela ionships – Relationship Structures; FAAv – Female caregiver attachment avoidance; FAAnx – Female caregiver attachment anxiety; LEE – Level of Expressed Emotion scale.

* *p* value <.05

***p* value < 01

5.5.2.2 Model 2 – Male caregivers

Table 9 and Figure 4 summarise the pattern of direct effects obtained for the male caregiver model. As with the female caregiver model, pEE significantly predicted greater self-reported attachment avoidance (path *a*) and attachment anxiety (path *b*) but did not significantly predict adolescent RF (path *e*) or self-harm (path *i*). RF was also a significant predictor of self-harm (path *f*) in this model. As was also the case in the female caregiver model, neither dimension of attachment insecurity significantly predicted RF (paths *c* and *d*), however, nor was either dimension of attachment insecurity a significant predictor of adolescent self-harm (paths *g* and *h*), unlike in the female caregiver model. Taken together, hypothesis 1 was again only partially supported for the male caregiver model. pEE did not exert a direct effect on adolescent self-harm as hypothesised; in this model only RF did, with higher levels of RF uncertainty predicting a greater level of self-harm. With regards to research question 3, it appeared that neither self-reported attachment avoidance nor anxiety towards the male caregiver was a significant predictor of adolescent self-harm, unlike the results of the female caregiver model, which found attachment anxiety significantly predicted self-harm.

Table 9

Results from testing direct effects in the serial mediation model using male caregiver dataset

Direct path	Path label	Estimate	Lower 2.5%	Upper 2.5%	p-value
LEE → ECR-RS-FAAv	*a*	.70	.62	.77	.000***
LEE ECR → ECR-RS-FAAnx	*b*	.54	.41	.64	.000***
ECR-RS-FAAv → RFQY-6	*c*	.08	-.10	.25	.38
ECR-RS-FAAnx → RFQY-6	*d*	.06	-.09	.22	.43
LEE → RFQY-6	*e*	.03	-.16	.22	.76
RFQY-6 → RTSHIA-SH	*f*	.13	.01	.25	.039*
ECR-RS-FAAv → RTSHIA-SH	*g*	.01	-.15	.17	.91
ECR-RS-FAAnx → RTSHIA-SH	*h*	-.02	-.15	.13	.83
LEE → RTSHIA-SH	*i*	.15	-.01	.31	.07

Abbreviations: RFQY-6 – Reflective Functioning Questionnaire for Youths, Short Version; PHQ-9 – Patient Health Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Relationships – Relationship Structures; MAAv – Male caregiver attachment avoidance; MAAnx – Male caregiver attachment anxiety; LEE – Level of Expressed Emotion scale.

* *p* value <.05

****p* value <.001

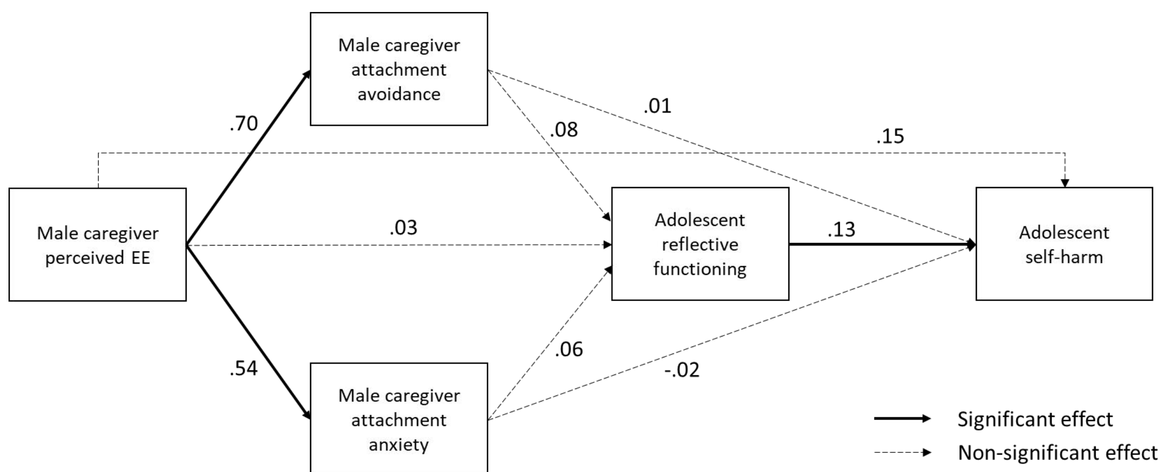

Figure 4. Path diagram of mediation analysis using male caregiver dataset testing indirect effects of perceived EE on adolescent self-harm via mediators.

Notes: path coefficients represent standardised regression estimates; covariates and residuals have been omitted from diagram for ease of interpretation; covariates were age, PHQ-9 total score, GAD-7 total score, participant gender (cis female/non cis female), participant-caregiver relationship (biological parent/non biological parent), and participant living with caregiver (yes/no).

Taken together, the pattern of direct effects observed do not support the hypothesis that there is an indirect effect of pEE on self-harm through attachment insecurity and/or RF, as theorised by the model. This conclusion is supported by the results of analyses of indirect effects within the male caregiver model, presented in Table 10. There were no significant indirect effects present in this model, therefore hypothesis 2 is unsupported in this model. In partial support of hypothesis 3, there were significant direct effects of PHQ-9 total on attachment avoidance (β=.16, 95%CI=.01, .29, *p*=.05), RF (β=.30, 95%CI=.09, .51, *p*=.006) and self-harm (β=.43, 95%CI=.28, .60, *p*<.001), but not attachment anxiety (β=.14, 95%CI=-.01, .29, *p*=.06, *ns*). Contrary to the female caregiver dataset, there were no significant direct effects of GAD-7 total on RF (β=.15, 95%CI=-.05, .35, *p*=.17, *ns*), attachment anxiety (β=.09, 95%CI=-.06, .24, p=.23, *ns*), or avoidance (β=-.12, 95%CI=-.26, .03, *p*=.11, *ns*), but a significant direct effect was found for self-harm (β=.16, 95%CI=.000, .32, *p*=.05). pEE was significantly positively correlated with both PHQ-9 (*r*=.29, 95%CI=.16, .41, *p*<.001) and GAD-7 (*r*=.28, 95%CI=.15, .40, *p*<.001) within the male caregiver model as well. Taken together, these results indicate that young people who reported higher levels of depression and anxiety reported greater pEE, higher attachment insecurity, lower levels of RF, and higher levels of self-harm. There was no significant direct effect of age on self-harm (β=-.01, 95%CI=-.12, .11, *p*=.88, *ns*).

Table 10

Results from testing indirect effects in the serial mediation model using male caregiver dataset

Indirect path	**Path labels**	**Indirect effect (SE)**	**Lower 2.5%**	**Upper 2.5%**	**p-value**
LEE → ECR-RS-FAAv → RFQY-6	*a* x *c*	.05 (.00)	-.002	.006	.36
LEE → ECR-RS-FAAv → RFQY-6 → RTSHIA-SH	*a* x *c* x *f*	.05 (.00)	-.001	.01	.22
LEE → ECR-RS-FAAv → RTSHIA-SH	*a* x g	.01 (.02)	-.04	.04	.96
LEE → ECR-RS-FAAnx → RFQY-6	*b* x *d*	.03 (.00)	-.001	.004	.44
LEE → ECR-RS-FAAnx → RFQY-6 → RTSHIA-SH	*b* x *d* x *f*	.03 (.00)	-.001	.008	.31
LEE → ECR-RS-FAAnx → RTSHIA-SH	*b* x *h*	-.01 (.02)	-.03	.02	.87
LEE → RFQY-6 → RTSHIA-SH	*e* x *f*	.00 (.01)	-.01	.01	.62
ECR-RS-FAAv → RFQY-6 → RTSHIA-SH	*c* x *f*	.01 (.09)	-.03	.29	.22
ECR-RS-FAAnx → RFQY-6 → RTSHIA-SH	*d* x *f*	.04 (.06)	-.03	.20	.31

Abbreviations: RFQY-6 – Reflective Functioning Questionnaire for Youths, Short Version; PHQ-9 – Patient Health Questionnaire; GAD-7 – Generalised Anxiety Disorder; RTSHIA-SH – Risk-Taking and Self-Harm Inventory for Adolescents – Self-Harm subscale; ECR-RS – Experience in Close Relationships – Relationship Structures; MAAv – Male caregiver attachment avoidance; MAAnx – Male caregiver attachment anxiety; LEE – Level of Expressed Emotion scale.

5.6 Discussion

The purpose of this study was to evaluate a theoretical model of self-harm, developed from research evidence of associations between self-harm and EE, attachment insecurity and RF and informed by the FFM of self-harm. The predictor variables selected in this project aimed to represent both the inter-personal and intra-personal mechanisms through which self-harm develops in adolescence. The inter-personal processes in this study were the young person's perceptions of maladaptive communication from their caregivers (pEE) and attachment insecurity resulting from this (attachment anxiety and attachment avoidance). The intra-personal mechanism in this study was RF, or uncertainty about mental states. The results obtained partially supported the model and its hypotheses, with a significant indirect effect of pEE from female caregivers on adolescent self-harm mediated by attachment anxiety in the relationship with the female caregiver and uncertainty about mental states (or RFQu). These findings were not replicated for male caregivers.

This study provides the first evidence of such an association, lending support to a theoretical model in which self-harm is the outcome of higher perceived levels of maladaptive communication from female caregivers, which results in a higher level of attachment anxiety and higher uncertainty about mental states in the self and others. It could be that self-harm in this model is fulfilling the intra- and inter-personal functions hypothesised by the FFM, being used as an emotion regulation strategy when RF capacity reduces due to perceived interpersonal threat, and as a communication of distress to a caregiver to which the adolescent is insecurely attached, who is perceived as irritable, intrusive, and critical. These effects were present after controlling for factors such as participant gender and age, depression and anxiety, whether the caregiver was a biological parent or non-biological caregiver, and whether the participant was living with the caregiver at the time of responding, although it should be noted that there were unequal numbers across these conditions, making comparisons limited. The idea that family communication styles influence both attachment and self-harm has research support (Maximo et al., 2011; Michelson & Bhugra, 2012; Mikulincer & Florian, 1999), which is furthered by this project. Adolescents who reported perceiving their caregivers as higher in EE reported significantly greater levels of both dimensions of attachment insecurity. These effects were found in both the female and male caregiver datasets, suggesting that the way caregiver communication is perceived by adolescents is influential in the development of attachment security to the caregiver.

The findings in the present study also indicated that self-harm is influenced by the anxiety dimension of attachment insecurity and not avoidance, replicating results reported by Gormley & McNiel (2010), Kharsati & Bhola (2016), and Tatnell et al. (2014), however, this was found in the female dataset only. A possible explanation of this is that attachment anxiety is hypothesised to result from an experience of the caregiver as inconsistent or unpredictable in their caregiving responses, whereas attachment avoidance arises in the context of a predictable but aversive response or lack of availability in the caregiver. It theoretically follows that an inconsistent or unpredictable caregiver leads adolescents to develop more anxious attachment representations, leading to a greater level of uncertainty about others' mental states as a result, given their lived experiences of being unable to anticipate their caregiver. In turn, this uncertainty leads to a greater reliance on self-harm as an emotion regulation strategy. A significant indirect effect of attachment anxiety on self-harm through RF was found in the female caregiver dataset, lending possible support to this hypothesis, but further research is needed to explore if and how attachment anxiety and RF are associated, and whether this effect is truly exclusive to female caregiver attachments.

As noted, the hypothesised direct and indirect effects were not found for male caregivers as they were for female caregivers, potentially providing a tentative answer to research question 2 and replicating findings that maternal attachment security is the more influential in this developmental process (Glazebrook et al., 2015). There are numerous possible explanations for this. It may be that attachment to female caregivers is more important in the development of RF and emotional regulation strategies than attachment to male caregivers. This would contradict research findings by Diener et al. (2002), however, who reported consistency in attachment quality and emotion regulatory style for mother- and father-child relationships, and recent research by Gambin et al. (2021), who found attachment to father and not mother was significantly associated with mentalizing abilities in adolescents. It may also be the case that the failure to detect a significant indirect effect in the male caregiver model was methodological. Analyses for the male caregiver dataset were underpowered due to sample size, which was below the estimated minimum number required to detect medium effects (n=208, as opposed to the estimated n=278), though this explanation may be refuted by the fact that none of the indirect effects in the male caregiver dataset approached significance. Of note in this sample was that most female caregivers were identified as the first caregiver (92.3%) and most male caregivers identified as the second caregiver (77.0%), perhaps indicating that most participants in this study represented their

female caregiver as their primary attachment figure. It is therefore possible that the significant effects reported for the female caregiver dataset had more to do with female caregivers representing the primary caregiver figure than the effects being associated with their gender alone.

5.6.1 Theoretical and clinical implications

This study is the first to report on direct and indirect effects on self-harm of EE, attachment anxiety, and RF, and could form the basis of further research of longitudinal design across a variety of community and clinical settings. The findings lend further credence to the importance of taking a family-systems approach to working with adolescents presenting to mental health services with self-harm. The results of this project appear to support the theory that how caregiver communication is perceived by adolescents is influential in their developing an attachment relationship with their caregiver; communications perceived as high in irritability, intrusiveness, and criticism and low in emotional support appear to be associated with lower levels of attachment security in this sample. It may be that family communication, or specifically EE, can be targeted by clinical intervention (Garcia-Lopez et al., 2014; McCann, 2015), leading to improvements in attachment security and subsequent outcomes. However, it is important to acknowledge that some research indicates that EE appears to be resistant to intervention (Eisner & Johnson, 2008).

The obtained findings are not just applicable to clinical settings. The finding that EE is associated with attachment security and indirectly with self-harm could inform public health strategies aimed at improving communication between caregivers and adolescents. Recent qualitative research indicates that when it comes to self-harm, commonly reported parental reactions diverge substantially from the preferred responses reported by adolescents (Curtis et al., 2018). The development of resources for parents regarding how to effectively communicate with adolescents about self-harm could be beneficial, as this research indicates that critical, irritable, or intrusive responses from caregivers can have a detrimental impact on attachment security and indirectly on self-harm.

This study also provides indirect support for the use of mentalization-based treatments (MBT) for adolescents who self-harm (Griffiths et al., 2018; Rossouw & Fonagy, 2012). A significant direct effect of RFQY-6 on self-harm was found in both male and female caregiver datasets; it theoretically follows that a reduction in uncertainty about mental states and a more developed RF capacity could help

adolescents reduce self-harm. Though many studies have focused on the application of MBT with people diagnosed with BPD, a recent systematic review indicated that MBT is a potentially effective therapeutic approach across a broad range of clinical presentations, including adolescent self-harm (Malda-Castillo et al., 2019). This research appears to support the hypothesised association between reduced RF capacity and self-harm, which potentially indicates that a MBT approach to this difficulty would be advantageous.

This research project highlighted some potential benefits of undertaking IMR in psychological research. The lack of a clinical setting or in-person interview may have helped reduce participant anxiety over participation and led to a more open or truthful response, reducing bias due to social desirability effects. This may particularly have been the case given the subject matter of this survey; self-harm remains a stigmatised topic (Law et al., 2009), and the privacy afforded to participants by this format may have increased the likelihood of fully transparent responses, which may explain the higher severity of self-harm reported in this study compared with previous work using the same outcome measure. One strength of the current project was the adherence to best practice guidelines in undertaking psychological IMR, which ensured a comprehensive approach to safeguarding participant wellbeing and minimising the likelihood of distress as far as possible using this medium.

A further point of interest is the number of participants identifying as non-cisgender, raising the question whether more inclusive practices in demographic data collection could lead to better representation of non-cisgender people in psychological research more broadly (Fernandez et al., 2016) and self-harm specifically, as evidence indicates a higher prevalence of self-harm and suicide attempt and completion among LGBT+ and non-binary youth (McDermott et al., 2013; Rimes et al., 2019).

5.6.2 Limitations

This study has several limitations that are important to acknowledge. Firstly, the models described above are exploratory and therefore findings should be interpreted with caution. Furthermore, data were gathered at a single timepoint, meaning that causality cannot be inferred from these results. Future studies may make use of a longitudinal design to explore the developmental components of the associations reported here. In addition, multiple covariates were included in the models, in an attempt to control for the effects of mental health and sociodemographic factors. As a result of including these

covariates, it is likely that the models are underpowered, again stressing the need for caution when interpreting these results. Future studies may overcome this limitation by advertising more broadly and attracting a larger sample size.

It is further worth noting that though statistically significant results were obtained, the variables in the model could be ordered in a different causal sequence which would be consistent with attachment theory. The model was sequenced in the above-described way to reflect the theoretical stance that it is the interaction between parent and child (represented in the model as pEE) that influences the formation and maintenance of security (or insecurity) in the attachment relationship. However, it could be argued that higher levels of attachment insecurity will lead to adolescents perceiving higher levels of EE in their caregivers, which leads to a disruption to reflective functioning and increase in self-harm, or that disrupted reflective functioning leads adolescents to perceive a higher level of EE from caregivers. Future research using multiple timepoints will help to evaluate whether the causal sequence used in this model is the most theoretically sound, or whether a revision to the sequence is justified.

Despite research indicating associations between attachment disorganisation and maternal EE (Jacobsen et al., 2000; Green et al., 2007), this study did not include a measure of attachment disorganisation, in part because of the challenges of measuring attachment disorganisation using self-report measures, and due to a paucity of validated measures appropriate for this age range. Nonetheless, the potential importance of attachment disorganization has been overlooked in this study. Future research using observational measures may be able to account for this variable.

There is a potential risk of bias due to the high proportion of respondents who were excluded based on missing data in their responses. The rationale for excluding responses with incomplete data was to ensure that path analyses would run effectively. However, this could increase bias in the results if it were the case that respondents did not complete the survey due to factors such as screen fatigue or distress resulting in discontinuation.

Initially, multi-group analyses were planned to determine whether respondent gender would moderate the observed direct and indirect effects, however, given that the sample was majority cis female, planned multi-group comparisons were not completed as the sample was not deemed to have had sufficient representation of other genders to make meaningful statistical comparisons. The lack of cis

male respondents adds to the evidence about differential responses to IMR based on gender, as it is currently unclear whether males are more or less likely to participate in online research than in more traditional data collection methods (Pitman et al., 2015).

This issue links to a broader limitation, that the sample was self-selecting. Most respondents were recruited through social media advertising on Facebook; advertisements were designed to be visually appealing and no incentive was offered for participation. While this ensured that respondents were not taking part due to undue financial influence, it does mean that the sample was likely to consist of individuals with an interest in the subject area or perhaps with personal experiences of the survey topic. This would explain the high average scores of self-harm, as well as some of the other observed high mean scores, though this could in part be attributable to the COVID-19 pandemic and UK national lockdowns, which were co-occurring with data collection and may have resulted in a higher prevalence of mental health difficulties in the general population which was reflected in this survey (Millar et al., 2020; Newlove-Delgado et al., 2021; Power et al., 2020).

Interpretation of these results should take account of the self-selecting nature of the sample and the high prevalence of depression, anxiety, and attachment insecurity when compared with other community samples. In addition to this, limited demographics were gathered in the survey. The rationale for this was to keep participant burden low while obtaining demographics deemed relevant to answer the research questions, but the lack of information about ethnicity, education, employment, and socioeconomic status means that conclusions cannot be drawn about the representativeness of the sample. This study also focused on a late-adolescent population and cannot draw any conclusions about earlier developmental stages. Further research in this area might explore the associations between these variables in a community sample of young people in the pre-, early or mid-adolescent period, with James & Gibb (2019) reporting on links between NSSI and maternal criticism in girls aged between 7 and 11 years.

A further limitation of this study was the reliance on self-report methods to gather information about all variables of interest. Though this is not a limitation unique to this study, or to IMR in general, the result of relying entirely on self-report measures is that there is a high risk of bias in the reported results due to shared method variance (Podsakoff et al., 2012), and the validity of measures may have been influenced by the respondent’s self-perception and state of mind at the time of responding (Orth, 2013).

For instance, significant correlations and direct effects were reported for PHQ-9 total score on the exogenous and endogenous variables, as well as on several of the mediator variables in both datasets; it is possible that the high levels of depressive symptomatology reported in this sample provide a clue that respondents presented a negatively skewed report of their levels of attachment security and perceptions of EE from their caregivers. Future studies could address this by using validated observer-rated measures of EE, attachment and RF in adjunct to self-report measures, such as the FMSS (Magana Amato et al., 1986), the Child Attachment Interview (Shmueli-Goetz et al., 2008), or the Reflective Functioning Scale (Fonagy et al., 1998), or by taking a family-systems approach to measurement by including parent self-report measures of EE as well. Additionally, the use of an open link means that the study is reliant on individual honesty to confirm eligibility, as there is no way of verifying participants meet inclusion criteria other than the measures described in the Methods section.

5.6.3 Conclusions

This study provides evidence for the associations between adolescent self-harm and pEE, attachment anxiety and reflective functioning uncertainty. The obtained results were consistent with previous research and theory and highlight the potential role for family intervention and MBT in adolescent self-harm, as well as providing evidence to inform public health strategies around family communication and adolescent wellbeing. The findings of this study could form the basis of further longitudinal research to explore more fully the developmental aspects of the predictor variables found to be associated with self-harm in late adolescence.

5.7 References

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6 Appendices

Appendix A. Child Psychiatry and Human Development author submission guidelines (relevant sections)

Child Psychiatry & Human Development is an interdisciplinary international journal serving the professional groups represented by child and adolescent psychiatry, clinical child/pediatric/family psychology, pediatrics, social science, and human development. The journal publishes research on diagnosis, assessment, treatment, epidemiology, developmental psychopathology, advocacy, training, cultural factors, ethics, policy, and professional issues as related to clinical disorders in children, adolescents, and families. The major emphasis of the journal is original data-based empirical investigations. The journal also considers substantive and theoretical reviews. Case studies and brief reports are not considered.

Instructions for Authors

Online Manuscript Submission

Springer offers authors, editors, and reviewers of *Child Psychiatry & Human Development* the use of our fully web-enabled online manuscript submission and review system. The journal accepts only online submissions and the review system allows authors to track the review process of manuscripts in real time. Manuscripts should be submitted to http://chud.edmgr.com.

The online manuscript submission and review system for *Child Psychiatry & Human Development* offers easy and straightforward log-in and submission procedures. The system supports a wide range of submission file formats: for manuscripts-Word, WordPerfect, RTF, TXT, and LaTex; for figures-TIFF, GIF, JPEG, EPS, PPT, and Postscript. PDF is not an acceptable file format.

NOTE: In case you encounter any difficulties while submitting your manuscript online, please get in touch with the responsible Editorial Assistant by clicking on "CONTACT US" from the tool bar. Assistance will be provided by the system administrator if you do not have electronic files for figures; originals of artwork may be sent to the system administrator to be uploaded.

Publication Policies

Submission is a representation that the manuscript has not been published previously and is not currently under consideration for publication elsewhere. Upon acceptance of your article, you will receive a link to the special Author Query Application of Springer's website where you can sign the Copyright Transfer Statement online and indicate whether you wish to order OpenChoice, paper offprints, or printing of figures in color. Such a written transfer of copyright, which previously was assumed to be implicit in the act of submitting a manuscript, is necessary under the U.S. Copyright Law in order for the publisher to carry through the dissemination of research results and reviews as widely and effectively as possible.

In addition to the standard publication process (whereby an article is submitted to the journal and access to that article is granted to customers who have purchased a subscription), Springer now provides an alternative publishing option: Springer OpenChoice. A Springer OpenChoice article receives all the benefits of a regular subscription-based article, but in addition is made available publicly through Springer's online platform SpringerLink. To publish through Springer OpenChoice, upon acceptance please visit the link below to complete the relevant order form and provide the required payment

information. Payment must be received in full before publication or articles will publish as regular subscription–model articles.

The Method section of each manuscript should contain a detailed description of the study consent/assent procedures and verify that the study has been conducted with full IRB approval.

Piecemeal publication of limited data from larger data sets is discouraged. Findings that are novel and make substantive contributions to the literature are encouraged.

All authors are responsible for noting any and all financial or other relationship that might be a potential conflict of interest.

International submissions are welcomed. It is the responsibility of the authors to ensure that the manuscript has been very carefully copyedited for language, grammar, punctuation prior to submission. Manuscripts that fail to meet generally accepted criteria for quality writing and adherence to style mandates are not forwarded for review and processing.

All manuscripts are given preliminary review by the editor-in-chief, who examines each submission for topic fit, methodological rigor, adherence to submission guidelines, etc. Manuscripts outside the scope and/or the expected minimal methodological rigor are not considered for peer review.

Permission requests are the responsibility of the author and guidance for writing a permission request letter is found in the Publication Manual of the APA. Permission must be granted for reproduction in both print and electronic form. Please label each permission with the corresponding figure number. Permissions must be attached to your Transfer of Copyright:

- Informed consent, which has been obtained from individuals who have been photographed.
- Letter of Permission from the copyright holder, if the photographs were obtained from another source (i.e., a photographer or primary investigator who prepared a CD of faces).
- If the photographs are not original, text should be added to your figure captions to acknowledge the author and the copyright holder. Often wording is supplied by the copyright holder. If not, you may add copyright information and the phrase "reprinted with permission." (page 175)

Example:

Note. From "Title of Article", by A.N. Author and C.O. Author, 2000, Title of Journal, 50, p. 22. Copyright 2000 by the Name of the Copyright Holder, Reprinted (or adapted) with permission.

Manuscript Style

Length of article: Articles are expected to be no more than 35 double-spaced pages including all tables, figures, references, abstract and titles page. For comprehensive reviews, the page limit is 55 pages.

Typing Format: Double-spaced, 12 point font, pages numbered consecutively (except for figures). Two words from the Running Head may appear in the header of each page.

Title Page: A title page is to be provided and should include the title of the article, author's name(s), and suggested running head. Academic affiliations of all authors should be included. The affiliation should

comprise the department, institution (usually university or company), city, and state (or nation) and should be typed as a footnote to the author's name. The suggested running head should be less than 80 characters (including spaces) and should comprise the article title or abbreviated version thereof. For office purposes, the title page should include the complete mailing address including email address, telephone number, and fax number of the corresponding author designated to review feedback and proofs.

Abstract: An Abstract, no longer than 150 words, must be provided. No headings of any type can be used within the Abstract proper. The Abstract is to be the second page. A list of 4-5 Keywords is to be provided directly below the Abstract. Keywords should express the precise content of the manuscript, as they are used for indexing purposes.

Illustrations, Artwork, and Tables: Illustrations (photographs, drawings, diagrams, and charts) are to be numbered in one consecutive series of Arabic numerals. Artwork for each figure should be provided in a separate file. Each figure should have an accompanying caption. Artwork should be submitted as TIFF or EPS format (1200 dpi for line and 300 dpi for half-tones and gray-scale art). Color art should be in the CMYK color space. Tables should be numbered and referred to by number in the text. Each table should be typed on a separate sheet of paper and should have a descriptive title. Center the title above the table, and type explanatory footnotes (indicated by superscript lowercase letters) below the table.

References

The accuracy of references is the responsibility of the contributing authors. The journal uses numeric referencing for references in text. The journal uses numeric listing of references in the order they were used in text (1,2,3, etc.) in the reference list. Use initials and surnames for all authors and list all authors for each publication up to six authors. Use et al. after the sixth author. The journal uses a specific style for reference in the reference list. Please see examples below and note that the appropriate journal title abbreviations can be found at the National Library of Medicine's List of Journals Indexed in Index Medicus. Please do consult a recent issue of the journal for sample references.

Examples:

1. Pfiffer LJ, McBurnett K (2006) Family correlates of comorbdid anxiety disorders in children with attention-deficit/hyperactivity disorder. J Abnorm Child Psychol 34: 725-735
2. Negoro H, Sawada M, Iida T, Tanaka S, Kishimoto T (2010). Prefrontal dysfunction in attention-deficit/hyperactivity disorder as measured by near infrared spectroscopy. Child Psychiatry Hum Dev 41: 133-155
3. Muris P (2007) Normal and abnormal fear and anxiety in children and adolescents. Elsevier, Oxford, UK

Summary

The format for database articles in *Child Psychiatry & Human Development* is identical to that of other peer-reviewed science outlets (Abstract, Introduction, Methods, Discussion, References) with the exception that each article in the journal concludes with a section labeled *Summary*. The Summary follows the discussion section and is basically an elaborated Abstract. Please consult back issues including those online at the journal portal at http://www.springer.com/10578 for additional guidance and examples.

The corresponding author will include a summary statement, **on the title page that is separate from their manuscript,** that reflects what is recorded in the potential conflict of interest disclosure form(s).

See below examples of disclosures:

Funding: This study was funded by X (grant number X).

Conflict of Interest: Author A has received research grants from Company A. Author B has received a speaker honorarium from Company X and owns stock in Company Y. Author C is a member of committee Z.

If no conflict exists, the authors should state:
Conflict of Interest: The authors declare that they have no conflict of interest.

Research involving human participants and/or animals

1) Statement of human rights
When reporting studies that involve human participants, authors should include a statement that the studies have been approved by the appropriate institutional and/or national research ethics committee and have been performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

If doubt exists whether the research was conducted in accordance with the 1964 Helsinki Declaration or comparable standards, the authors must explain the reasons for their approach, and demonstrate that the independent ethics committee or institutional review board explicitly approved the doubtful aspects of the study.

The following statements should be included in the text before the References section:

Ethical approval: "All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

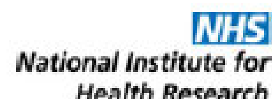
For retrospective studies, please add the following sentence:

"For this type of study formal consent is not required."

Available to view in full at https://www.springer.com/journal/10578/submission-guidelines

Appendix B – PROSPERO Protocol, CRD42020213248

PROSPERO
International prospective register of systematic reviews



UNIVERSITY of York
Centre for Reviews and Dissemination

Systematic review

Fields that have an asterisk (*) next to them means that they must be answered. Word limits are provided for each section. You will be unable to submit the form if the word limits are exceeded for any section. Registrant means the person filling out the form.

1. * Review title.

Give the title of the review in English

A systematic review of expressed emotion, attachment and parenting

2. Original language title.

For reviews in languages other than English, give the title in the original language. This will be displayed with the English language title.

3. * Anticipated or actual start date.

Give the date the systematic review started or is expected to start.

19/10/2020

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.

01/03/2021

5. * Stage of review at time of this submission.

Tick the boxes to show which review tasks have been started and which have been completed. Update this field each time any amendments are made to a published record.

Reviews that have started data extraction (at the time of initial submission) are not eligible for inclusion in PROSPERO. If there is later evidence that incorrect status and/or completion date has been supplied, the published PROSPERO record will be marked as retracted.

This field uses answers to initial screening questions. It cannot be edited until after registration.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	Yes	Yes
Risk of bias (quality) assessment	Yes	Yes
Data analysis	Yes	Yes

Provide any other relevant information about the stage of the review here.

6. * Named contact.

The named contact is the guarantor for the accuracy of the information in the register record. This may be any member of the review team.

Jamie Kennedy-Turner

Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

Mr Kennedy-Turner

7. * Named contact email.

Give the electronic email address of the named contact.

s1690949@sms.ed.ac.uk

8. Named contact address

Give the full institutional/organisational postal address for the named contact.

School of Health in Social Science,

The University of Edinburgh,

Medical School,

Teviot Place.

Edinburgh

EH8 9AG

9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.

+44 (0)7812 737336

10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

The University of Edinburgh

Organisation web address:

www.ed.ac.uk

11. * Review team members and their organisational affiliations.

Give the personal details and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong. **NOTE: email and country now MUST be entered for each person, unless you are amending a published record.**

Mr Jamie Kennedy-Turner. The University of Edinburgh
Ms Nienke van Alphen. The University of Edinburgh
Dr Helen Griffiths. The University of Edinburgh

12. * Funding sources/sponsors.

Details of the individuals, organizations, groups, companies or other legal entities who have funded or sponsored the review.

None

Grant number(s)

State the funder, grant or award number and the date of award

13. * Conflicts of interest.

List actual or perceived conflicts of interest (financial or academic).

None

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members. **NOTE: email and country must be completed for each person, unless you are amending a published record.**

15. * Review question.

State the review question(s) clearly and precisely. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS or similar where relevant.

1. Which studies explore the associations between expressed emotion (EE), attachment, and parenting factors? 2. Are certain sub-domains of EE (e.g. criticism, emotional over-involvement), or "low EE" or "high EE" families, associated with certain attachment styles or levels of attachment security? 3. Is EE, or certain

sub-domains of EE, associated with parenting factors or behaviours?

16. * Searches.

State the sources that will be searched (e.g. Medline). Give the search dates, and any restrictions (e.g. language or publication date). Do NOT enter the full search strategy (it may be provided as a link or attachment below.)

The following databases will be searched for relevant articles: ProQuest (ProQuest Dissertations and Theses Global, ASSIA); EBSCOhost (CINAHL Plus, ERIC); Ovid (PsycINFO, PsycArticles, EMBASE, Ovid MEDLINE (R) 1946 to Present, Ovid MEDLINE (R) Epub Ahead of Print, In Process and Other Non-Indexed Citations, Ovid MEDLINE (R) Daily Update); The Cochrane Library; Web of Science; OpenGrey. The reference lists of articles deemed eligible for inclusion will also be searched for further potentially relevant articles. Additional search strategy information can be found in the attached PDF document (link provided below).

17. URL to search strategy.

Upload a file with your search strategy, or an example of a search strategy for a specific database, (including the keywords) in pdf or word format. In doing so you are consenting to the file being made publicly accessible. Or provide a URL or link to the strategy. Do NOT provide links to your search results.

https://www.crd.york.ac.uk/PROSPEROFILES/213248_STRATEGY_20201014.pdf

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Yes I give permission for this file to be made publicly available

18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied in your systematic review.

There are two broad outcomes relevant to this review: attachment and parenting.

For the purposes of this review, attachment is conceptualised using commonly accepted dimensions of attachment anxiety and attachment avoidance, and will include attachment styles, such as secure, insecure-ambivalent, insecure-avoidant, and insecure-disorganised. This approach accounts for the differing conceptualisations and measurements of attachment across childhood, adolescence, and adulthood. A paper will be considered relevant to the review if it reports on any of the following using a validated observer-, clinician- or self-rated measure: caregiver-child attachment patterns, styles, security or behaviours; child attachment style, security, behaviour or state of mind; and/or parent attachment style, security, behaviour or state of mind. Parenting is a more nebulous outcome, with no single comprehensive definition and a multitude of measures examining different aspects of parenting. This study aims to take an inclusive approach and seek literature reporting associations between EE and intra- and interpersonal parenting factors. Studies will be considered relevant for this review if they report on any of the following using a validated observer-, clinician- or self-rated measure: parenting stress; beliefs; confidence or self-

efficacy; styles; skills; warmth, sensitivity, or responsiveness; practices; and/or behaviour.

19. * Participants/population.

Specify the participants or populations being studied in the review. The preferred format includes details of both inclusion and exclusion criteria.

The populations of interest to this review are infants, children and adolescents aged between 0-24 years old, and/or their parents or caregivers. Studies will be considered relevant to this review if they report on samples consisting of infants, children and adolescents aged 0-24 years, or their parents or caregivers, or families consisting of young people aged 0-24 and their parents/caregivers. Studies in which samples of young people have a mean age of 24 or under will also be deemed eligible for inclusion. Both clinical populations and general population samples will be deemed eligible for inclusion. Studies will not be excluded on the basis of young people having a clinical diagnosis of a mental, behavioural or neurodevelopmental disorder.

20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the interventions or the exposures to be reviewed. The preferred format includes details of both inclusion and exclusion criteria.

The associations between expressed emotion (EE), attachment and parenting. EE is a measure of the family emotional environment whereby communication between family members is coded for criticism, hostility, emotional over-involvement (EOI), positive remarks and warmth. The "gold standard" of EE measurement is the Camberwell Family Interview, an observer-rated semi-structured interview where family communication is coded for the above sub-domains. Perceived EE refers to EE measurement using individual self-report. Studies will be deemed eligible for inclusion if they report assessment of EE, or perceived EE, using a validated self-report or observer-rated measure, such as the Camberwell Family Interview, the Five Minute Speech Sample, the Family Attitudes Scale, the Expressed Emotion Scale, the Level of Expressed Emotion Scale and the Perceived Criticism scale. Studies which report on specific EE sub-domains (e.g. warmth, hostility, emotional over-involvement/intrusiveness, criticism) will also be considered eligible for inclusion. Studies will be excluded if they do not report measurement of EE or any EE sub-domains.

21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the intervention/exposure will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Possible comparison groups could include families coded by raters or self-reported as "low EE" or "high EE", or families of children in a clinical population and families of typically developing children. Comparison groups could also be studies which compare biological parents against other caregivers, or studies which compare the relevant outcomes across ages or genders of either young people or caregivers.

22. * Types of study to be included.

Give details of the study designs (e.g. RCT) that are eligible for inclusion in the review. The preferred format

includes both inclusion and exclusion criteria. If there are no restrictions on the types of study, this should be stated.

Studies are eligible if they are of observational quantitative design, including case series, cross-sectional, case control and cohort studies, or have a quantitative component relevant to the research questions. Papers are considered relevant if they report on attachment using a validated observer-, clinician- or self-rated measure. For example, a study would be deemed relevant for inclusion if it reported attachment security in young people and/or their parents/caregivers using a validated dimensional measure of attachment anxiety/avoidance. A paper will also be considered relevant to the review if it reports on parenting factors, as measured using a validated observer-, clinician- or self-rated measure of parenting stress, beliefs, attitudes, attributions, confidence/self-efficacy, styles, skills, warmth, sensitivity, responsiveness, practices, and/or behaviour. For example, the Parenting Stress Index is a self-report 120-item inventory designed to measure the magnitude of stress in the parent-child system. Case studies are excluded.

23. Context.

Give summary details of the setting or other relevant characteristics, which help define the inclusion or exclusion criteria.

Studies will not be excluded on the basis of context. Studies taking place in the community, online, in education or health settings will all be considered eligible. Studies will not be excluded based on country of origin, though studies will be excluded if a full-text English translation is not available.

24. * Main outcome(s).

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

The associations between expressed emotion (EE), attachment, and parenting factors. A paper will be considered relevant to the review if it reports on attachment using a validated observer-, clinician- or self-rated measure of any of the following: caregiver-child attachment patterns, styles, security or behaviours; child attachment style, security, behaviour or state of mind; and/or parent attachment style, security, behaviour or state of mind. For example, a study would be deemed relevant for inclusion if it reported attachment security in young people and/or their parents/caregivers using a validated dimensional measure of attachment anxiety/avoidance, for example, the Experience in Close Relationships Inventory Revised. A paper will also be considered relevant to the review if it reports on parenting factors, as measured using a validated observer-, clinician- or self-rated measure of parenting stress, beliefs, attitudes, attributions, confidence/self-efficacy, styles, skills, warmth, sensitivity, responsiveness, practices, and/or behaviour. For example, the Parenting Stress Index is a self-report 120-item inventory designed to measure the magnitude of stress in the parent-child system.

* Measures of effect

Please specify the effect measure(s) for you main outcome(s) e.g. relative risks, odds ratios, risk difference,

and/or 'number needed to treat.

It is anticipated that there will be considerable heterogeneity in measures reported across studies, though odds ratio is likely to be reported in some studies. A narrative synthesis approach will therefore be used to report findings in this systematic review.

25. * Additional outcome(s).

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state 'None' or 'Not applicable' as appropriate to the review

None.

* Measures of effect

Please specify the effect measure(s) for you additional outcome(s) e.g. relative risks, odds ratios, risk difference, and/or 'number needed to treat.

Not applicable.

26. * Data extraction (selection and coding).

Describe how studies will be selected for inclusion. State what data will be extracted or obtained. State how this will be done and recorded.

After completing the electronic search, the first author will screen the titles and abstracts of the retrieved records to determine whether they can proceed to full-text screening. Clearly irrelevant articles will be excluded.

Following this, a pilot phase will occur whereby the first and second authors conduct individual full-text screenings of a randomly selected subset of remaining articles. This subset will consist of at least 20% of articles retained after screening by title and abstract.

Discrepancies will be discussed and resolved by consensus, with the third author resolving any enduring disagreements.

The first author will then conduct full-text screening on all remaining articles, with the second author being shown the final set of included studies to ensure there is consensus regarding inclusion. The first author will also search the reference lists of the final set of papers for potentially eligible articles.

The following data will then be extracted from the included studies with a data extraction form created by the first author using Covidence, which will have been piloted beforehand using at least two studies:

Author names;

Publication year;

Publication type (e.g. journal article, dissertation);

Study design;

Sampling strategy and size, including attrition rates;

Sample characteristics, including age, gender, setting, family relationships between participants where

relevant, mental or behavioural disorder diagnoses where relevant;

Characteristics of the comparison group where relevant;

Expressed emotion and sub-domains, and how measured;

Attachment/parenting outcomes and how measured;

Analyses completed;

Results obtained;

Study limitations.

The first and second authors will use the data extraction form on a random subset of included articles (at least 20% of total articles eligible for inclusion) to ensure consistency in data being extracted.

Any discrepancies will be resolved through discussion and consensus, with the option to involve the third author to settle any enduring disagreements.

The extracted information will be presented in written format and visually using tables.

27. * Risk of bias (quality) assessment.

State which characteristics of the studies will be assessed and/or any formal risk of bias/quality assessment tools that will be used.

The revised 13-item Item Bank for Assessing Risk of Bias and Confounding for Observational Studies of Interventions or Exposures (RTI-IB; Viswanathan et al., 2013) is a thorough quality appraisal tool for observational studies and has been selected for use in this review.

The first and second author will complete a pilot phase of quality appraisal, whereby they will undertake independent quality assessments of a random selection of at least 20% of articles eligible for inclusion using the RTI-IB tool, which will be completed in written format and with a summary graph following Cochrane handbook guidelines, with each item on RTI-IB given a green or "+" sign, indicating low risk of bias, red or "-" indicating high risk of bias, and yellow or "?" indicating an unclear risk of bias. The first and second author's ratings will be compared, and an analysis of inter-rater reliability completed. Discrepancies will be resolved through discussion, with the option to involve the third author to settle any ongoing disputes.

Following this pilot phase, the first author will proceed to appraise the quality of remaining studies using the RTI-IB tool. Included studies quality appraisals will be summarised graphically using the format described above.

28. * Strategy for data synthesis.

Describe the methods you plan to use to synthesise data. This **must not be generic text** but should be **specific to your review** and describe how the proposed approach will be applied to your data. If meta-analysis is planned, describe the models to be used, methods to explore statistical heterogeneity, and software package to be used.

Initial scoping of extant literature revealed significant heterogeneity in the methods and measures used in

Yes

Network meta-analysis
No

Pre-clinical
No

Prevention
No

Prognostic
No

Prospective meta-analysis (PMA)
No

Review of reviews
No

Service delivery
No

Synthesis of qualitative studies
No

Systematic review
Yes

Other
No

Health area of the review

Alcohol/substance misuse/abuse
No

Blood and immune system
No

Cancer
No

Cardiovascular
No

Care of the elderly
No

Child health
Yes

Complementary therapies
No

COVID-19
No

Crime and justice
No

Dental
No

Digestive system
No

Ear, nose and throat
No

Education
No

Endocrine and metabolic disorders
No

Eye disorders
No

General interest
No

Genetics
No

Health inequalities/health equity
No

Infections and infestations
No

International development
No

Mental health and behavioural conditions
Yes

Musculoskeletal
No

Neurological
No

Nursing
No

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
No

Public health (including social determinants of health)
No

Rehabilitation

No

Respiratory disorders
No

Service delivery
No

Skin disorders
No

Social care
No

Surgery
No

Tropical Medicine
No

Urological
No

Wounds, injuries and accidents
No

Violence and abuse
No

31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is not an English language summary

32. * Country.

Select the country in which the review is being carried out. For multi-national collaborations select all the countries involved.

Scotland

33. Other registration details.

Name any other organisation where the systematic review title or protocol is registered (e.g. Campbell, or The Joanna Briggs Institute) together with any unique identification number assigned by them. If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

34. Reference and/or URL for published protocol.

If the protocol for this review is published provide details (authors, title and journal details, preferably in Vancouver format)

Add web link to the published protocol.

https://www.crd.york.ac.uk/PROSPEROFILES/213248_PROTOCOL_20201021.pdf

Or, upload your published protocol here in pdf format. Note that the upload will be publicly accessible.

Yes I give permission for this file to be made publicly available

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

35. Dissemination plans.

Do you intend to publish the review on completion?

Yes

Give brief details of plans for communicating review findings.?

A journal article will be submitted for publication to a relevant international peer-reviewed journal (e.g. Child Psychiatry and Human Development). The researcher will also submit abstracts for poster presentations at research conferences in Scotland and elsewhere. Offers will be made to NHS Lothian CAMHS teams to give presentations updating staff of findings, as part of continuing professional development. Project information will be uploaded to the University of Edinburgh DClinPsychol Theses and Publications Database, and an abstract added to the researcher's ResearchGate profile. The findings will also be shared with local research networks and relevant third sector organisations (e.g. Scottish Association for Mental Health, YoungMinds).

36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords help PROSPERO users find your review (keywords do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

Attachment

Children

Adolescents

Young people

Parenting

Parents

Mental health

Behavioural

37. Details of any existing review of the same topic by the same authors.

If you are registering an update of an existing review give details of the earlier versions and include a full bibliographic reference, if available.

38. * Current review status.

Update review status when the review is completed and when it is published.New registrations must be ongoing so this field is not editable for initial submission.
Please provide anticipated publication date

Review_Ongoing

39. Any additional information.

Provide any other information relevant to the registration of this review.

40. Details of final report/publication(s) or preprints if available.

Leave empty until publication details are available OR you have a link to a preprint (NOTE: this field is not editable for initial submission). List authors, title and journal details preferably in Vancouver format.

Give the link to the published review or preprint.

The protocol is available to view at https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=213248

Appendix C – Revised Item Bank for Assessing Risk of Bias and Confounding of Observational Studies of Interventions or Exposures (RTI-IB)

Item	Type of bias assessed	Included?	Responses
1. Do the inclusion/exclusion criteria vary across the comparison groups of the study?	Selection bias	Yes	Yes, varies OR partially; some but not all criteria, applied to all groups nor not clearly stated if some criteria are applied to all groups (high risk of bias) No, does not vary (low risk of bias) Cannot determine: article does not specify (unclear risk of bias) Not applicable: study has only one group and so does not include comparison groups.
2. Does the strategy for recruiting participants into the study differ across groups?	Selection bias, confounding	Yes	Yes, differs (high risk of bias) No, does not differ (low risk of bias) Cannot determine (unclear risk of bias) Not applicable: only one study group
3. Is the selection of the comparison group inappropriate, after taking into account feasibility and ethical considerations?	Selection bias, confounding	Yes	Yes, inappropriate (high risk of bias) No, not inappropriate (low risk of bias) Cannot determine or no description of the derivation of the comparison group (unclear risk of bias) Not applicable: study does not include a comparison group (case series, one study group)
4. Does the study fail to account for important variations in the execution of the study from the proposed protocol?	Performance bias	No	Yes, fails to account OR partially fails to account (high risk of bias) No, does not fail to account (low risk of bias) Cannot determine (unclear risk of bias)

				Not applicable: not an intervention study or no variations.
5.	Was the outcome assessor not blinded to the intervention or exposure status of participants?	Detection bias	Yes	No, not blinded (high risk of bias) Yes, blinded (low risk of bias) Cannot determine (unclear risk of bias) Not applicable: assessor cannot be blinded
6.	Were valid and reliable measures implemented consistently across all study participants used to assess inclusion/exclusion criteria, intervention/exposure outcomes, participant health benefits and harms, and confounding?	Detection bias, confounding	Yes	No, valid and reliable measures not used (high risk of bias) Yes, valid and reliable measures used (low risk of bias) Cannot determine, or measurement approach is not reported (unclear risk of bias)
7.	Was the length of follow-up different across study groups?	Attrition bias	No	Yes, different (high risk of bias) No, not different, or remedied through analysis (low risk of bias) Cannot determine (unclear risk of bias) Not applicable: cross-sectional or only one group followed over time
8.	In cases of high loss to follow-up (or differential loss to follow-up), was the impact assessed (e.g., through sensitivity analysis or other adjustment methods)?	Attrition bias, detection bias	No	Yes, impact assessed (low risk of bias) No, impact not assessed (high risk of bias) Cannot determine (unclear risk of bias) Not applicable: no loss to follow-up or loss to follow-up was not considered to be high, cross-sectional study or case-control study selected on outcome.
9.	Are any important primary outcomes missing from the results?	Selective outcome reporting	Yes	Yes, important outcome(s) missing (high risk of bias) No important outcome(s) missing (low risk of bias) Cannot determine (unclear risk of bias)

10. Are any important harms or adverse events that may be a consequence of the intervention/exposure missing from the results?	Selective outcome reporting	No	Yes, important outcomes missing (high risk of bias) No important outcomes missing (low risk of bias) Assessment of harms not applicable to this study
11. Are the results believable taking study limitations into consideration?	Overall assessment	Yes	Yes, believable (low risk of bias) No, not believable (high risk of bias) Cannot determine (unclear risk of bias)
12. Any attempt to balance the allocation between the groups or match groups (e.g., through stratification, matching, propensity scores)?	Confounding	Yes	Yes, or study accounts for imbalance between groups through a post hoc approach such as multivariate analysis (low risk of bias) No or cannot determine (high risk of bias) Not applicable: study does not include a comparison group (case series or one study group)
13. Were important confounding variables not taken into account in the design and/or analysis (e.g., through stratification, interaction terms, multivariate analysis, or other statistical adjustment such as instrumental variables)?	Confounding	Yes	Yes, not accounted for or not identified OR Partially, some variables taken into account or adjustment achieved to some extent (high risk of bias) No, taken into account (low risk of bias) Cannot determine (unclear risk of bias)

The original tool is available to view at https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/rti-item-bank_research.pdf

Appendix D – *Journal of Youth and Adolescence* author submission guidelines (relevant sections)

Types of papers

Empirical Research, Book Review, Editorial.

Editorial procedure

Double-blind peer review

This journal follows a double-blind reviewing procedure. Authors are therefore requested to submit:

A blinded manuscript without any author names and affiliations in the text or on the title page. Self-identifying citations and references in the article text should be avoided.

A separate title page, containing title, all author names, affiliations, and the contact information of the corresponding author. Any acknowledgements, disclosures, or funding information should also be included on this page.

Manuscript selection

The Editor and Editorial Board members control manuscript review and selection. Manuscripts are reviewed by the Editor, the Editorial board and perhaps by invited reviewers with special competence in the area represented by the manuscript. The Editor determines whether the manuscript will be sent for review. The Editor's decision depends on the relative importance, scientific rigor, and appropriateness of submissions to the journal readership. The Editor retains the discretion to integrate solicited reviews with his own opinions and recommendations into a determinative response.

Title page

The title page should include:

The name(s) of the author(s)

A concise and informative title

The affiliation(s) and address(es) of the author(s)

The e-mail address, telephone and fax numbers of the corresponding author

Abstract

Please provide an abstract of 120 words or less. The abstract should not contain any undefined abbreviations or unspecified references.

Keywords

Please provide 4 to 6 keywords which can be used for indexing purposes.

Text

Text Formatting

Manuscripts should be submitted in Word.

Use a normal, plain font (e.g., 10-point Times Roman) for text.

Use italics for emphasis.

Use the automatic page numbering function to number the pages.

Do not use field functions.

Use tab stops or other commands for indents, not the space bar.

Use the table function, not spreadsheets, to make tables.

Use the equation editor or MathType for equations.

Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Manuscripts with mathematical content can also be submitted in LaTeX.L

Headings

Please use no more than three levels of displayed headings.

Abbreviations

Abbreviations should be defined at first mention and used consistently thereafter.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other

statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

Empirical articles must have the following major sections

Introduction (although not labeled as such)

Hypotheses (remind readers of rationales and actually make testable predictions or explain why you cannot predict)

Method (include demographic information about participants, such as race, ethnicity, and sex; have a subheading for each key variable, followed by appropriate text describing the variable and its effectiveness)

Results

Discussion

References

Appendices (if appropriate)

Manuscript Length

Manuscripts should not exceed 25-30 pages (including text, references, tables and figures); the Editor considers exceptions if authors provide adequate justifications when they submit their manuscripts. It is expected that the review process will result in an additional 5 to 10 pages of text.

Terminology

Please use the standard mathematical notation for formulae, symbols etc.:Italic for single letters that denote mathematical constants, variables, and unknown quantities Roman/upright for numerals, operators, and punctuation, and commonly defined functions or abbreviations, e.g., cos, det, e or exp, lim, log, max, min, sin, tan, d (for derivative) Bold for vectors, tensors, and matrices.

Nonsexist Language

Authors must use nonsexist language. Make correct use of the terms "gender" and "sex." The term "gender" refers to culture and should be used when referring to men and women as social groups. The term "sex" refers to biology and should be used to emphasize biological distinctions.

Tenses

Carefully use tenses. The past tense refers to a past study. Specific results are written in the past tense, given that the study already has been completed. Use the present tense to refer to results (i.e., "the results indicate. . .") when your narrative refers to hypotheses that are being discussed in the present.

Active Voice

Use an active voice. Consult The Elements of Style (W. Strunk, Jr. & E.B. White) and Style: Writing with Clarity and Grace (J. M.Williams).

References

Citation

Cite references in the text by name and year in parentheses. Some examples:

Negotiation research spans many disciplines (Thompson 1990).

This result was later contradicted by Becker and Seligman (1996).

This effect has been widely studied (Abbott 1991; Barakat et al. 1995; Kelso and Smith 1998; Medvec et al. 1999).

Ideally, the names of six authors should be given before et al. (assuming there are six or more), but names will not be deleted if more than six have been provided.

Reference list

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list.

Reference list entries should be alphabetized by the last names of the first author of each work.

Journal names and book titles should be *italicized*.

If available, please always include DOIs as full DOI links in your reference list (e.g. “https://doi.org/abc”).

Journal article Grady, J. S., Her, M., Moreno, G., Perez, C., & Yelinek, J. (2019). Emotions in storybooks: A comparison of storybooks that represent ethnic and racial groups in the United States. *Psychology of Popular Media Culture, 8*(3), 207–217. https://doi.org/10.1037/ppm0000185

Article by DOI Hong, I., Knox, S., Pryor, L., Mroz, T. M., Graham, J., Shields, M. F., & Reistetter, T. A. (2020). Is referral to home health rehabilitation following inpatient

rehabilitation facility associated with 90-day hospital readmission for adult patients with stroke? *American Journal of Physical Medicine & Rehabilitation*. Advance online publication. https://doi.org/10.1097/PHM.0000000000001435

Book Sapolsky, R. M. (2017). *Behave: The biology of humans at our best and worst*. Penguin Books.

Book chapter Dillard, J. P. (2020). Currents in the study of persuasion. In M. B. Oliver, A. A. Raney, & J. Bryant (Eds.), *Media effects: Advances in theory and research* (4th ed., pp. 115–129). Routledge.

Online document Fagan, J. (2019, March 25). *Nursing clinical brain*. OER Commons. Retrieved January 7, 2020, from https://www.oercommons.org/authoring/53029-nursing-clinical-brain/view

For authors using EndNote, Springer provides an output style that supports the formatting of in-text citations and reference list.

Tables

All tables are to be numbered using Arabic numerals.

Tables should always be cited in text in consecutive numerical order.

For each table, please supply a table caption (title) explaining the components of the table.

Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.

Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

Figure Lettering

To add lettering, it is best to use Helvetica or Arial (sans serif fonts).

Keep lettering consistently sized throughout your final-sized artwork, usually about 2–3 mm (8–12 pt).

Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.

Avoid effects such as shading, outline letters, etc.

Do not include titles or captions within your illustrations.

Figure Numbering

All figures are to be numbered using Arabic numerals.

Figures should always be cited in text in consecutive numerical order.

Figure parts should be denoted by lowercase letters (a, b, c, etc.).

If an appendix appears in your article and it contains one or more figures, continue the consecutive numbering of the main text. Do not number the appendix figures,"A1, A2, A3, etc." Figures in online appendices [Supplementary Information (SI)] should, however, be numbered separately.

Figure Captions

Each figure should have a concise caption describing accurately what the figure depicts. Include the captions in the text file of the manuscript, not in the figure file.

Figure captions begin with the term Fig. in bold type, followed by the figure number, also in bold type.

No punctuation is to be included after the number, nor is any punctuation to be placed at the end of the caption.

Identify all elements found in the figure in the figure caption; and use boxes, circles, etc., as coordinate points in graphs.

Identify previously published material by giving the original source in the form of a reference citation at the end of the figure caption.

Figure Placement and Size

Figures should be submitted separately from the text, if possible.

When preparing your figures, size figures to fit in the column width.

For large-sized journals the figures should be 84 mm (for double-column text areas), or 174 mm (for single-column text areas) wide and not higher than 234 mm.

For small-sized journals, the figures should be 119 mm wide and not higher than 195 mm.

Available to view in full at https://www.springer.com/journal/10964/submission-guidelines#Instructions%20for%20Authors_Informed%20consent

Appendix E – School of Health in Social Science ethics application form and approval

University of Edinburgh, School of Health in Social Science

Research Ethics, Integrity and Governance

The forms required when seeking ethical approval in the School of Health and Social Sciences have now been merged into this single electronic document. The sections you are required to complete will depend on the nature of your application. Please start to complete the form from the beginning and proceed as guided. On completion the *entire* document should be submitted electronically to your section's ethics administrator using the email addresses detailed on the final page.

Applications submitted without appropriate documentation will be returned.

Please work your way through this form, reading the questions and accompanying information carefully. Sections highlighted in yellow are mandatory, so you must answer all the questions in these sections.

Aside from the mandatory questions you won't always need to answer all of the questions in the form. Section 1 "your project details" includes a set of filter questions that determine the rest of the questions you need to answer. Please read the notes carefully to make sure you answer the right questions. The notes contain hyperlinks so you can jump directly to the relevant section.

Sections highlighted in yellow are **mandatory**. These must be completed for every application.

Section 1: Introduction

Section 2: Your project details

Section 3: Description of the research

Section 4: Potential risks to participants and researchers

Section 5: Participants and data subjects

Section 6: Participants or data subject information and consent

Section 7: Confidentiality and handling of data

Section 8: Security sensitive material

Section 9: Copyright

Section 10: Good conduct in collaborative research

Section 11: Good conduct in publication research

SECTION 1: Introduction

This is a:

New application for ethical approval – first submission ☒

A resubmission following reviewer comments ☐

A resubmission with requested amendments ☐

Please select your School:

☒ School of Health in Social Science

Please select your subject area

☐ CPASS

☒ Clinical Psychology

☐ Nursing Studies

It is each researcher's responsibility to check whether their project requires Sponsorship, Caldicott Approval, R&D approval, and/or IRAS. https://www.ed.ac.uk/health/research/ethics/sponsorship-and-governance

If the project requires any of these, these need to be secured prior to submitting this application.

Please tick the relevant box before proceeding:

I have checked and this project does not require Sponsorship, Caldicott, R&D and/or IRAS approval ☐

My project requires Sponsorship ☒ Sponsorship letter attached ☐

My project requires Caldicott approval ☐ Caldicott approval letter/e-mail attached ☐

My project requires R&D approval ☐ R&D approval letter/e-mail attached ☐

My project requires IRAS approval ☐ IRAS approval letter/e-mail attached ☐

External Research Ethics Approval

Does your research project require the approval of any other institution and/or ethics committee, nationally or internationally?

Please state the name of the review body and the current status of your application (for example, submitted, approved, deferred, or rejected)? Please include any known submission / approval timelines.

N/A

SECTION 2: Your project details

2.1 Project details

Your name: Jamie Kennedy-Turner

Please enter your project title: Exploring the associations between Mentalisation, Expressed Emotion, Self-Harm and Attachment in late adolescence (MEESHA)

Proposed Project Start Date: 24th August 2020

Proposed Project End Date: 30th April 2021

Q1. Are you a member of staff or a student?

☐ Staff member

Supplementary questions for staff members only:

List the names and institutions of any Co-Investigators working with you on the project.

☒ Student

Supplementary questions for students only:

What type of student are you?

Doctoral student, second year

Please provide your course title or programme name

Doctorate in Clinical Psychology (DClinPsych)

Who is your supervisor?

Dr Helen Griffiths (Programme Director, The University of Edinburgh)

Dr Vilas Sawrikar (Lecturer in Clinical Psychology, The University of Edinburgh)

Q2. Please indicate any external ethical guidance your project has to adhere to. For example, the British Psychological Society (BPS), the British Academy, the British Association of Sport and Exercise Sciences (BASES)

BPS Code of Human Research Ethics (2018)

BPS Ethics Guidelines for Internet Mediated Research (2017)

2.2 Participants

Q3. Will you be collecting or generating any new data (including autoethnographic writings)?

☒ Yes

☐ No

Q4. Will you be extracting, re-coding or using existing data that contains sensitive information (i.e., identifiable information)?

☐ Yes

☒ No

If the answers to both Q3 and Q4 are 'no' you are not required to complete:

Section 4: Potential risks to participants and researchers

Section 5: Participants and data subjects

Section 6: Participant or data subject information and consent

2.3 Security-Sensitive Material

Q5. Does your research project fit into any of the following security-sensitive categories?

☐ Your research project is commissioned by the military.

☐ Your research project is commissioned under an EU security cell.

☐ Your research project involves the acquisition of security clearances.

☐ Your research project concerns groups which may be construed as terrorist or extremist

If you answer 'yes' to any of the questions above you must complete Section 8 Security Sensitive Material. You must answer all questions in the section.

2.4 Good Conduct in Collaborative Research

Q6. Will your research project involve collaborative work?

☐ Yes

☐ No

Selecting "Yes" to this question means you must complete Section 10 "Good conduct in collaborative research" later in the form. You must answer all questions in the section.

2.5 Project Funding

Q7. Is funding required for your research project? (To be completed by staff only)

Please indicate how the project will be financially supported.

2.6 Knowledge Exchange and Impact

Q8. Will there be any knowledge exchange and impact activities associated with this project? (To be completed by staff only)

2.7 Consultancy Potential

Q9. Could your research project lead to potential consultancy activities in the future? (To be completed by staff only)

SECTION 3: Description of the research

Q10: Please use the box below to describe your research; including a background summary, rationale, research questions and hypotheses, methodology, procedures. If you have identified ethical considerations that are not addressed in other parts of the form, please outline and discuss them here.

Background Summary and Rationale

Non-fatal self-harm, henceforth self-harm, can be defined as "self-poisoning or self-injury irrespective of motivation or extent of suicidal intent (excluding accidents, substance misuse and eating disorders)" (Teuton et al., 2014, p.6). Self-harm is common in adolescence (Plener et al., 2015), with average onset between 13-17 years and a higher incidence in females (Klonsky & Muehlenkamp, 2007; O'Connor et al., 2018). Prevalence estimates vary, but Scottish adolescent samples report prevalence rates of 13.8-16% for at least one lifetime incident of self-harm. Adolescent self-harm is a major public health concern (Scottish Government, 2011, 2017, 2018), as self-harm is a strong predictor of further self-harm, suicide attempt and completed suicide, particularly when onset occurs at earlier ages (Andover et al., 2012; O'Connor et al., 2018). Self-harm is associated with psychological distress, suicidal and self-injurious ideation, depression, anxiety, low self-esteem, eating disorders, borderline personality disorder (BPD) and substance misuse (Cipriano et al., 2017; Fergusson et al., 2005; Hawton et al., 2007; Hawton et al., 2012; O'Connor et al., 2009).

Self-harm likely results from the convergence of multiple biopsychosocial factors (see Cipriano et al., 2017, and Fox et al., 2015) , with insecure attachment frequently cited as a risk factor for self-harm (Glazebrook et al., 2015, 2016; Gratz, 2003; Gratz et al., 2002; Hallab & Covic, 2010). A strong evidence base suggests that the family environment is a key factor in the development of self-harm (Michelson & Bhugra, 2012) and emerging evidence also indicates adolescent self-harm may be associated with Expressed Emotion (EE), a multi-dimensional measure of familial emotional environment (Brown, 1985). Wedig and Nock (2007) and James & Gibb (2019) reported that critical comments (a dimension of the EE construct) are strongly correlated with adolescent self-harm, adding to evidence indicating that parent-child communication and families emotional environment are linked to self-harm in adolescence (see Fortune et al., 2016, and Michelson & Bhugra, 2012). There are also early indications that adolescent self-harm may be associated with mentalisation, or reflective functioning (RF), a complex psychological process referring to the ability to understand and reflect on the behaviour of oneself and others as motivated by internal experiences, such as thoughts, feelings, beliefs and goals (Fonagy et al., 1998). Studies by Badoud et al. (2015) and Bo & Kongerslev (2017) reported that adults and adolescents with lower RF are more likely to engage in self-harm and risk-taking behaviour. The finding that

RF and self-harm may be associated is consistent with broader literature in similar yet distinct areas. Mentalisation-based therapy (MBT) is a therapeutic intervention aimed at enhancing mentalisation capacity, and early evidence suggest efficacy in reducing self-harm in patients presenting with BPD-consistent symptoms (Bateman & Fonagy, 2009; Ougrin et al., 2015; Rossouw & Fonagy, 2012). Furthermore, theoretical accounts of self-harm hypothesise it is involved in intrapersonal affect regulation and interpersonal regulation (e.g. communicating distress) (Bentley et al., 2014; Nock, 2009), both also theoretical functions of RF (Fonagy et al., 1998, 2004).

Given the health harms associated with self-harm, greater understanding of self-harm's aetiology is necessary to develop effective public health and clinical interventions for young people and their families. If the factors contributing to self-harm can be identified, then interventions can be targeted at the contributing factors with the hope that this will lead to a reduction in self-harm and subsequent negative health outcomes.

Research questions and hypotheses

This study aims to investigate the relationships between perceived EE and adolescent non-fatal self-harm, with the aim of answering the following research questions:

Primary Research Question

What is the relationship between perceived EE, attachment insecurity, RF and self-harm in the general late adolescent population?

Secondary Research Questions:

Does pEE predict adolescent self-harm?

Does attachment security and/or RF mediate these hypothetical relationships?

Are these hypothesised relationships moderated by level of psychological distress, age, gender, and/or the nature of the caregiving relationship?

The hypotheses of the study are that there will be a direct relationship between greater levels of pEE (particularly perceived criticism) and self-harm, and that this relationship will be mediated by levels of attachment security and/or RF (see Figure 1 below for a diagrammatic representation of the theoretical model).

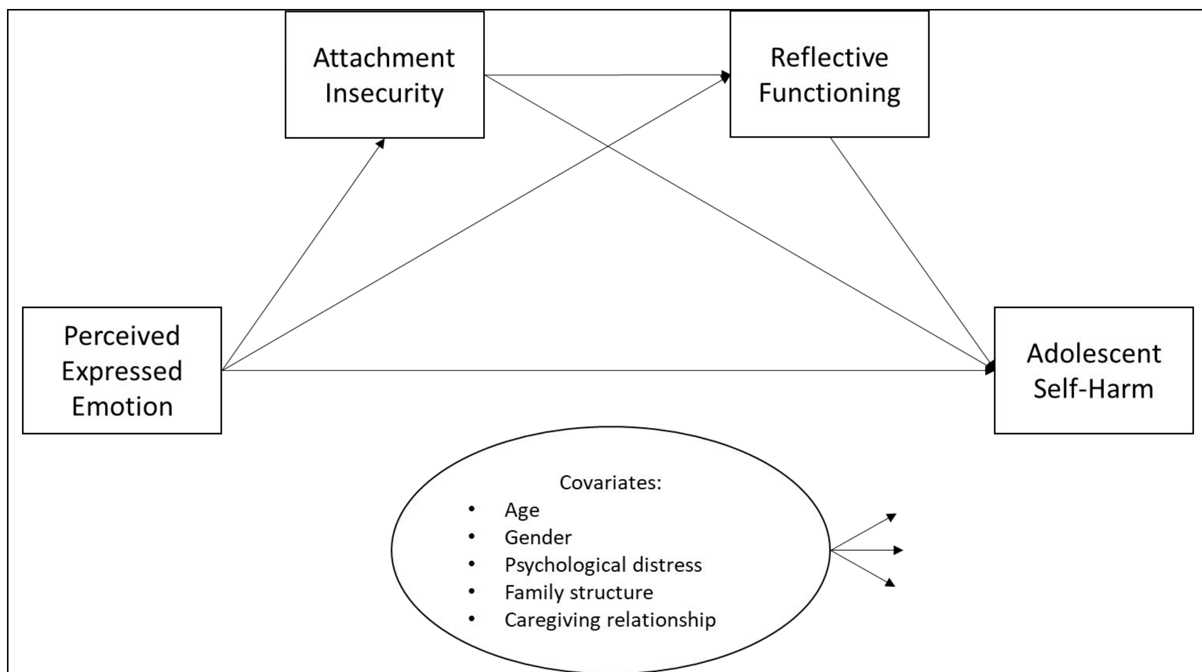


Figure 1 – Theoretical model of associations between attachment insecurity, pEE, RF and self-harm

Methodology

Design

This study will use a single-stage population-based cross-sectional survey design. It will be internet-mediated research (IMR), using an open online survey containing self-report psychometric questionnaires targeting adolescents and young adults aged between 16 to 24. An IMR cross-sectional design was selected as a fast, inexpensive method of quantitatively exploring the relationships between the variables of interest, with the results of this study potentially forming the basis for further research of cohort or longitudinal design (Setia, 2016).

Survey instrument

The project will use the web-based survey software Qualtrics XM to create, publish and distribute the survey, and to collate the responses. The College of Arts, Health and Social Sciences at the University of Edinburgh have licensed Qualtrics as their preferred survey tool and have agreed robust and fully compliant data and use agreements to protect researchers, respondents, and their data.

Population

Young people aged between 16 to 24 years will be eligible to participate in the online survey. This age range was selected in keeping with modern conceptualisations of late

adolescence (Sawyer et al., 2018) and in accordance with legal guidelines on capacity to provide fully informed consent, which is assumed in Scotland from 16 years of age onwards.

The survey link will be distributed through a wide variety of means to increase the likelihood of receiving responses from a representative sample (Branley et al., 2014), including social media, mailing lists (e.g. the School of Health in Social Science mailing lists at the University of Edinburgh), student participation pools, dedicated participation sites (e.g. Social Psychology Network, Online Psychology Research) and other websites and forums (e.g. The Student Room, the Social Research Forum). Local organisations will also be approached and asked for their assistance in distributing the link (e.g. Penumbra, YoungScot, etc). Use of "snowball sampling" whereby participants can share the link with other potential participants via making the link available to participants to share on social media should they choose to.

As with much IMR relying on self-report, the researcher will be unable to verify that respondents meet the inclusion criteria. In an attempt to mitigate this, the survey will make it clear in the information page that only 16 to 24-year olds should proceed with the survey. The survey will contain an eligibility check before the online consent form asking individuals to confirm that they are aged between 16-24 years, which will be a required item. Any respondents selecting "No" will be redirected to the final survey page thanking them for their interest. Furthermore, in the demographics questionnaire, participants will be asked to confirm their age, and any participants selecting answers "Below 16" or "Above 24" will be redirected in the same way. It is hoped that this will ensure that the sample remains true to the target population, though the researcher acknowledges the limitations of this approach.

Questionnaires

The research survey has been designed with consideration for the BPS Ethical Guidelines regarding IMR (British Psychological Society, 2017) and other research into IMR in mental health practice (Bartell & Spyridakis, 2012; Hoerger, 2010; Kraut et al., 2004; Pitman et al., 2015). Attempts have been made to keep participant burden low by selecting the brief versions of self-report questionnaires where available and psychometrically sound.

Demographic information

A brief questionnaire was devised to gather information about participants' age, gender identity, and information about their families of origin and childhood attachment figures, including their primary caregivers' genders, relationships to each other and relationship to the participant growing up (e.g. biological parent, step-parent, children of same-sex couples, kinship care arrangements, etc). Participants will also be asked whether they are still living with their childhood caregivers for most of an average week (i.e. four or more days out of a seven-day week) or whether they have moved out from the family home. Participants will be asked to give a name or nickname for their parent/caregiver(s); this will

help to personalise the subsequent questionnaires for them and will not be used for any other purpose in data analysis.

Psychological distress

Patient Health Questionnaire (PHQ-9, Kroenke et al., 2001)

The PHQ-9 is a 9-item self-report measure which has demonstrated adequate reliability, convergent/discriminant validity, robustness of factor structure and responsiveness to change in a Scottish primary care sample (Cameron et al., 2008) and sample of patients receiving e-CBT for depression (Titov et al., 2011). The PHQ-9 has been validated for use with adults and adolescents as young as 13 years (Richardson et al., 2010). It is also quick to complete and free to use. This questionnaire takes approximately 1 minute to complete.

General Anxiety Disorder questionnaire (GAD-7, Spitzer et al., 2006)

The GAD-7 is a 7-item self-report measure developed as a screening tool for generalised anxiety symptoms which has been validated for use with adolescents as young as 12 years (Mossman et al., 2017). The GAD-7 reported good reliability, as well as criterion, construct, factorial and procedural validity (Spitzer et al., 2006), with cross-cultural validation of its reliability and validity for use with adolescents (Adjorlolo, 2019; Tiirikainen et al., 2019). This questionnaire takes approximately 1 minute to complete.

Attachment security

The Experiences in Close Relationships – Relationship Structures questionnaire (ECR-RS, Fraley et al., 2011)

The ECR-RS is a brief 9-item self-report measure designed to assess individual's attachment on two dimensions, attachment anxiety and attachment avoidance, with higher scores on each dimension indicating a greater level of attachment insecurity. It is usually administered four times, asking questions about mother, father, romantic partner and friend attachments, though recently Fraley and colleagues have introduced a more "global" assessment about individuals' feelings about their close relationships "in general". The ECR-RS as usually administered has been validated for use with adolescents as young as 15 years (Donbaek & Elklit, 2014) and reported good reliability and factor structure (Fraley et al., 2011). This questionnaire takes approximately 1 minute to complete.

Perceived Expressed Emotion

Level of Expressed Emotion scale (LEE, Cole & Kazarian, 1988)

The LEE is a self-report measure designed to assess perceived EE in the family. It has undergone substantial revision over the years, from an original 60-item measure (Cole & Kazarian, 1988) to a 33-item or 38-item measure depending on the study and whether or not an additional measure of perceived criticism is included, as was done by Gerlsma & Hale (1997). Hale et al. (2007) investigated the factor structure of the 38-item LEE when used

with an adolescent sample, finding that the LEE's original four-factor structure applied to adolescents as it does for adults. These four subscales are perceived lack of emotional support, perceived intrusiveness, perceived irritation and perceived criticism. Hale et al. (2007) reported good internal consistency and significant inter-correlations between the subscales. They concluded that the LEE may be a good instrument in the measurement of adolescent perceived EE. Similar results were obtained for the shortened 33-item scale by Nelis et al. (2011), which omits the perceived criticism subscale. This questionnaire takes between 2 to 3 minutes to complete.

Perceived Criticism Scale (PCS; Hooley & Teasdale, 1989)

The PCS is a simple measure of perceived criticism which can be administered to patients and family members, consisting of two Likert scales asking individuals to rate how critical they perceive the family member to be, and how critical they perceive themselves to be of their family member. No validation of this measure currently exists with adolescent samples, however, the simplicity of the measure and ease of completion lends itself well to this study, coupled with its good reported correlations with EE as measured by the Camberwell Family Interview, considered to be the "gold standard" of EE measurement (Hooley & Parker, 2006). This questionnaire takes under a minute to complete.

Self-Harm

Risk Taking and Self-Harm Inventory for Adolescents (RTSHIA; Vrouva et al., 2010)

The RTSHIA is a self-report measure with two subscales assessing an individual's risk-taking (9 items) and self-harm behaviour (18 items). The self-harm and risk-taking factors of the RTSHI evidenced high internal consistency, test-retest reliability and sufficient validity in a sample of adolescent participants, with further validation available from a Portuguese sample of adolescents (Xavier et al., 2019). For the purposes of this research, only the self-harm subscale will be included. This questionnaire takes approximately 1 to 3 minutes to complete.

Reflective Functioning

Reflective Functioning Questionnaire Youth – Short Version (RFQY; Fonagy et al., 2016; Ha et al., 2013; Sharp et al., 2009)

The RFQY is a 46-item self-report measure which has evidenced adequate internal consistency, convergent validity, and reliability in adolescent samples. The decision has been taken to use the shortened 8-item version of this questionnaire to reduce burden placed on participants. This questionnaire takes approximately 1 minute.

Procedure

Following ethical approval, the survey link hosted by Qualtrics will be distributed by multiple different means (listed above) in targeted ways to increase the volume of

responses and likelihood that an appropriate sample will provide responses (e.g. focusing recruitment strategies through colleges, local charities and organisations for adolescents and young adults).

The online survey will begin with a detailed information page explaining the purpose of the research, what participation will involve, possible risks, what will happen to the information they provide, and contact information for the research team. It will then ask participants to provide informed consent by reading a series of statements and answering a required yes/no question to indicate consent.

Participants will then be asked to provide limited demographic information as described above. Following this, participants will be asked to complete each of the outcome measures in turn, with LEE, PCS and ECR-RS ratings made for each caregiver identified in the demographic questionnaire. Participants may

Once participants have completed the questionnaires, they will be taken to a page thanking them for their participation and providing debriefing information, with links to mental health websites and the contact details for the research team and support helplines available, plus guidance on how to seek help should their participation in the questionnaire have been in any way distressing. Participants will also be provided with a link to the study Facebook page, with a note advising them to make a note of these or the researchers' contact details should they wish to receive any further information about the study or the results obtained.

Participants' rights to withdraw data have been considered in line with ethical guidance for IMR from the British Psychological Society (2017). Participants will be advised that partially completed surveys may still be used in data analyses unless participants clearly indicate that that would like to withdraw their responses by clicking on the "Withdraw" button included at the bottom of each survey page; this will redirect participants to the survey debrief page. Participants will be advised at the beginning of the survey prior to consenting that as their responses are anonymous, it will not be possible to withdraw their results after they have completed the survey, and that results will only be withdrawn should they press the "Withdraw" button while completing the survey.

Risk management and safety of participants is of the utmost importance to this research. At the bottom of each page of the questionnaire, included in the footer, will be the contact details of mental health support lines and guidance suggesting that participants speak with NHS 111 or their GP should they feel adversely affected by participation in any way. This advice will be reiterated in the debrief page, alongside the contact information for helplines (e.g. Samaritans) and links to mental health websites (e.g. Mind, ReThink, etc).

SECTION 4: Potential risks to participants and researchers

Q11. Is your research project likely or possible to induce any psychological stress or discomfort in the participants or others, indirectly associated with the research?

☒ Yes

☐ No

If "yes" state the types of risk and what measures will be taken to deal with such problems

It is possible that answering some of the psychometric questionnaires will be distressing or triggering for some participants, given the subject matter of some of the questionnaires (e.g. emotional wellbeing, close relationships, self-harm). To minimize the risk of this, each page of the questionnaire will have a footer detailing mental health support services and helplines, and guidance on seeking support from NHS 111 or the participants GP should they feel distressed. There will also be a page at the end of the questionnaire with debriefing information for participants and helpful mental health websites and helplines, as well as guidance on how to go about seeking mental health support.

Q12. Does your research project require any physically-invasive or potentially physically harmful procedures?

☐ Yes

☒ No

If "yes" give details and outline procedures to be put in place to deal with potential problems.

N/A

Q13. Does your research project require the use of privacy-invasive technology, such as CCTV, biometrics, facial recognition, vehicle tracking software?

☐ Yes

☒ No

If "yes" - Give details and outline procedures to be put in place to deal with potential problems.

N/A

Q14. Does your research project involve the investigation of any illegal behaviour or activities?

☐ Yes

☒ No

If "yes" - Give details of any illegal behavior or activities you may investigate

N/A

Q15. Is it possible that your research project will lead to awareness or the disclosure of information about child abuse or neglect?

☐ Yes

☒ No

If "yes" - Indicate the likelihood of disclosure and the procedures to be followed if you become aware that a child has been or may be at risk of harm

Though the study will ask questions about the nature of participants close relationships with caregivers, no questions directly ask about abuse or neglect, and only participants aged over 16 years will be eligible to participate.

Q16. Is it likely that dissemination of research findings or data could adversely affect participants or others indirectly associated with the research?

☐ Yes

☒ No

If "yes" - Describe the potential risk for participants/data subjects of this use of the data. Outline any steps that will be taken to protect participants.

N/A

Q17. Could participation in this research adversely affect participants and others associated with the research in any other way?

☐ Yes

☒ No

If "yes" - Describe the possible adverse effects and the procedures to be put in place to protect against them.

N/A

Q18. Is this research expected to benefit the participants, directly or indirectly?

☐ Yes

☒ No

If "yes" - Give details of how this research is expected to benefit the participants.

N/A

Q19. Will the true purpose of the research be concealed from the participants/data subjects?

☐ Yes

☒ No

If "yes" - Explain what information will be concealed and why.

N/A

Q20. Will participants/data subjects be debriefed at the conclusion of the study?

☒ Yes

☐ No

If "no" – Why will participants / data subjects not be debriefed?

N/A

Q21. At any stage in this research could researchers' safety be compromised, or could the research induce emotional distress in the researchers?

☐ Yes

☒ No

If "yes" - Give details and outline procedures to be put in place to deal with potential problems.

N/A

Please tick to confirm you agree with the following:

I will adhere to School guidance on risk assessment and health and safety and will seek advice on project and travel insurance prior to project commencement.

☒ I agree

☐ I do not agree

☐ Not applicable

<u>SECTION 5: Participants and data subjects. For autoethnographic research also include those who may feature in your writings.</u>

Q22. How many participants or data subjects are expected to be included in your research project?

In order to complete the intended data analysis, namely a serial multiple mediation analysis, sample size calculations indicated that a minimum of 276 participants would be required in order to be adequately powered.

Given that this is a substantial number of respondents, the researcher has a secondary data analysis plan of conducting a multiple regression analysis with four predictor variables (pEE, RF, attachment insecurity and psychological distress) and one outcome (self-harm). A sample size calculation for this method of analysis was computed and resulted in recommended minimum of 84 respondents.

Q23. What criteria will be used in deciding on the inclusion and exclusion of participants/data subjects in your research project?

Participants will be eligible to participate in the anonymous online survey if they are aged between 16 and 24 years. Participants will be excluded from the study if they give any indication in their responses to certain survey questions that they are outside this age range.

Q24. Are any of the participants or data subjects likely to be under 16 years of age?

☐ Yes

☒ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

As with much internet-mediated research, it is possible that anonymous respondents will not be aged within the specified range for the study. The researcher has hoped to mitigate this by making it clear that the research project is only for those aged between 16-24, asking participants to confirm when giving consent that they are aged between 16-24 and redirecting any participants who indicate that they are not.

Q25. Are any of the participants or data subjects likely to be children in the care of a Local Authority?

☐ Yes

☒ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Q26. Are any of the participants or data subjects likely to be known to have additional support needs?

☒ Yes

☐ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

As this study intends to gather data from a community sample, it is likely that some of the sample will have additional support needs, though no information will be gathered by the survey to determine whether this is the case. The researcher has endeavored to make the study information page as accessible as possible by subjecting it to readability analysis using the Hemingway app (hemingwayapp.com) and revising sentences to achieve a reading level equivalent to the UK national adult average reading age (approximately equivalent to 9 years old).

Q27. In the case of participants with additional support needs, will arrangements be made to ensure informed consent?

☒ **Yes**

☐ **No**

If "yes" – What arrangements will be made?

As above, to ensure individuals considering participation are able to give fully informed consent, the study information page has been made to have an accessible level of readability to promote understanding.

If "no" – Please explain why not

Q28. Are any of the participants or data subjects likely to be physically or mentally ill?

☒ Yes

☐ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

A proportion of the community sample are likely to be experiencing mental health difficulties. As stated above, participants experiencing emotional distress will be directed to appropriate support services, websites and telephone helplines and the debriefing page will provide an overview on how to seek mental health supports.

Q29. Are any of the participants or data subjects likely to be vulnerable or likely exposed to harm in other ways?

☐ Yes

☒ No

If "yes" - Explain and describe the nature of the vulnerability and the measures that will be used to protect and/or inform participants/data subjects.

Q30. Are any of the participants or data subjects likely to be unable to communicate in the language in which the research is conducted

☐ Yes

☒ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Q31. Are any of the participants or data subjects likely to be in a relationship (i.e., professional, student-teacher, other dependent relationship) with the researchers?

☐ Yes

☒ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Q32. Are any of the participants or data subjects likely to have difficulty in reading and/or comprehending any printed material distributed as part of the study?

☐ Yes

☒ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Q33. Describe how the sample will be recruited.

The survey link will be distributed through a wide variety of means to increase the likelihood of receiving responses from a representative sample (Branley et al., 2014), including social media, the School of Health in Social Science mailing list at the University of Edinburgh, student participation pools, dedicated participation sites (e.g. Social Psychology Network, Online Psychology Research) and other websites and forums (e.g. The Student Room, the Social Research Forum). Local organisations will also be approached and asked for their assistance in distributing the link (e.g. Penumbra, YoungScot, etc). Use of "snowball sampling" whereby participants can share the link with other potential participants via making the link available to participants to share on social media should they choose to.

Q34. Will participants receive any financial or other material benefits as a result of participation?

☐ Yes

☒ No

If "yes" - What benefits will be offered to participants and why?

Section 6: Participant or data subject information and consent

Q35. Will written consent be obtained from all participants or data subjects?

☐ Yes

☒ No

If "yes" – attach participant information sheet and consent form

If "no" – explain why not and how consent is obtained (e.g. orally), and/or if consent cannot or should not be sought for some reason, please provide a clear case and rationale for this

Consent will be obtained on the second survey page. Participants will be asked to read a series of nine consent statements. They will then be asked to indicate whether they agree to participate in the study or disagree with these statements and do not wish to participate. By clicking "I Agree", participants will be able to progress through the survey. If they click "I Disagree", they will be taken to the study debrief page.

Q36. Have you made arrangements to tell participants what information you will hold about them and for how long?

☒ Yes

☐ No

If "yes" - what arrangements have been made?

The survey information page outlines what data will be collected and for how long their anonymized data will be retained.

Q37. Have you made arrangements to tell participants whether you will disclose the information to other organisations?

☐ Yes

☒ No

If "yes" - What arrangements have been made?

No information will be disclosed to other organisations.

Q38. Have you made arrangements to tell participants whether you will combine that information with other data?

☐ Yes

☒ No

If "yes" - What arrangements have been made?

No other data will be combined with the participants anonymized responses.

Q39. In the case of children participating in the research, will the consent or assent of parents be obtained?

☐ Yes

☒ No

If "yes" - Explain how this consent or assent will be obtained

If "no" – Please explain why you won't be obtaining consent

Q40. Will the consent or assent of children participating in the research be obtained?

☐ Yes

☒ No

If "yes" - Explain how this consent or assent will be obtained

If "no" – Please explain why not

Q41. In the case of participants who are not proficient in the language in which the research is conducted, will arrangements be made to ensure informed consent?

☒ Yes

☐ No

If "yes" – What arrangements will be made?

As stated above, the study information page has been subjected to readability analysis to ensure a low level of reading skill is required to understand its contents.

Participants are advised that a secondary school level of reading ability is required to participate.

If "no" – Please explain why not

Q42. Does the activity involve using cookies or tracking individual's activity on a website or the Internet in general?

☐ Yes

☒ No

If "yes" – Describe the arrangements, you have put in place to obtain informed consent for the use of these tools?

N/A

SECTION 7: Confidentiality and handling of data

Q43. What information about participants/data subjects will you collect and/or use?

Limited demographic information will be collected about participants, including their age and gender identity. Participants will also be asked to provide limited information about one or two adult caregivers they had when growing up, including the caregivers gender identity and relationship to the participant and to each other. Participants will also be asked to indicate whether they still live in the family home with one or both identified caregivers for most of an average week (four or more days out of a usual seven day week).

To help personalize the questionnaires in the survey and to reduce participant burden, participants are given the option of providing a first name or nickname for one or both caregivers in a free text box. This information will be used only to personalize the questionnaires in the survey and will form no part of the data analysis, nor will it be used in any subsequent publication. Participants are advised of this in the text for the question. All provided first names or nicknames will be kept confidential in line with data management policy. The fields in which this information is provided will not be exported from Qualtrics when the full dataset is pulled for analysis and will be deleted

along with the rest of the raw response data when the dataset is exported from Qualtrics.

Participant responses to a series of psychometric questionnaires will also be collected (see above for details). These questionnaires ask participants to self-report their levels of psychological distress, use of self-harm, perceived expressed emotion, reflective functioning and attachment to their caregiver/parental figures, as well as a global measure of attachment security.

Q44. Will you collect or use NHS data?

☐ Yes

☒ No

If "yes" – what NHS data will you collect or use?

Q45. What training will staff who have access to the data receive on their responsibilities for its safe handling? Have all staff who have access completed the mandatory data protection training on the self-enrolment page of Learn?

The principal researcher has completed the mandatory data protection training on the self-enrolment page of Learn and has worked through the MANTRA Research Data Management training pages. As an employee of the NHS, the principal researcher has also received training on safe data management in a healthcare context.

Q46. Will the information include special categories of personal data (health data, data relating to race or ethnicity, to political opinions or religious beliefs, trade union membership, criminal convictions, sexual orientations, genetic data and biometric data)

☒ Yes

☐ No

If "yes" – Explain what safeguards e.g. technical or organisational you have in place; including any detailed protocols if this requires special and/or external processing, storage, and analysis.

The personal and health data obtained will be stored securely in line with University policy and in adherence to the agreement between Qualtrics XM and the College of Arts, Humanities and Social Sciences at the University of Edinburgh. Research data will be anonymous, as the researcher will not have access to any personally identifiable information that could link participants responses to the survey to individuals. Once data collection is completed, the anonymous research data will be exported from Qualtrics and stored on DataSync in a password protected folder accessible only to the research team.

If you answered “no” to this question, please skip Q56 and continue answering the rest of the questions..

Q47. Please indicate how your research is in the public interest:

☒ Your research is proportionate

☒ Your research is subject to a governance framework

☐ Research Ethics Committee (REC) review (does not have to be a European REC)

☐ Peer review from a funder

☐ Confidentiality Advisory Group (CAG) recommendation for support in England and Wales or support by the Public Benefit and Privacy Panel (PBPP) for Health and Social Care in Scotland

☐ Other

Q48. It is essential that you identify, and list all risks to the privacy of research participants. You will then need to consider the likelihood of the risks actually manifesting and the severity of harm if the risks actually manifest.

Risk	**Likelihood of risk manifesting**			**Severity of harm**		
	Remote	**Possible**	**Probable**	**Minimal**	**Significant**	**Severe**
Identifiable due to data linkage	✓	☐	☐	☐	✓	☐

Identifiable due to low participant numbers	✓	☐	☐	☐	✓	☐
Identifiable due to geographical location	✓	☐	☐	☐	✓	☐
Identifiable due to transfer of data	✓	☐	☐	☐	✓	☐
Identifiable due to access of data	✓	☐	☐	☐	✓	☐
Identifiable due to use of shared computer	☐	✓	☐	☐	✓	☐

Please use this text box to record any other risks and the likelihood of them occurring, along with the severity of harm.

The research data gathered in this study will be anonymous. There will be no way for the researcher to link individual responses with specific participants. For this reason, risk to privacy is deemed low.

There is a possible risk to privacy for participants who complete the survey on a shared computer, as their internet browser may store details of the survey visit in the browsing history.

Please identify measures you could take to reduce or eliminate risks identified as possible/significant or probable/severe.

Participants have been advised of this risk in the Participant Information page and it has been suggested they can clear their browsing history should this be a concern for them.

Q49. Will information containing personal, identifiable data be transferred to, shared with, supported by, or otherwise available to third parties outside the University?

☒ Yes

☐ No

If "yes" - Please explain why this necessary and how the transfer of the information will be made secure. If the third party is based outside the European Economic Area please obtain guidance from the Data Protection Officer.

The project will use the web-based survey software Qualtrics XM to create, publish and distribute the survey, and to collate the responses. The College of Arts, Health and Social Sciences at the University of Edinburgh have licensed Qualtrics as their preferred survey tool and have agreed robust and fully compliant data and use agreements to protect researchers, respondents, and their data.

Q50. Other than the use by third parties, will the data be used, accessed or stored away from University premises?

☒ Yes

☐ No

If "yes" - Describe the arrangements you have put in place to safeguard the data from accidental or deliberate access, amendment or deletion when it is not on University premises, including when it is in transit, and (where applicable) it is transferred outside the EEA.

Anonymous research data in the form of survey responses will be exported from Qualtrics and uploaded to a password protected folder hosted by the University of Edinburgh, which will be accessible by the research team. The principal researcher will conduct data analysis using a personal laptop with a VPN connection to the University of Edinburgh servers to ensure data security.

Q51. Will feedback of findings be given to your research project participants or data subjects?

☐ Yes

☒ No

If "yes" - How and when will this feedback be provided?

If "no" - Please provide rationale for this.

Participants will not be directly provided with feedback from the research project as no personal contact information will be requested from participants at any point during the survey. However, participants will be invited on the debrief page to

bookmark a link for the study's webpage should participants wish to follow up on the findings or results of the study when they are made available.

Participants will also be invited to check the University of Edinburgh Clinical Psychology Thesis Database for the full manuscript when it is finished and uploaded (circa April 2021).

The participants will also be provided with the research team contact information on the survey information and debrief pages and can contact the principal researcher should they wish to obtain the results of the study. It will be made clear in the information and debrief pages that individual responses will not be accessible to participants as the research data will not be personally identifiable.

Q52. How do you intend to use/disseminate the results of your research project?

The results will be written up in as a doctoral dissertation. Project information will be uploaded to the University of Edinburgh DClinPsychol Theses and Publications Database, and an abstract added to the researchers ResearchGate profile.

The researcher will take steps to ensure further dissemination of the research findings. Findings will be submitted for publication to a relevant international peer-reviewed journal (e.g. Child and Adolescent Mental Health or Journal of Adolescence). The researcher will also submit abstracts for poster presentations at local research conferences in Scotland (e.g. the Suicide and Self-Harm Early and Mid-Career Researcher's Forum). Offers will be made to the NHS Lothian CAMHS team where the researcher works to give presentations updating staff of findings and opportunities to present findings within the University of Edinburgh will be pursued. Findings will also be shared with local research networks and relevant third sector organisations (e.g. 6VT, Scottish Association for Mental Health, YoungMinds) and any organisations who assisted in distribution of the survey link.

SECTION 8: Security-sensitive material

The Terrorism Act (2006) outlaws the dissemination of records, statements and other documents that can be interpreted as promoting or endorsing terrorist acts.

Q53. Does your research involve the storage on a computer of any such records, statements or other documents?

☐ Yes

☒ No

If "yes" - Please tick 'Yes' to indicate that you agree to store all documents on that file store

Q54. Might your research involve the electronic transmission (for example, as an email attachment) of such records or statements?

☐ Yes

☒ No

If "yes" - Please tick 'Yes' to indicate that you agree not to transmit electronically to any third party documents stored in the file store

Q55. Will your research involve visits to websites that might be associated with extreme, or terrorist, organisations?

☐ Yes

☒ No

If "yes" - You are advised that such sites may be subject to surveillance by the police. Accessing those sites from University IP addresses might lead to police enquiries. Please acknowledge that you understand this risk by ticking 'Yes'

☐ Yes

☒ No

By submitting to the ethics process, you accept that your School Research Ethics Officer and the convenor of the University's Compliance Group will have access to a list of titles of documents (but not the contents of documents) in your document store. Please acknowledge that you accept this by ticking 'Yes'

Please confirm that you have contacted your School Research Ethics Officer to discuss security-sensitive material by ticking ‘Yes’

☒ Yes, I have contacted my School’s Research Ethics Officer

☐ No, I have not contacted my School’s Research Ethics Officer

Section 9: Copyright

Q56. Does your project require use of copyrighted material?

☒ Yes

☐ No

If “yes” please give further details

Several of the outcome measures identified for use in the survey (the PHQ-9 and GAD-7) are in the public domain. Nonetheless, the authors of all outcome measures have been approached by email for permission to use their measure. Email permissions once granted will be available at request and retained digitally and in the project research folder.

Section 10: Good conduct in collaborative research

Q57. Does your project involve working collaboratively with other academic partners?

☐ Yes

☒ No

If “yes” - Is there a formal agreement in place regarding a collaborative relationship with the academic partner(s)?

If “no” - Please explain why there is no formal agreement in place?

Not required.

Q58. Does your project involve working collaboratively with other non-academic partners?

☒ Yes

☒ No

If "yes" - Is there a formal agreement in place regarding a collaborative relationship with the non-academic partner(s)?

If "no" - Please explain why there is no formal agreement in place.

Not required.

Q59. Does your project involve employing local field assistants (including guides/translators)?

☐ Yes

☒ No

If "yes" - Is there a formal agreement in place regarding the employment of local field assistants (including guides and translators)?

If "no" - Please explain why there is no formal agreement in place

Not required.

Q60. Will care be taken to ensure that all individuals involved in implementing the research adhere to the ethical and research integrity standards set by the University of Edinburgh?

☒ Yes

☐ No

If "no" - Please explain why care will not be taken

Q61. Have you reached agreement relating to intellectual property?

☒ Yes

☐ No

If "no" - Please explain why you have not reached agreement

Section 11: Good conduct in publication practice

In publication and authorship, as in all other aspects of research, researchers are expected to follow the University's guidance on integrity.

By ticking yes, you confirm that full consideration of the items described in this section will be addressed as applicable

☒ Yes

☐ No

Subsequent to submission of this form, **both the applicant and their supervisor should review any alterations in the proposed methodology of the project.** If the change to methodology results in a change to any answer on the form, then a resubmission to the Ethics subgroup is **required.**

The principal investigator is responsible for ensuring compliance with any additional ethical requirements that might apply, and/or for compliance with any additional requirements for review by external bodies.

ALL forms should be submitted in electronic format. Digital signatures or scanned in originals are acceptable. The applicant should keep a copy of all forms for inclusion in their thesis.

Jamie Kennedy-Turner		25/08/2020
Applicant's Name	Applicant's Signature	Date signed
	Helen Griffiths	27/08/20
*Supervisor Signature[7]	Supervisor Name	Date

*NOTE to Supervisor: Ethical review will be based only on the information contained in this form. If countersigning this check-list as truly warranting all 'No' answers, you are taking responsibility, on behalf of the HSS and UoE, that the research proposed truly poses no ethical risks.

ISSUES ARISING FROM THE PROPOSAL

[7] Not required for staff applications

Reviewer comments 18.09.20

Comments ethics application.

General comments – there are a lot of questionnaires should note how long each lasts. Would also double check how long these take (preferably someone outside of the research team). I see you have estimated 20-25 minutes - seems a short time? If this time needs to be changed then please make sure the new time is noted on the application, the participant info screen and the survey itself.

Ethics application:

Q41: how has the readability analysis been performed? This ties in with the comment below about including required reading level. If this is relevant and could influence results, maybe a question can be added to the demographics section about education level.

Will the data be made available on open data repositories? I can see that you have said it could be used in future by other researchers but would just make it clear if an open data repository is where you intend to store this. If this is the case this should be noted in the participant info and consent form.

Advert for social media etc

Missing advert – please do send a copy of the ad which should also contain a trigger warning (due to the topic being about self harm).

MEESHA survey content:

Q5.1: categories are similar to Q4.2 but the option 'prefer to self-describe' is missing. Maybe the researchers can consider if it would be relevant to add.

MEESHA PIS:

The document starts out mentioning that the survey is for anyone who can read at secondary level school level, but this is not incorporated in the survey questions. Not sure if it is necessary to include this? Maybe discuss in research team.

Debrief

This looks really good – well done. Perhaps a statement at the top saying to participants to 'please take a screen shot or image capture of this screen to save this information for your records'. That way the participants will still retain this information.

The applicant should respond to these comments in section below.

Signature:

Position: Lecturer in Applied Psychology; Ethics and Integrity Lead

Date: 18.9.20

APPLICANT'S RESPONSE (If required)

Timings query

The 25-minute completion time was an automated estimate provided by Qualtrics. It is based on the assumption that participants will rate two parents/caregivers, and so is an estimate of the time it would take for a participant to complete every questionnaire in the study, though participants who opt only to rate one parent/caregiver will not complete Q9.1 to Q9.5 and can therefore expect a shorter completion time than 25 minutes.

With regards to the psychometric questionnaires, the researcher checked each journal article presenting the included measures and the authors published no data on likely completion times. To get an idea of how long each questionnaire takes to complete in vivo, as well as the total length of the survey, the researcher asked two members of his household to complete the survey, asking them to respond for two caregivers to get an idea of the likely time of completion for the full survey. One was a 28 year old public sector employee (therefore ineligible for participation in the actual survey), the other was a 24 year old student (who met criteria at the time of the trial run but will turn 25 before the survey link goes live and will therefore be unable to participate in the study proper). Neither had seen the survey or completed the measures before. Their timings are shown below (rounded to the nearest second):

Questionnaire section	Participant A	Participant B
Total survey completion time	22m 05s	18m 48s
Information page	5m 46s	4m 36s
Consent form	1m 32s	33s
Demographics	2m 21s	1m 52s
RFQ-8	59s	1m 06s
PHQ-9	41s	37s
GAD-7	20s	24s
RTSHIA	2m 10s	1m 39s
ECR-RS (Global)	44s	49s
ECR-RS (Caregiver 1)	44s	43s
LEE (Caregiver 1)	1m 46s	2m 25s
PCS (Caregiver 1)	22s	25s
ECR-RS (Caregiver 2)	43s	42s

LEE (Caregiver 2)	1m 47s	2m 15s
PCS (Caregiver 2)	23s	26s

Q41: Readability analysis query

The readability analysis was conducted using the web-based application Hemingway (hemingwayapp.com), which uses the automated readability index, an algorithm which highlights complicated words, lengthy sentences, use of adverbs and the passive voice. It provides a readability level using the US grade system which the researcher has converted to the UK equivalent. For information pages (e.g. Participant Information Page, Consent, Demographics, and Debrief) the highest estimated reading age was 12-13 (or US grade 7, Scottish S2, English Year 8).

Advert for Social Media

This is now included in the study documentation entitled Appendix 5 – MEESHA Social Media Advert. Both the Twitter and Facebook adverts contain trigger warnings for self-harm and will be posted on the study's Facebook and Twitter pages, for which there is also a logo and cover photo available and included in Appendix 5.

MEESHA PIS query

Following discussion in the research team, the stipulation for a secondary school reading age has been omitted from the PIS and from Q23 of this ethics application form.

MEESHA Survey Content query

Q5.1: The option for participants to self-describe their parent(s)/caregiver(s) gender identity is has been added to the multiple choice question, with additional free text entry questions added to the questionnaire (see Q6.2 and Q6.3 highlighted in red on Appendix 3 - MEESHA Survey Content).

Debrief query

The suggested sentence has now been added to the documentation and corresponding digital copy of the questionnaire (highlighted in red in Appendix 4 – MEESHA Debrief Form V2). Other minor changes have been made to the debrief form, highlighted in red, namely adding the project Facebook page web address and a sentence thanking participants for their interest and advising them they can now close the webpage.

Other changes

Due to unforeseen circumstances, Dr Lucy Clark has requested to be removed as a project supervisor. The principal investigator will still be supervised by Dr Helen Griffiths and Dr Vilas Sawrikar.

Anonymised research data will be retained for 10 years after study completion, not 5 as originally stated. Changes have been made to Appendices 1 and 2 accordingly (highlighted in red).

A spelling mistake has been corrected in the RTSHIA measure, highlighted with a comment in Appendix 3.

Signature:

Date: 08/10/2020
The applicant's response to our request for further clarification or amendments has now satisfied the requirements for ethical practice and the application has therefore been approved. Signature: Position: Ethics and Integrity Lead Date: 16.10.20

AMENDMENT/S: REQUEST FOR APPROVAL
It is possible individuals living outside the UK will complete the online survey. In order to ensure these individuals have access to information about further supports available in their country of residence, approval is requested for amendments made to the footer on each survey page and to the debrief form (see Appendix 4 – MEESHA Debrief Form, V3, attached with changes highlighted in red), adding the website for befrienders.org, an international charity which provides the details of emotional support and crisis helplines available in different countries worldwide. New footer text will read the following, with changes highlighted in red: "If you live in the UK and need any support while completing this survey, please consider calling Samaritans on 116 123, NHS24 by calling 111. In an emergency, call 999. If you do not live in the UK and need any support while completing this survey, please consider visiting www.befrienders.org for information about supports local to you." Signatures: Date: 04/11/2020
CONCLUSION TO ETHICAL REVIEW OF AMENDMENT
The applicant's response to our request for further clarification or amendments has now satisfied the requirements for ethical practice and the application has therefore been approved. Signature: Position: Ethics and Integrity Lead Date: 12.11.20

Acronyms / Terms Used

NHS: National Health Service

SHSS: School of Health in Social Science

IRAS: Integrated Research Applications System

Section: The SHSS is divided into Sections or subject areas, these are; Nursing Studies, Clinical Psychology, C-PASS.

Appendix F – College of Arts, Humanities, and Social Sciences sponsorship letter

University of Edinburgh
College of Arts, Humanities and Social Sciences
Research Governance Office
55 George Square
Edinburgh
EH8 9JU

2nd September 2020

Jamie Kennedy-Turner
c/o School of Health in Social Sciences
University of Edinburgh

Dear Jamie,

Study Title: Exploring the associations between Mentalisation, Expressed Emotion, Self-Harm and Attachment in late adolescence (MEESHA)

Sponsor number: CAHSS2008/01

Under the requirements of the UK policy framework for health and social care research, the University of Edinburgh agrees in principle to act as Sponsor for this project. Sponsorship is subject to you obtaining institutional ethics for the project.

As Chief Investigator, you must ensure that the study does not commence until all applicable approvals have been obtained. Following receipt of all relevant approvals, you should ensure that any amendments to the project are notified to the Sponsor.

Yours sincerely

Charlotte Smith

Research Governance Manager

Appendix G – Participant information sheet

Exploring the associations between Mentalisation, Expressed Emotion, Self-Harm and Attachment in late adolescence (MEESHA)

Information Page for Participants

You are being invited to take part in an online research study. This is a survey for anyone aged between 16 and 24 years old. The survey takes between 20-25 minutes to complete.

Before you decide to take part, it's important to know why the research is being done and what it will involve. Please read the following information carefully.

1. Why are we doing this research?

Self-harm is common in adolescence and young adulthood. People sometimes self-harm when in psychological distress, or when experiencing difficult life events. Research suggests that how family members respond to self-harm is very important. We want to find out how the emotions expressed in someone's family influences things like:

- how safe and secure people feel in their relationships,
- how people reflect on their own and others thoughts and feelings,
- their levels of psychological wellbeing,
- whether people self-harm or not.

It is important that we understand these relationships better. Better understanding could lead to improved support and treatment for people in distress. It could also help families know how to respond to distressed family members in a more helpful way.

2. Do I have to take part?

No. This survey is completely voluntary. You are under no pressure to take part. You can choose not to take part without giving a reason.

You can also change your mind partway through the survey if you wish. If you want to stop the survey, click the "Withdraw" button at the bottom of any survey page. Clicking this button will mean that we delete the data you have given so far.

Please note that you won’t be able to withdraw your responses after submitting. This is because the survey is anonymised. This means we won’t be able to tell which answers were yours afterwards.

3. What will happen if I take part?

If you do want to take part, you can click the arrow at the bottom of this page after reading the rest of the information. You will answer several questions to provide your consent to take part in this study.

After giving consent, you will be asked to complete a demographics questionnaire. We ask your age and gender identity. We also ask for some limited information about your family.

Following this demographic questionnaire, you will be asked to complete a series of psychological questionnaires. Some of them will ask about your mood and anxiety levels. Some will ask about your close relationships. Some will ask about how different people in your life behave towards you. Please answer all the questions as honestly and accurately as you can. If you are unsure what answer to give, give your best guess.

Once you complete these questionnaires, the survey will finish. The final page provides more information about the study. There will also be information about helpful mental health organisations and supports. These supports are available to you if you need them.

4. What happens to the information and data I give?

Your responses to this survey will be kept confidential. The researcher will not be able to link your answers to any information that could identify you. If you decide to stop the survey and come back to it later, you will have one week to complete it. If a week passes and you haven't finished the survey, we will include your data as a partial response.

You will not have to give your name, location, education or employment status. The survey does not ask for any contact details or things which could identify you.

We will include the anonymous data you give in the results of the study, even if you don't get to the end of the survey. If you do not want your data included, you will need to press the "Withdraw" button before the survey ends.

We will keep all information collected from the survey confidential. It will be processed in line with Data Protection Law. The survey software does not collect information that would allow us to identify you. All information collected is stored in a single secure data centre. This data centre complies with UK standards.

The research team will keep the anonymous data you give for at least 10 years. With your consent, it may be used again for other studies with ethical approval. You can read more about the University of Edinburgh's data protection policy here:

https://www.ed.ac.uk/records-management/privacy-notice-research

5. What will happen when the study finishes?

The survey link will close when there have been enough responses. The Principal Investigator will write the findings into a report. These findings might be published in a journal or online. They may also be presented at academic conferences. They could also shared with professionals working in mental health services. Your results will stay anonymous throughout this process.

If you would like to find out the results of the project, you could:

- Visit the project Facebook page, which will post the results by the end of April 2021. https://www.facebook.com/MEESHAproject
- Visit the University of Edinburgh Clinical Psychology Thesis Database. https://www.ed.ac.uk/health/subject-areas/clinical-psychology/research/student-research/past-student-projects/clinical-psychology-thesis-database

6. Is there anything to worry about if I take part?

There are no known risks at all, but you should be aware of some things before starting. Some survey questions ask about psychological distress and self-harm. Others will ask you to think about your close relationships. Answering these questions may or may not be distressing for you. Your wellbeing is very important. If you need any support after taking part, please consider doing one or all the following things:

- Speaking with a trusted friend or family member,
- Distracting yourself by doing something you enjoy (e.g. music, walking, TV),
- Speaking with your general practitioner (GP) or local doctor,
- Contacting a mental health support helpline such as Samaritans (116 123)
- Contacting the NHS helpline on 111 for medical advice,
- Contacting 999 if it is an emergency.

There is a list of helpful supports and organisations at the end of this survey. Helplines are at the bottom of each page of the survey as well. Feel free to contact these services at any time if you need to.

7. What are the possible benefits of taking part?

Your answers will make a great contribution towards this research project. You will get experience of completing psychological questionnaires. You will also have a chance to think about your experiences in an anonymous space.

Your results will help us learn how different factors connect with distress. They may also help us understand self-harm better. We hope this will lead to better support and treatment for families affected by these things.

8. Who is organising the research?

The Principal Investigator for this study is Jamie Kennedy-Turner. Jamie is a student at the University of Edinburgh. He is also a trainee Clinical Psychologist working for NHS Lothian.

Jamie is being supervised by:

- Dr Helen Griffiths (Programme Director, DClinPsych, The University of Edinburgh)
- Dr Vilas Sawrikar (Lecturer in Clinical Psychology, The University of Edinburgh)

The Ethics Review Committee at the School of Health in Social Science has provided ethical approval for this study. The School of Health in Social Science is part of the University of Edinburgh.

The University of Edinburgh sponsors this project. NHS Education Scotland has funded it as part of the East of Scotland Clinical Psychology Training Programme.

9. What if I have questions or there is a problem with this research?

If you want more information, you can contact Jamie Kennedy-Turner. His email is s1690949@sms.ed.ac.uk.

If you would like to talk to the academic supervisor of this study, you can contact Dr Helen Griffiths. Helen works at the University of Edinburgh. Her email is

If you want to discuss this study with someone not involved in the research, you can contact Dr Helen Sharpe. Helen also works at the University of Edinburgh. Her email is

If you would like to make a complaint about this study, you can email The University of Edinburgh Research Governance Team at cahss.res.ethics@ed.ac.uk.

Thank you for reading this information. If you would like to take part in this study, please press the arrow below to continue to the consent form.

Appendix H – Participant consent form

Exploring the associations between Mentalisation, Expressed Emotion, Self-Harm and Attachment in late adolescence (MEESHA)

Consent Form

Title of the Study: Exploring the associations between Mentalisation, Expressed Emotion, Self-Harm and Attachment in late adolescence (MEESHA)

By clicking “Agree”, you agree to the following points:

1. I have read the Information Page for Participants (V3, 08/10/2020) for the above study. I have understood its contents. I know how to ask the research team any questions. If I have asked questions, they have been answered acceptably.
2. I know it is up to me to choose whether to take part in the study. I do not have to take part. I am free to change my mind at any point while completing this survey without giving any reason.
3. I am aware I must press the "Withdraw" button for my responses to be removed from the study. I understand I will be unable to withdraw my responses once I complete the questionnaire.
4. I understand that the research data I give in this survey may be looked at by project researchers from the University of Edinburgh. I give permission for these individuals to access my data.
5. I understand that the anonymised data I give may contribute to the researcher's academic work and publications on this topic. I consent for the anonymised data I provide in this survey to be used for this purpose.
6. I understand that my anonymised data will be kept for at least 10 years after this study finishes. I understand it may be used in future ethically approved research and I consent for this to happen.
7. I agree to all the above and agree to take part in this research study.

If you wish to take part, please select "Agree" and press the arrow at the bottom of the page.

If you do not wish to take part, please select “Disagree” or close your browser window.

○ Agree
○ Disagree

Appendix I – Participant demographics questionnaire

Start of Block: Deomgraphic Information Questionnaire

Q4.1 What is your age?

- Younger than 16 (1)
- 16 (2)
- 17 (3)
- 18 (4)
- 19 (5)
- 20 (6)
- 21 (7)
- 22 (8)
- 23 (9)
- 24 (10)
- Older than 24 (11)

Q4.2 What is your gender identity? Please tick all that apply.

- ☐ Male (1)
- ☐ Female (2)
- ☐ Non-binary (3)
- ☐ Transgender (4)
- ☐ Genderqueer (5)
- ☐ Agender (6)
- ☐ Prefer not to say (7)
- ☐ Prefer to self-describe (8) ____

Q4.3 We would like to find out more about the adult or adults who were responsible for you when you were growing up.

For example, this could be your parent or parents, a legal guardian, your parent's partner or any other adult who looked after you.
This could have been by providing food, money, shelter, emotional or other support.

We recognise that everyone's family is different. We also know that there may have been many adults in your life who were responsible for looking after you.

For the purposes of this research, we would like you to **pick one or two of your childhood caregivers** to speak about. They could be the person or people who spent the most time caring for you or living with you. Or they could be the person or people who you feel were the most important adults in your life while growing up.

Q4.4
How many parents/caregivers would you like to talk about in this survey?

▼ 1 (1) ... 2 (2)

End of Block: Deomgraphic Information Questionnaire

Start of Block: Demographics Information Questionnaire - Caregiver Nicknames

Q5.1 To help us customize the survey for you, please provide the first name or nickname that you use to refer to your first parent or caregiver (e.g. mum, dad, John, Jane, etc). This data will only be used to customize the survey for you. It will stay private and never be used in data analysis or any publication.

____

Display This Question:

If How many parents/caregivers would you like to talk about in this survey? = 2

Q5.2 Please also type a first name or nickname for your second parent or caregiver. Again, this data will only be used to customize the survey for you. It will stay private and never be used in data analysis or any publication.

____

Q6.1 How do you think your parent(s)/caregiver(s) would describe their gender identity? Please tick all that apply.

	Female (1)	Male (2)	Non-binary (3)	Transgender (4)	Genderqueer (5)	Agender (6)	Prefer not to say (7)	Prefer to describe (8)
${Q5.1/ChoiceTextEntryValue} (1)	▢	▢	▢	▢	▢	▢	▢	▢
How many parents/caregivers would you like to talk about in this survey? = 2 ${Q5.2/ChoiceTextEntryValue} (2)	▢	▢	▢	▢	▢	▢	▢	▢

Display This Question:
If How do you think your parent(s)/caregiver(s) would describe their gender identity? Please tick al... = ${q://QID7/ChoiceTextEntryValue} [Prefer to describe]

Q6.2 Please write below how you think ${Q5.1/ChoiceTextEntryValue} would describe their gender identity.

____

Display This Question:
If How do you think your parent(s)/caregiver(s) would describe their gender identity? Please tick al... = ${q://QID63/ChoiceTextEntryValue} [Prefer to describe]

Q6.3 Please write below how you think ${Q5.2/ChoiceTextEntryValue} would describe their gender identity.

____

Q6.4 What word best describes your parent(s)/caregiver(s) relationship to you? Please tick all that apply.

	Biological parent (1)	Adoptive parent (2)	Foster parent (3)	LGBT+ parent (4)	Guardian (5)	Grandparent (6)	Aunt/Uncle (7)	Parent's partner or step-parent (8)	Other (9)
${Q5.1/ChoiceTextEntryValue} (1)	▢	▢	▢	▢	▢	▢	▢	▢	▢
How many parents/caregivers would you like to talk about in this survey? = 2 ${Q5.2/ChoiceTextEntryValue} (2)	▢	▢	▢	▢	▢	▢	▢	▢	▢

Q6.5 Where do you usually live for most of an average week (e.g. for four days or more out of a seven-day week)?

- In the family home with ${Q5.1/ChoiceTextEntryValue} (1)

How many parents/caregivers would you like to talk about in this survey? = 2

- In the family home with ${Q5.2/ChoiceTextEntryValue} (2)

How many parents/caregivers would you like to talk about in this survey? = 2

- In the family home with ${Q5.1/ChoiceTextEntryValue} and ${Q5.2/ChoiceTextEntryValue} (3)
- In rented accomodation (4)
- In student accomodation (5)
- In accomodation that you own (6)
- No fixed accomodation (7)
- Other (8) ____

Display This Question:

If How many parents/caregivers would you like to talk about in this survey? = 2

Q6.6 What best describes ${Q5.1/ChoiceTextEntryValue} and ${Q5.2/ChoiceTextEntryValue}'s relationship with each other?

- Married/Civil Partnership (1)
- Co-habiting (living together), in a relationship (2)
- Co-habiting (living together), not in a relationship (3)
- In a relationship, not living together (4)
- Divorced (5)
- Separated (6)
- No relationship (7)

Display This Question:
If How many parents/caregivers would you like to talk about in this survey? = 1

Q6.7 What best describes ${Q5.1/ChoiceTextEntryValue}'s current relationship status?

- Single (1)
- Married (2)
- Co-habiting, in a relationship (3)
- Co-habiting, not in a relationship (4)
- Divorced (5)
- Separated (6)
- Widowed (7)

Appendix J – Participant debrief form

Exploring the associations between Mentalisation, Expressed Emotion, Self-Harm and Attachment in late adolescence (MEESHA)

Debrief form

Thank you for your interest in this research!

We hope the information we are getting will help us understand more about relationships and self-harm. This will help us to make better treatments and supports for people experiencing psychological distress.

Please take a screenshot or image capture of this screen for your records.

If you have any questions about this research study, you can contact Jamie Kennedy-Turner on (s1690949@sms.ed.ac.uk). Jamie is the Principal Investigator for this study and will be happy to answer any questions.

Jamie's main academic supervisor is Dr Helen Griffiths. If you have any questions or concerns about this research, you can contact Helen by email on Helen.Griffiths@ed.ac.uk.

If you would like to discuss this study with someone not involved, please contact Dr Helen Sharpe. Helen is a lecturer at the Department of Clinical Psychology, University of Edinburgh. Her email address is Helen.Sharpe@ed.ac.uk.

If you would like to make a complaint about this study, you can email The University of Edinburgh Research Governance Team at cahss.res.ethics@ed.ac.uk.

We understand that some of the questions in this survey are sensitive. We know that thinking about these topics can be distressing. Your wellbeing is very important. If you are in need of any support, please try the following things:

- Speak to a friend or family member
- Arrange an appointment with your doctor or General Practitioner (GP)
- Call NHS 24 by dialling 111 for advice
- Call the Samaritans for support by dialling 116 123
- If it is an emergency, you can dial 999 or visit your local hospital.
- If you do not live in the UK, you can visit www.befrienders.org for information about supports local to you.

Thank you again for your time! It is very much appreciated. The results of the study are expected to be published in April 2021, please feel free to visit the study Facebook page on https://www.facebook.com/MEESHAproject or contact Jamie on the email above if you are interested in a summary of the results.

If you think someone else would like to take part, please feel free to share the survey link or Facebook page!

Here are some websites with useful information about relationships and mental health. They can also help you find local supports should you wish to.
ttps://www.nhs.uk/conditions/stress-anxiety-depression/mental-health-helplines/
https://www.rethink.org/
https://www.mind.org.uk/
https://www.childline.org.uk/

If you do not live in the UK and would like information about support available in your country of residence, please visit https://www.befrienders.org/.

Thank you again for your interest. You may now close this webpage.

Appendix K – Social media content

Facebook social media advert:

Trigger warning: this post and the survey talks about self-harm

Survey responses needed:

MEESHA is an online mental health survey for anyone aged 16 to 24 years old.

It only takes about 20 to 25 minutes to complete. Your answers will help us learn how families can support young people who self-harm.

The survey asks questions about your wellbeing and your family. It asks questions to see how your family expresses emotions and how you understand yourself and others. It also asks whether you self-harm. Your answers are anonymous.

For more information and to take part:

https://tinyurl.com/MEESHA20

Twitter social media advert (280 character limit):

Trigger warning: self-harm content. Help us learn how families can support young people who self-harm. Complete the new MEESHA mental health survey for 16-24 year olds. It will take around 20-25 minutes and is anonymous. For more info and to take part: https://tinyurl.com/MEESHA20

Profile pictures for social media accounts: