

Investigating associations between maternal mental health, maternal Mind-Mindedness, and infant attachment security in a socioeconomically disadvantaged population

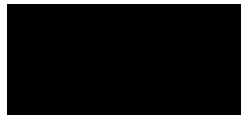
Helen R.C Maris

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature:



Name: Helen Maris

Date: 31st July 2022

Overview

This thesis focuses on two distinct yet related research projects centring on mentalizing and its associations.

Part 1 is a systematic literature review and meta-analysis that critically examines the relationship between childhood maltreatment and adolescent mentalizing. 16 studies met the criteria for inclusion; methodological quality of these studies was high. A significant negative association was found between childhood maltreatment and adolescent mentalizing, indicating that higher levels of maltreatment was associated with reduced mentalizing capacity, and this relationship appeared to be moderated by sample type and mentalizing measure type. Further research examining this relationship is needed.

Part 2 is an empirical quantitative longitudinal study investigating the associations between maternal mental health problems, mothers' 'Mind-Mindedness' abilities, and subsequent infant attachment security. This study built on existing research evaluating the Minding the Baby (MTB) trial, a parenting programme aimed at improving the reflective functioning of a sample of multiply disadvantaged mothers. This study was conducted in collaboration with two other UCL Clinical Psychology Doctorate students (Alqadri, 2022; Melwani, 2022). In this study, video-recordings of mother-infant interactions were coded using Meins et al.'s (2016) Mind-Mindedness framework. Maternal mental health difficulties were not found to be associated with levels of mind-mindedness, nor attachment security. Using socioeconomic variables as covariates provided important insight into the roles of these upon maternal mental health, maternal caregiving, and infant attachment security, highlighting the need for more support for low-income families.

Part 3 reflects on the challenges and opportunities associated with this research.

Impact statement

The work outlined in this thesis furthers our understanding of mentalizing and adversity by synthesising and analysing associations between childhood maltreatment and later mentalizing in adolescents (Part 1), and by exploring associations between maternal mental health, maternal mentalizing (in the form of Mind-Mindedness), and infant attachment security outcomes (Part 2). Both the meta-analysis and empirical paper share the common understanding that mentalizing is an important concept worthy of further examination.

This meta-analysis found an overall significant negative association between childhood maltreatment and adolescent mentalizing, with greater levels of maltreatment associated with poorer mentalizing capacity. Given the association between mentalizing and a number of negative outcomes, this thesis offers several important clinical and research implications. This meta-analysis advocates for routine screening of both maltreatment history and mentalizing capacity in order to know how best to support young people, and highlights how treatment could benefit from being tailored according to individual mentalizing deficits, such as by providing a lengthier period of psychoeducation prior to therapy for those with greater mentalizing deficits. It also highlights the need for longitudinal studies tracking mentalizing over the life course; the use of more ecologically valid mentalizing measures; and for more research elucidating the pathways between different types/severity/ages of maltreatment and different domains of mentalizing.

The empirical paper's finding that higher levels of maternal mental health difficulty were not significantly associated with greater infant attachment insecurity is unexpected, and goes against the dominant literature. When socioeconomic variables were included as covariates, they were found to be responsible for a larger proportion of the variance associated with infant attachment security. However, much of the variance remained,

indicating that other factors not measured in this study mediate or moderate the pathway between maternal mental health and infant attachment security.

Maternal Mind-Mindedness was not found to be associated with either maternal mental health problems or infant attachment security, however it was associated with marital/cohabitation status, appearing to indicate that the presence of two parents involved in the child's care leads to increases in maternal mind-minded behaviours, and supporting the importance of support at the microsystem/family level.

The finding that several socioeconomic factors were significantly associated with mother and infant outcomes highlights the need for greater support for low-income families. The empirical paper encourages further research to clarify the mechanisms driving the effect of socioeconomic variables on infant attachment security and has implications for the type of support that may benefit multiply disadvantaged mothers on lower incomes.

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Part 1. Literature Review

Child maltreatment and adolescent mentalizing

- a systematic review and meta-analysis

Abstract

Aims: Mentalizing, the ability to interpret the feelings, thoughts, wishes, and beliefs of ourselves and of others, is arguably one of the most uniquely human capacities, and central to our ability to function in society. Mentalizing is understood to develop in the context of early attachment relationships. Childhood maltreatment has many deleterious effects on emotional development and is associated with increased prevalence of mental health difficulties, though its relationship to mentalizing is as yet unknown. Adolescence is a significant period for social cognition and emotional development, and thus represents an important age to explore mentalizing capacities and its association with maltreatment. This review aims to systematically review the extant psychological literature in order to better understand the relationship between childhood maltreatment and adolescent mentalizing.

Method: Studies were identified from a search of the PsycINFO, MEDLINE, Web of Science, Embase, Cochrane Library, Scopus, and ERIC online databases. Only peer-reviewed articles were included. Reviews, case studies, qualitative, and neuroimaging studies were excluded. Studies were rated for methodological quality using the Murray, Farrington, & Eisner (2009) checklist.

Results: 16 studies met the inclusion criteria for the review, exploring 3 different aspects of mentalizing (Reflective function; alexithymia; facial emotion recognition). This meta-analysis found an overall significant negative association between childhood maltreatment and adolescent mentalizing, with greater levels (or presence vs. absence) of maltreatment associated with poorer mentalizing capacity. Subgroup analyses, however, found that this association was only present in community samples, not clinical samples, and for only internal mentalizing (reflective functioning; alexithymia), not for external

mentalizing (facial emotion recognition). Neither gender nor age were found to significantly moderated the relationship between childhood maltreatment and adolescent mentalizing.

Conclusions: This study found a significant negative association between childhood maltreatment and adolescent mentalizing, which was moderated by mentalizing measure and sample type, but not by age and gender. Further research is needed to examine this relationship using larger samples, relying upon a wider range of more ecologically valid mentalizing tasks, exploring the impacts of different types of maltreatment and assessing their association with mentalizing using longitudinal research designs. Given the impacts that mentalizing deficits can have, this is an area of research that deserves further attention.

Introduction

Mentalizing and maltreatment

Mentalization is a uniquely human skill, an aspect of imagination that allows for an individual's awareness of their own and of others' mental states, and the capacity to use this awareness to explain and predict their own and others' behaviours. It involves perceiving and interpreting thoughts, feelings, desires, and beliefs, and using knowledge and awareness of the others' experiences, circumstances, prior behaviour in order to make sense of their actions (Fonagy & Bateman, 2019). It is through such capacities that cooperative interactions are possible (Fonagy & Bateman, 2019), enabling people to engage in relationships and function effectively in society.

The concept of mentalizing has grown in prominence, emerging from origins in Descartes' (2008) theory of mind, through psychoanalytic theory (Bion, 1967; Winnicott, 1971), and building on Bowlby's (1977, 1982) attachment theory. Recent developments in neuroscience have provided further opportunities to understand this construct, by highlighting brain networks involved in mentalizing processes (Debbane & Nolte, 2019; Lieberman, 2007).

Our ability to develop strong and balanced mentalizing capacities is believed to be greatly impacted by the quality of our early relationships. Bowlby (1977, 1982) argued that the capacity to reflect on one's mind and to understand and empathise with the thoughts, feelings, and behaviours of others is nurtured through infants' interactions with key attachment figures, and the development of an 'internal working model' of relationships. Within secure attachment relationships, nurturing caregivers help to scaffold their child's emotional world and their comprehension of their own and other's minds (Fonagy & Target, 1996). If we have felt understood by reliable and responsive caregivers, we are better able to mentalize (Fonagy & Luyten, 2016).

Within a secure attachment relationship, the primary caregiver's mirroring of an infant's internal state is thought to facilitate the infant's capacity to mentalize. This is done, for example, through a parent noticing that their baby is upset and tearful, and responding appropriately, by expressing warmth and concern through an exaggerated frown, not by directly mirroring the infants' tears or distress. By 're-presenting' the infants' emotions in this manner, the infant learns that its caregiver understands its emotions and needs and begins to make sense of its own mind (Choi-Kain & Gunderson, 2008). Infants who have been raised in environments where they regularly experience positive and informative relational interactions such as that described above are understood to develop better mentalizing abilities than their insecurely attached peers (Condon et al., 2021; de Rosnay & Harris, 2002; Sharp et al., 2016; Outcalt et al., 2015), and are thus able to successfully, and effectively, navigate social situations through their understanding of their own and others' minds.

It is understood that infants who are not provided with nurturing, positive caregiving are more likely to develop negative internal working models of relationships; and be more likely to believe that others will treat them poorly and not meet their needs (Bowlby, 1982). Less is known, however, about whether such difficulties in the early parent-infant relationship have a negative impact on mentalizing abilities more broadly – that is, not just that these children develop a belief that others cannot be relied upon, but that they also have difficulties understanding both their own and others' minds. Fonagy & Bateman (2006, 2019) propose that being denied these helpful and informative interactions with their caregivers may result in children developing mentalizing impairments.

Impaired mentalizing is associated with a range of emotional and behavioural problems and is therefore a helpful concept in understanding the aetiologies of a range of psychopathologies and disorders (Bateman & Fonagy, 2019).

The capacity to mentalize can be considered trait-like, in that we are all born with an innate capacity for mentalizing, and vary in our competencies (Fonagy & Bateman, 2019). Mentalizing is a multidimensional construct consisting of four dimensions, each with two poles (Fonagy & Luyten, 2009; Fonagy & Bateman, 2019). Mentalizing can be interpersonal (other mentalizing) or intrapersonal (self-mentalizing); it can be slow and deliberate (controlled mentalizing), or quick and reflexive (automatic mentalizing); it can be based on facial expressions and body language (external mentalizing), or upon prior knowledge of someone's mind and of the context they are operating in (internal mentalizing). Lastly, mentalizing can be based on the ability to recognise and reason about mental states (cognitive mentalizing), or the ability to understand how such mental states feel (affective mentalizing) – something that is arguably essential for genuine empathy, or a true sense of self (Fonagy and Luyten, 2009, Fonagy & Bateman, 2019).

While it is common to have a varied profile of mentalizing, with strengths in some domains and weaknesses in others (Fonagy & Bateman, 2019), difficulties arise when we have more pronounced difficulties in one or more of these areas, or struggle to shift between domains or along a spectrum (Fonagy & Bateman, 2019). People with antisocial personality disorder diagnoses, for example, often show strengths in other mentalizing, but struggle to understand their own mental states (Luyten & Fonagy, 2019). People with borderline personality disorder diagnoses tend to have deficits in internal mentalizing, and many thus develop a greater reliance upon external mentalizing, often resulting in them being acutely sensitive to subtle shifts in external expressions or behaviour (Sharp et al., 2016).

The assessment and operationalising of mentalization can be achieved through interview, questionnaires, or with visual tests. Given that mentalizing is such a broad multidimensional construct, it is not surprising that assessments of mentalizing capacity are many and wide-ranging, with most being insufficient to capture all eight 'systems' (Luyten et al., 2019). Mentalizing

research is still in relative infancy, and most research into mentalizing explores a single aspect or limited number of systems of mentalizing. An overview of measures and the aspects of mentalizing they assess can be found in Figure 2.

The most comprehensive measure of mentalizing is the Reflective Function Scale (RFS, Meehan et al., 2009), which uses interview responses from the Adult Attachment Interview to assess an individual's mentalizing ability, resulting in scores ranging from -1 (rejected reflective functioning) to 9 (very high reflective functioning). The RFS can assess all 8 poles or systems of mentalizing. The Reflective Functioning Questionnaire (Fonagy et al., 2016; Ha et al., 2013) is quick to administer and almost as comprehensive, allowing for assessment of all but automatic mentalizing. A second common measure of mentalizing is that of the Toronto Alexithymia Scale (TAS, Bagby et al., 1994), a measure of a series of mentalizing deficits known as alexithymia. Alexithymia is characterized by difficulties in describing, recognising, or interpreting emotions (American Psychological Association, 2020; Bagby et al., 1994), in addition to deficits in relating to and identifying others' facial expressions, and imagining others' perspectives (Di Tella et al., 2020). Alexithymia is perhaps best understood as a subtype of mentalizing deficit. The TAS measures individuals' ability to self-mentalize, but not other-mentalize; to measure internal mentalizing but not external mentalizing; and to measure controlled mentalizing but not automatic mentalizing (Luyten et al., 2019).

Attachment insecurity (Sharp et al., 2016; Outcalt et al., 2015) and childhood adversity (Brüne et al., 2015) have both been found to be associated with mentalizing deficits, but less is known about the relationship between childhood maltreatment and mentalizing. Given that mentalizing develops in the context of early social interactions with close attachment figures, and that mentalizing capacities are partly accounted for by the quality of these early childhood experiences and relationships (Bateman & Fonagy, 2019), it follows that individuals who have a history of childhood maltreatment may have difficulties mentalizing. Afterall, for a child who has

experienced maltreatment, their relationship with their key attachment figure is likely to not only have been less than ideal but also actively damaging or traumatic. Infants' 'internal working models' of relationships are developed through their relationships with their early primary caregivers and inform their expectations and beliefs about self and others. It is understood that individuals who have experienced maltreatment are more likely to develop negative working models of relationships, understanding that others will not think of or not treat them kindly, but less is known about these individuals' ability to mentalize, and whether their ability to mentalize is different to individuals who have not experienced maltreatment. Until now, the relationship between maltreatment and mentalizing has not been studied systematically.

The World Health Organization (WHO, 2019) defines maltreatment as *“abuse and neglect that occurs to children under 18 years of age...includes all types of physical and/or emotional ill-treatment, sexual abuse, neglect, negligence and commercial or other exploitation, which results in actual or potential harm to the child’s health, survival, development, or dignity in the context of a relationship of responsibility, trust, or power.”*

The experience of childhood maltreatment is associated with a range of enduring developmental consequences (Cicchetti & Toth, 2005; Gilbert et al., 2009), and is strongly indicated in the aetiology of wide range of psychopathologies (McCrory et al., 2012). Indeed, Teicher et al. (2021) argue that maltreatment is the most significant and preventable risk factor for mental health difficulties.

Those with a history of maltreatment are more likely to develop psychiatric disorders, to develop disorders at an earlier age, to have more chronic and severe presentations, to respond less well to treatment, and to have more comorbidities - as compared to those without a maltreatment history (Teicher et al., 2021). Prevalence of child maltreatment is thought to have increased during the Covid-19 pandemic, due to increased isolation of at-risk children, additional stressors placed on vulnerable families, and social care services being limited in their ability to access

families (Romanou & Belton, 2020). It is therefore increasingly important to understand how maltreatment affects young people.

There is growing evidence of the impact of maltreatment upon many areas of areas of social cognition, including differential reactions to facial expressions compared to those without a maltreatment history (e.g., Berube et al., 2021; Simon et al., 2019; Pollack et al., 1997), deficits in certain aspects of theory of mind compared to those without a maltreatment history (e.g., Benarous et al., 2015), and a dose-response relationship appears to be present, with greater levels of maltreatment associated with greater deficits in social cognition skills (Crawford et al., 2020). Findings are mixed, however, varying according to the domains of social cognition assessed, the strength of the relationships, and which populations are sampled.

Mentalizing in adolescence

Investigating the impact of childhood maltreatment upon later mentalizing skills is of great importance, and adolescence represents arguably the most important period to understand mentalizing deficits.

The adolescent period is associated with considerable social change and psychological upheaval and can thus be seen as an important period for investigating mentalizing, and as a critical period for prevention and intervention for those experiencing or at risk of difficulties (Sharp and Rossouw, 2019). During the ‘biopsychosocial storm’ (ibid, 2019) of adolescence, most will achieve or resolve a series of ‘developmental tasks’ across domains of biological, social, and psychological development (Begent, Simpson and Gamper, 2019). Biological ‘tasks’ include considerable changes and pruning in brain regions associated with social cognition (Blakemore, 2012; Blakemore & Mills, 2014). Social tasks include progressing through education and into careers; shifts in relationships towards peers, partners, and other external sources of support and away from the family unit; and increased engagement in risky, novelty-seeking behaviours (Blakemore & Mills, 2014; Burnett et al., 2011, Lam et al., 2014). Psychologically, adolescence is

a time when individuals develop a more stable and self-determining sense of self and develop clear boundaries between self and other (Majorano et al., 2015; McAdams and Olson, 2010).

Mastering of these adolescent developmental tasks can be considered a prerequisite for success in adulthood (Begent et al., 2019), and experience of excessive stress and turmoil during adolescence, caused largely by difficulties in making sense of our own and others' minds (i.e., mentalizing), increases the likelihood of 'adolescent breakdown', through failure to achieve these milestones. Mentalizing may play a critical role in the success or failure of these developmental tasks: Sharp and Rossouw (2019) argued that mentalizing is crucial in developing of a sense of self, and Bleiberg et al. (2012) argued that adolescents with mentalizing deficits are less able to withstand the challenges associated with achieving developmental tasks, and the turmoil of adolescence. Mentalizing difficulties likely contribute to the proliferation of psychological disorders that emerge during adolescence (Fonagy et al., 2002; Taubner et al., 2013).

Given the widespread challenges associated with mentalizing deficits - in terms of greater prevalence of psychological disorders, negative impacts upon child rearing, and relational difficulties, it is critically important to intervene before difficulties become too well-established – and thus harder to amend. Given the repercussions that adolescent breakdown can have upon life trajectories and outcomes, personally and professionally, it is of utmost important that those experiencing difficulties mentalizing are offered support to develop these capacities, and the opportunity to shift to a more positive trajectory.

Adolescence appears to be a sensitive period of flux for social cognition. Cohen et al. (2005) suggest that difficulties associated with a borderline personality disorder diagnosis, namely difficulties in regulating emotions and managing interpersonal relationships, peak in mid adolescence then decline in early adulthood. Hauser et al. (2006) argued that changes in mentalizing during adolescence could provide opportunities for at-risk adolescents to shift to healthier courses of development, and away from more problematic outcomes. Together, this

evidence points to the period of adolescence as an important time to explore mentalizing capacities.

A further significant reason to investigate mentalizing in the adolescent period is that it offers a critical opportunity to understand the impacts of childhood maltreatment after it has ended yet while ‘early intervention’ remains possible. While childhood maltreatment can occur any time between before the age of 18 years (WHO, 2019), the most prevalent period for child maltreatment is during the first 3 years of life. By intervening during adolescence, those who have experienced childhood maltreatment and have difficulties mentalizing, can be supported to develop these capacities, prior to engaging in life tasks that will be more challenging if deficits remain, namely entering into intimate relationships, building a career, and raising children.

Rationale for this review

In sum, mentalizing is an important and uniquely human capacity that develops in the context of early childhood relationships and early social environments. Childhood maltreatment is known to have a range of deleterious effects, but its relationship with mentalizing is unclear. The adolescent period involves significant biopsychosocial development, and therefore represents a critical time to understand mentalizing. Despite ever increasing interest in mentalizing, and a wealth of theoretical literature showing the importance of early relationships on mentalizing capacity, findings vary according to the domains of mentalizing assessed, the strength of the relationships, and which populations are sampled. The objective of the present review, therefore, is to explore the relationship between childhood maltreatment history and adolescent mentalizing, and to synthesise the extant literature.

To achieve this, a systematic review of research published on the topic was conducted to address two hypotheses:

- (1) Greater childhood maltreatment results in greater adolescent mentalizing deficits
- (2) The strength of this relationship will be influenced by age, gender, and mentalizing task

In order to capture the broad range of mentalizing capacities, a wide range of measures of mentalizing were included in the search criteria. To my knowledge, no systematic review has investigated this important relationship at the time of writing. My colleagues conducted a parallel review into childhood maltreatment and mentalizing in adulthood (Alqadri, 2022; Melwani, 2022).

Methods

Protocol and registration

This systematic review and meta-analysis adhered to Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA) guidelines (Moher et al., 2009), and the protocol was developed and registered on PROSPERO (CRD42021252988) on 01.06.21.

Eligibility criteria

Participants

Papers were eligible for inclusion if they reported on adolescent participants. Recent research encourages us to view adolescence as a lengthier period, to include early adulthood, with the extended age range reflecting the continued delaying of role transitions between adolescence and adulthood in Western society (Sawyer, Azzopardi, Wickremarathne, & Patton, 2018), as well as the biological transitions of this developmental stage (e.g., Smith, Cowie, & Blades, 2015). Participants of eligible papers were adolescents between the ages of 10–21 years, with a mean age ≥ 13.3 and ≤ 18.8 years at time of outcome measurement. Studies from both clinical and community populations were included.

Types of exposure variable – measuring maltreatment

Studies were eligible for inclusion if they included aspects of maltreatment defined by the WHO (2019). Studies were excluded if their focus was on adverse childhood experiences in general, rather than on childhood maltreatment specifically. Studies were also excluded if their focus was on harsh parenting or discipline alone. Maltreatment must have been labelled as maltreatment by the authors themselves.

Types of outcome variable – measuring mentalizing

Mentalizing is a broad and complex construct that can be investigated by assessing a wide profile of skills. The research team (Fonagy et al) agreed upon a set of suitable measures for inclusion, covering a wide spectrum of mentalizing capacities. Studies were eligible if they included measures of mentalizing that looked at one or more of the following specific terms: Mind-Mindedness (Meins & Fernyhough, 1999); insightfulness; Mentalization; Reflective Functioning (Fonagy et al., 1991); Social Cognition; emotion recognition; Alexithymia; and Theory of Mind. These terms were inherited from Fonagy et al. as part of their attempt to encompass all aspects of mentalizing within this review. Due to mentalizing being a relatively new term, many clinicians and researchers use a range of terms to describe many overlapping tasks and capacities that fall under the umbrella of mentalizing.

Types of studies

Studies were included if they used quantitative analysis of either longitudinal or cross-sectional data, using a behavioural measure of mentalizing, and so reviews, case studies, qualitative, and neuroimaging studies were excluded. Only papers with full texts written in English, Dutch, or German were considered. Papers were considered for inclusion only if they belonged to adult or adolescent samples, and if they were peer reviewed.

Information sources and search strategy

Studies were searched for in seven electronic databases (PsycINFO; MEDLINE; Web of Science; Embase; Cochrane Library; Scopus, and ERIC) in September 2021. The search terms were as follows: (abus* OR neglect* OR negligence OR exploit* OR maltreat* OR mistreat* OR ill:treat* OR rape* OR incest) N5 (childhood OR history OR surviv*) AND ("reflective functioning" OR "mentali*" OR "mind:mind*" OR "mind:related" OR mentali#ation OR

insightfulness* OR "social cognition*" OR "alexithymia" OR "mindfulness" OR "emotion recognition" OR "theory of mind")

Data management and study selection

The first stage of screening removed duplicate records. The second stage of screening cross-referenced full texts against inclusion criteria, with eligible records included in the present review, and ineligible records excluded with the exclusion reason documented (see Figure 1, PRISMA diagram). Quality of included studies (and therefore risk of bias) was assessed based on the Cambridge Quality Checklists (Murray, Farrington, & Eisner, 2009), which were complemented with relevant quality indicators that are specific for the current field of research. The studies were independently assessed by three researchers (HM, SM, and YA). Any differences in opinion were resolved through discussion with the wider research team.

Data extraction and coding procedure

Data was extracted from eligible studies and inputted into a standardised Excel form, using an accompanying manual detailing each variable. In addition to coding statistics on the relationship between childhood maltreatment and mentalizing, descriptive data on source characteristics (e.g., publication year), sample characteristics (e.g., sample size, mean age, percentage of female participants), and study characteristics (e.g., measures used, sample type) were also coded. Categories relevant to the present meta-analysis are presented in Figure 3.

Risk of bias

Methodological quality of included studies was assessed using the Cochrane risk of bias tool. Several steps were taken to investigate possible publication bias and heterogeneity. First, a funnel plot was created and visually examined for each significant effect size. For funnel plots, the

standard error of each study contributing to overall effect size was on the Y axis, and the study's effect size estimate was plotted on the X axis. Egger's regression tests (Egger et al., 1997) were then conducted to aid interpretation of the funnel plots. Duval & Tweedie's (2000) trim and fill test was conducted to determine if any hypothetical studies might be missing from the meta-analysis, and corrections applied to the effect sizes if appropriate.

Data analysis procedure

Metanalytic approach

Meta-analysis is a statistical technique that estimates mean and variance of underlying population effects from a group of studies investigating the same research topic (Field & Gillett, 2010). For this review, all statistical analyses were conducted using IBM SPSS Statistics software (Version 28).

For each relationship, Z-Standardised effect sizes (r), 95% confidence intervals, and heterogeneity statistics (Q) were calculated, using procedures outlined by Hedges and Olkin (1985). The I^2 index was also calculated (Higgins & Thompson, 2002), in order to quantify the extent of heterogeneity – by comparing the Q value with its expected value assuming homogeneity. I^2 estimates the proportion of the variance that is due to heterogeneity. I^2 of 0% to 40% suggest little heterogeneity; 30-60% may represent moderate heterogeneity; 50% to 90%: may represent substantial heterogeneity, and 75% to 100%: considerable heterogeneity. However, I^2 should be interpreted with caution in meta-analyses with few studies, such as this (Deeks, Higgins & Altman, 2019).

Studies varied in their design and methodologies, and therefore random effects models were employed. Random effects models assume that variability in effect sizes across studies are due to both sampling error and population variability (Lipsey & Wilson, 2001). Sensitivity analyses were then conducted to test data robustness. The mean effect for each study (r) was the

level of analysis, and where studies tested multiple associations (i.e., between different types of abuse or different aspects of mentalizing), a mean effect size was calculated. Cohen's (1988) guidelines were used to interpret effect size magnitudes for significant correlations, where $r = .10$ represents a small effect, $r = .30$ represents a medium effect, and correlations of $r = .50$ and above represent a large effect. Correlations were entered into the meta-analysis where reported. If only standardised regression coefficients (betas) or t-tests were given, these were converted to r using an online calculator.

Moderator analyses

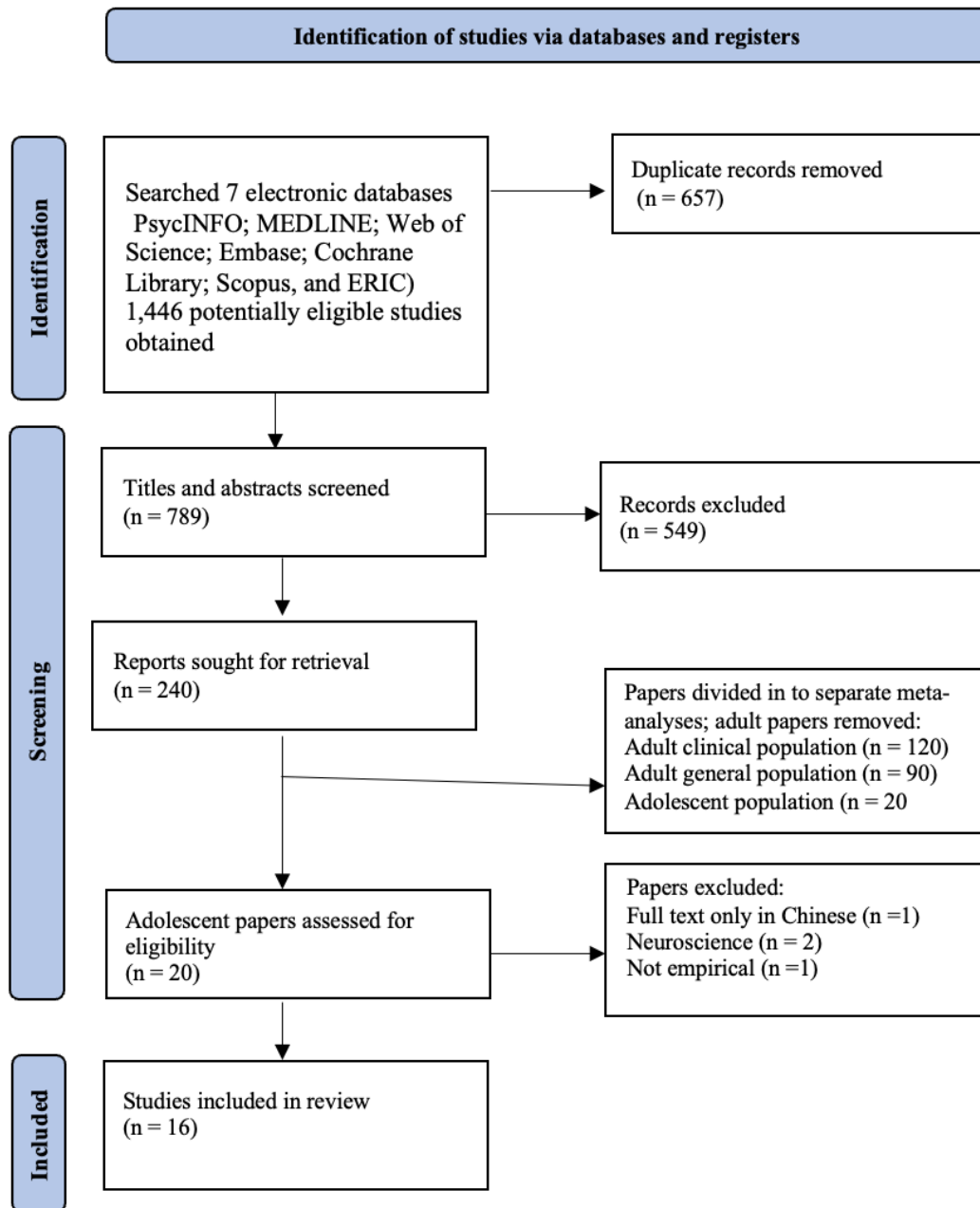
Moderator analyses were conducted to identify variables associated with the size of the relationship between childhood maltreatment and adolescent mentalizing. A minimum of three studies representing each moderator level category was required in order to conduct moderation analyses. Meta-regression analysis was conducted to determine whether effect size varied by gender and age. Subgroup analyses were conducted to determine whether effect size varied by sample type, and by mentalizing measure used. Ethnicity could not be included as moderator due to inconsistencies in studies reporting relevant information. Random effects models were used.

Q statistics were used to assess whether effect sizes were significantly different between moderator variables. For continuous variables, sample-weighted meta-regression was conducted to investigate impacts of moderators on adolescent mentalizing. For categorical variables, analysis was based on a mixed effects model. Pooling of effect sizes within each moderator level was based on a random effects model, and comparison of effect sizes between moderator levels was based on a fixed effects model.

Results

Based on the above criteria, a total of 1,446 papers were identified and saved to the reference manager software EndNote during the initial search, investigating the relationship between child maltreatment and subsequent mentalizing in both adolescent and adult samples. 657 papers were subsequently removed as duplicates. Thus, 789 titles and abstracts were eligible for review, and 240 possible papers were identified for inclusion. The full texts for these papers were obtained and screened according to our eligibility criteria. At this point, the team divided the papers into the three categories: adult general population (90 papers), adult clinical population (120 papers), and adolescent population (clinical and general, 20 papers). The present review conducted a full text screening of these 20 adolescent mentalizing papers, finding 16 papers eligible for inclusion in this systematic review and meta-analysis. These 16 studies utilised 3 of the 8 types of mentalizing included in the search terms. My colleagues Alqadri (2022) and Melwani (2022) conducted reviews of the adult general population data. The systematic review process is depicted in Figure 1.

Figure 1. PRISMA diagram showing process of retrieval and review of publication



Overview of study characteristics

Sample characteristics

Based on the inclusion criteria, a total of $n = 10,370$ participants were sampled across 16 independent studies. Of the 16 eligible papers, 6 used community samples (37.5%), 7 used clinical samples (43.75%), and 3 used mixed samples (18.75%). There was considerable variation within the ‘clinical populations’ group, spanning residential treatment programmes for substance

misuse (Leist & Dadds, 2009), private psychiatric hospitals for young people with a wide range of diagnoses (Penner et al., 2019), and young people with callous unemotional traits and conduct disorder diagnoses (Milone et al., 2019). Study sample sizes ranged from 23 participants (Leist & Dadds, 2009) to 6,532 participants (Hebert et al., 2020). 7 papers (43.75%) had fewer than 100 participants. 3 papers had between 100 and 200 participants (18.75%), and 5 had over 200 participants (31.25%). Mean participant age was 16.12% (1.2 SD), and an average of 56.4% of participants were female. 50% of studies were conducted in Europe, 25% were conducted in North America, 12.5% were conducted in Asia, and 12.5% were conducted in Australia. Notably, 62.5% did not report ethnicity of their participants, with many referring only to the geographical region in which the research took place, e.g., “adolescents in the German-speaking part of Switzerland and Germany” (Lüdtke et al., 2016). All studies were cross-sectional, with participants assessed at a single time point. See figure 3 for an overview.

Measurement characteristics

Maltreatment

Of the eligible papers, 6 (37.5%) used the Childhood Experience of Care and Abuse Interview (CECA; Bifulco et al., 1994), as their measure of childhood maltreatment. This retrospective standardised questionnaire assesses lack of parental care (neglect and antipathy), parental physical abuse, and sexual abuse from any adult prior to 17yrs of age. It consists of 16 items arranged on a 5-point Likert scale ranging from (1) ‘yes definitely’ to (5) ‘no, not at all’. A further 6 (37.5%) used the Child Trauma Checklist or its short form (CTQ, Bernstein et al., 1994; CTQ-S, Bernstein et al., 2003). These measure presence and severity of different types of childhood trauma on 5 clinical subscales: Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, Physical Neglect. 2 papers (12.5%) asked a dichotomous yes or no question

regarding experience of maltreatment and abuse; 1 paper (6.25%) used the Maltreatment classification system, and 1 paper (6.25%) used the maltreatment index (6.25%).

Mentalizing

The majority of the 16 eligible papers looked at the relationship between childhood maltreatment and reflective function (9, 56.25%); the remainder looked at the relationship between childhood maltreatment and alexithymia (4, 25%), or at the relationship between childhood maltreatment and facial emotion recognition skills (3, 19%). These measures tapped into almost all 8 of the different aspects of mentalizing (See Figure 2, below). 13 papers relied upon internal cues (9 RF; 4 Alexithymia), and three relied upon external cues (facial or eye emotion recognition). All assessed upon controlled mentalizing, just one assessed automatic mentalizing.

Reflective function was measured using the Reflective Function Questionnaire (Fonagy et al., 2016), the Reflective Function Questionnaire for youths (Ha et al., 2013), the Reflective Functioning Scale (Meehan et al., 2009) and coding of the Adult Attachment interview (George, Kaplan & Main, 1985) via the reflective function scale (Meehan et al., 2009). These reflective function measures include questions such as ‘I frequently feel that my mind is empty’ and ‘I usually know exactly what other people are thinking’, rated on a Likert scale.

Alexithymia was measured using the Toronto Alexithymia Scale (TAS-20, Bagby et al., 1994; TAS-26, Taylor et al., 1992, TAS-26 German version, Kupfer et al., 2001). The TAS is a standardised, self-report questionnaire used to assess the presence and severity of alexithymia. Questionnaire items are rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) assessing alexithymia according to three factors, difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking.

Facial emotion recognition was measured using the Reading the Mind in the Eyes Test (RMET, Baron-Cohen et al., 2001a), the Reading Mind in the Eyes Test-Child version (RMET-C;

Baron-Cohen et al., 2001b), and the UNSW Facial Emotion Task (FACES) (Dadds, Hawes, & Merz, 2004). The RMET and RMET-C consists of a self-paced task showing photographs of the eye region of female and male adult actors (a total of 36 and 28 photos, respectively). Each image is accompanied by four words that refer to mental states (e.g., “cross,” kind”, “hate,” “surprise,”), and the participant must select the one they consider best represents what that person feels or thinks. The FACES task requires participants to view 36 photos of faces for 2 seconds at a time, depicting sad, happy, neutral, disgusted, and fearful expressions demonstrated by a male and female child, adolescent, and adult actors. Participants must record what they consider to be the most appropriate emotion for the expression shown.

Table 1. Details of the aspects of mentalizing investigated by the studies in this review

	Self - Other		Cognitive - Affective		Internal - External		Automatic - Controlled	
	Self	Other	Cognitive	Affective	Internal	External	Automatic	Controlled
Reflective Function Questionnaire (Fonagy et al. 2016)	X	X	X	X	X	(X)		X
Reflective Function Questionnaire for Youths (Ha et al. 2013)	X	X	X	X	X	(X)		X
Reading the Mind in the Eyes Test (Baron-Cohen et al. 2001a)		X	X	X		X		X
Toronto Alexithymia Scale (Bagby et al. 1994)	X		X	X	X			X
UNSW ‘FACES’ Task (Dadds, Hawes, & Merz, 2004)		X	X	X		X		X
Reflective Functioning Scale (Meehan et al., 2009)	X	X	X	X	X	(X)	(X)	X
Reading the Mind in the Eyes Test – Child version (Baron-Cohen et al., 2001b)		X	X	X		X		X

NOTE: ‘X’ denotes that the measure taps into a given form of mentalizing ‘(X)’ denotes that the measure partially taps into this form of mentalizing (Luyten et al., 2019)

Table 2. Overview of reviewed studies

NOTE: CTQ = Childhood Trauma Questionnaire; CECA-Q = Childhood Experience of Care and Abuse Questionnaire; AAI = Adult Attachment Interview; TAS = Toronto Alexithymia Scale (either 26 or 20 item version); RFQ = Reflective Function Questionnaire; RF Scale

Author (year)	Participants (n)	% Female	Age (Mean, years)	Sample type	Maltreatment Measure	Mentalizing measure
Chung et al. (2020)	800	46	15.38	Community	CTQ-Short form	TAS- 20
Hebert et al. (2020)	6531	58	15.35	Community	Yes / no (unwanted sexual touching)	TAS- 20
Leist & Dadds (2009)	23	26	16.61	Clinical	MCS	UNSW FACES
Ludtke et al. (2016)	72	100	16.08	Clinical	CECA-Q	TAS- 26
Milone et al. (2019)	60	0	13.27	Clinical	Maltreatment Index	RMET-C
Musetti et al. (2021)	1308	52	16.27	Community	CTQ-Short form (Italian)	RFQ
Penner et al. (2019)	107	75.7	15.36	Clinical	CTQ-Short form	RFQ
Protic et al. (2020)	85	45.85	17.01	Clinical	CTQ-Short form	RF Scale
Quek et al. (2017)	51	84.3	15.39	Mixed	CTQ	RFQ
Sayar et al. (2005)	173	26	15.2	Community	Yes / No (physical abuse)	TAS-20
Taubner & Curth (2013)	97	48	15.94	Community	CECA-Q (yes / no)	RF Scale
Taubner et al. (2016)	161	52.8	16.5	Mixed	CECA-Q	RFQ
Waller et al. (2018)	261	58	18.84	Community	CECA-Q	RMET
Adler et al. (2020)	315	46	14.53	Mixed	CEQ (Lithuanian)	RFQ-Y
Duval et al. (2018)	263	78	17.5	Community	CECA-Q	RFQ
Crugnola et al. (2019)	63	100	18.63	Clinical	CECA-Q (Coded AAI)	RF Scale (coded AAI)

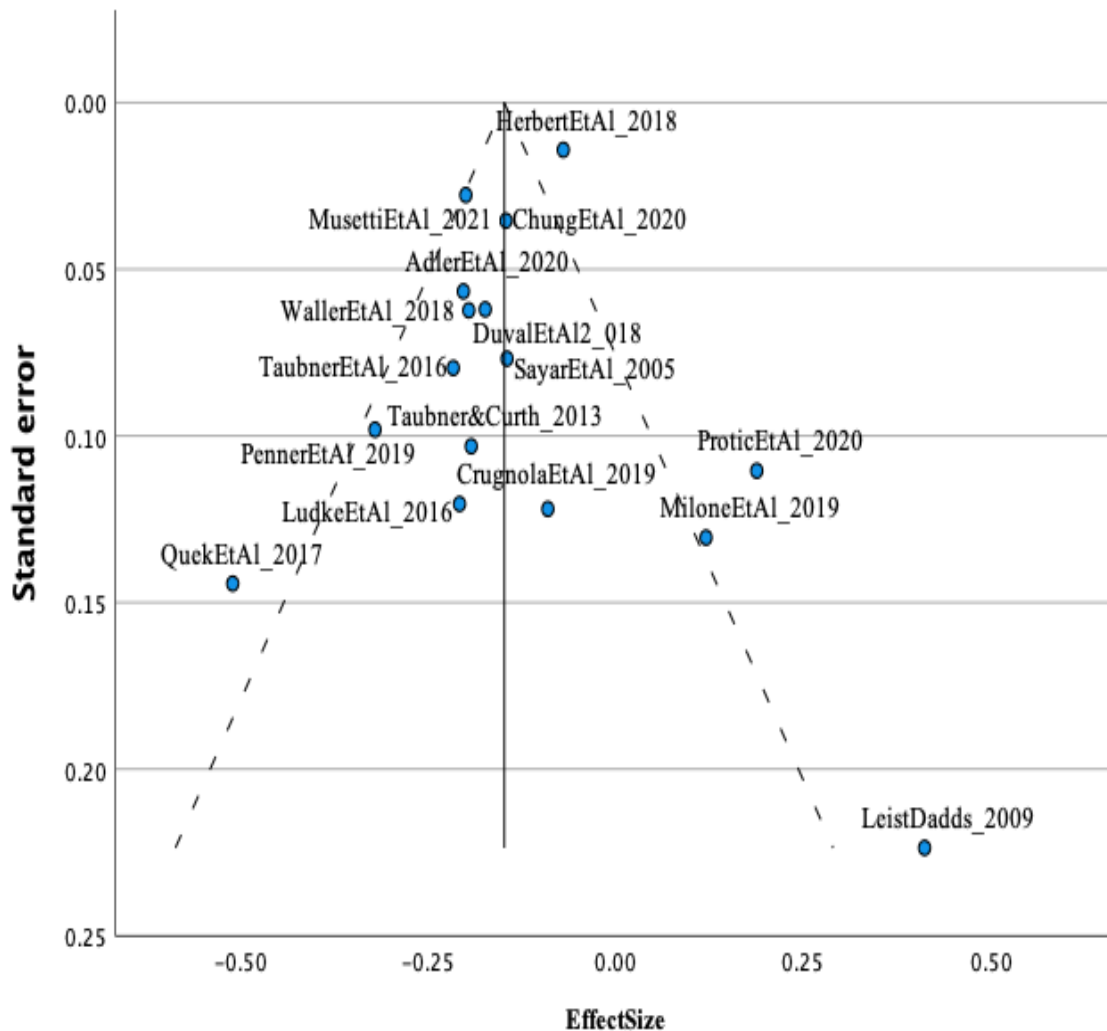
= Reflective Function Scale; RMET = Reading the Mind in the Eyes Test; RMET-C = reading the Mind in the Eyes Test – Child version; UNSW FACES = University of New South Wales Facial emotion recognition task.

Investigating potential publication bias

A visual inspection of the funnel plot indicated little clear evidence of data asymmetry (See Figure 2), and Egger's (1998) test of bias revealed this was non-significant ($t = 1.290$, $p = .220$). This therefore provides no strong evidence of publication bias. Correction for bias using the trim and fill method (Duval & Tweedie, 2000) was not required and therefore no

hypothetical papers needed to be imputed. In summary, these analyses suggest these findings are robust, and unlikely to be strongly affected by unpublished null findings.

Figure 2. Funnel plot to explore possible publication bias



NOTE: dotted line = 95% pseudo confidence intervals, solid line = estimated overall effect size of observed studies

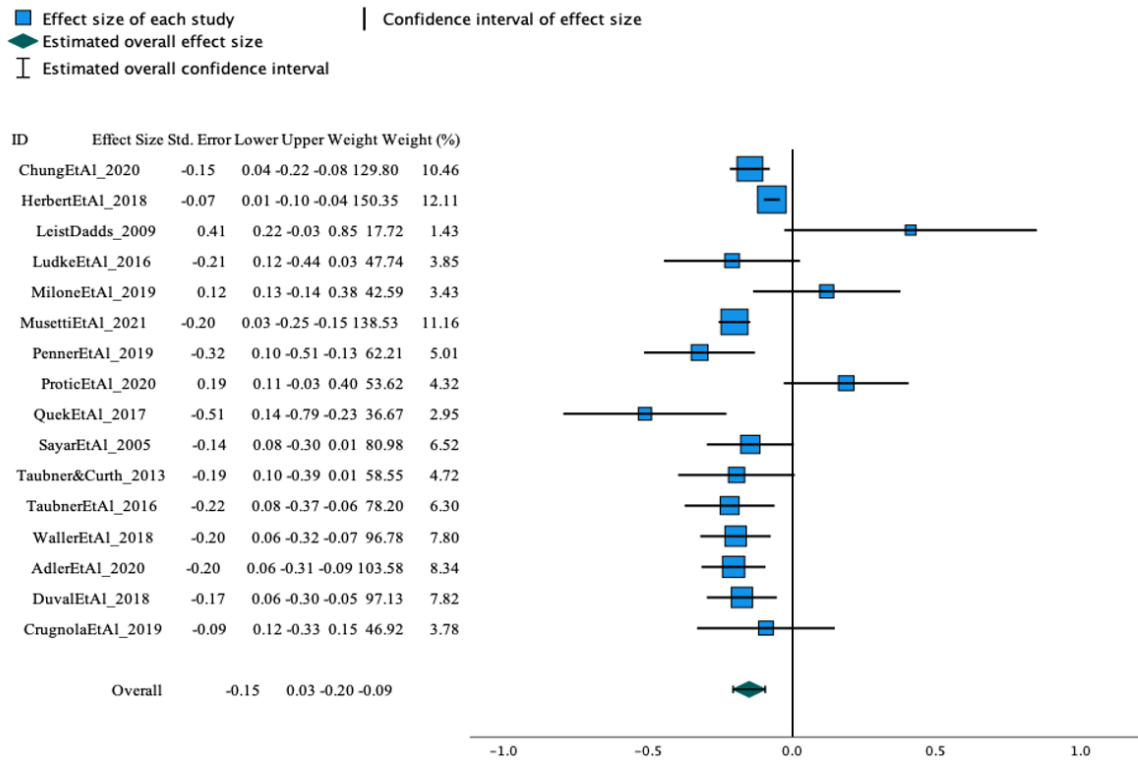
Synthesis of results

Main effects

Across the 16 eligible studies, mentalizing was found to have a significant negative relationship with maltreatment, indicating that individuals who experienced greater levels of childhood maltreatment (or presence vs. absence of maltreatment) were likely to show poorer mentalizing skills during adolescence than those without a childhood maltreatment history ($K = 16, r = -.15, t = -5.22 = 95\% \text{ CI: } -.204 \text{ } -.093, I^2 = 70.9\%, n = 10,370$). This converts to a small effect

size and confirms the first hypothesis. There was significant, substantial heterogeneity between studies exploring relationship between maltreatment and adolescent mentalizing ($Q = 56.536$, $t(15) = -5.22$, $p < 0.001$, $I^2 = 70.9\%$). Planned moderator analyses were conducted to better understand this heterogeneity. Figure 3 shows a forest plot of the 16 study effect sizes.

Figure 3. Forest plot of effect sizes for each study included in the meta-analysis



NOTE: effect sizes above 0 indicate a positive relationship between child maltreatment and adolescent mentalizing. Effect sizes below 0 indicate a negative relationship between child maltreatment and adolescent mentalizing.

Moderator analyses

To address the second hypothesis, that the strength of the relationship between childhood maltreatment and adolescent mentalizing deficits would be influenced by the mentalizing task used, the type of sample recruited, and the age or gender of participants, planned moderator analyses were conducted.

Mentalizing task type

In order to determine if the strength of the relationship between childhood maltreatment and adolescent mentalizing was influenced by the type of mentalizing assessed, a separate random

effects analysis was conducted using types of mentalizing (reflective functioning, alexithymia, facial emotion recognition) as categorical moderators. Results showed that the type of mentalizing measure used significantly moderated the relationship between maltreatment and mentalizing

Subgroup analyses showed that, when assessed by reflective functioning and alexithymia measures, child maltreatment was found to have a significant negative association with adolescent mentalizing: Reflective function, $r = -.19$, $t(8) = -4.16$, $p < .001$, 95% CI (-.28, -.1); Alexithymia $r = 1.11$, $t(4) = -3.6$, $p < .001$, 95% CI (-.17, -.05). No significant association was found between childhood maltreatment and adolescent performance on facial emotion recognition tasks ($r = .064$, $t(2) = .374$, $p = .708$, 95% CI [.27, .40]). This means that individuals who experienced greater levels of childhood maltreatment (or presence vs absence) were more likely to display mentalizing deficits, but only when assessed with measures of alexithymia and reflective function, and not facial emotion recognition.

In addition, there was significant, substantial heterogeneity between subgroups ($Q = 56.5458$, $t(15) = -2.68$, $p < 0.01$, $I^2 = 93\%$), and the direction of effects varied, with performance on facial emotion recognition measures leaning towards having a positive relationship with childhood maltreatment history, and both reflective functioning and alexithymia measures having a negative relationship with childhood maltreatment history. Moreover, the two studies that drove the relationship between childhood maltreatment and facial emotion recognition scores were also two of the smallest samples in this review ($n = 23$, Leist & Dadds, 2009; $n = 60$, Milone et al., 2019). Research has previously indicated that facial emotion recognition abilities can be better in maltreated compared to non-maltreated samples, this is discussed further in the discussion section later in this paper. Based on this, the decision was made to remove facial emotion recognition studies from the subsequent moderator analyses, resulting in 13 studies available for subsequent moderator analyses. Other studies have analysed internal and external mentalizing separately (e.g., Rutherford et al., 2012).

Gender

A meta-regression analysis was conducted to test the effect of the continuous moderator of gender upon the relationship between childhood maltreatment and adolescent mentalizing, with gender defined as the proportion of the sample recorded as female. Gender was found to have no moderating effect on the relationship between childhood maltreatment and adolescent mentalizing, $r = -.002$, $t(12) = -1.068$, $p = .30$, 95% CI $[-.005, .0002]$.

Age

A meta-regression analysis was conducted to test the effect of the continuous moderator of age upon the relationship between childhood maltreatment and adolescent mentalizing, with age defined as the mean age of participants at the time of testing. Age was found to have no significant moderating effect on the relationship between childhood maltreatment and adolescent mentalizing, $r = .031$, $t(12) = .974$, $p = .351$, 95% CI $[-.039, .100]$.

Sample type

No significant association was found between childhood maltreatment and adolescent mentalizing in participants from clinical samples ($r = -.110$, $t(3) = -.979$, $p = .328$, 95% CI $[-.329, .110]$). A significant relationship was found between childhood maltreatment and adolescent mentalizing in participant from community samples ($r = -.143$, $t(5) = -5.076$, $p < .001$, 95% CI $[-.198, -.088]$). A significant relationship was found between childhood maltreatment and adolescent mentalizing in participants from mixed samples (drawn from across community & clinical populations), ($r = -.254$, $t(2) = -4.108$, $p < .001$, 95% CI $[-.375, -.133]$).

The effect of sample type on the relationship between childhood maltreatment and adolescent mentalizing was assessed. Results show that the type of sample used did not significantly moderate the relationship between maltreatment and mentalizing: $Q(2) = 2.871$, $p = .238$.

Discussion

The central aim of this systematic review and meta-analysis was to investigate the relationship between childhood maltreatment and adolescent mentalizing. The present study is believed to be the first to systematically examine this relationship using meta-analysis. Key findings will be discussed and situated in the context of existing literature, before discussing the limitations of this research and implications for both research and clinical practice.

Main findings

Drawing upon data from 16 eligible studies, representing 10,371 adolescents recruited from both clinical and community settings, a significant combined effect size of $r = -.148$ (95% CIs: $-.204, -.093$) was found for this relationship, demonstrating a small association between childhood maltreatment upon adolescent mentalizing. This finding is consistent with research in this area and has important implications for both clinicians and policymakers. This finding deepens our understanding of the multitude of ways that maltreatment impacts the developing child. Moreover, it offers scope to develop more targeted approaches to intervention.

Although significant, the size of the effect for the relationship between childhood maltreatment and adolescent mentalizing was small, with a large portion of the variance in mentalizing left unexplained. Other factors that account for this variance may include the type of maltreatment experienced (e.g., Al Qadri, 2022), the roles of genetics (e.g., Warrier & Baron-Cohen, 2018) and culture (e.g., Aival-Naveh, Rothschild-Yakar, & Kurman, 2019; Sayar et al., 2005).

Bias and heterogeneity

Tests revealed no significant bias, and so the findings in this review can be considered robust, and unlikely to be affected substantially by unpublished null findings. There was

significant, heterogeneity between studies. Heterogeneity in meta-analyses is common – especially for studies such as this, which are the first to draw upon a burgeoning literature exploring a broad concept such as mentalizing. To better understand the high level of heterogeneity in this meta-analysis, planned moderator analyses were conducted.

Moderating effects

The main effect of childhood maltreatment on adolescent mentalizing was significantly moderated by mentalizing type and sample type. Meta-regressions found no significant effect of age, and no significant effect of gender.

Age

That age was not a significant moderator is perhaps not surprising. The period of adolescence is relatively brief, and thus the maximum range of ages is small. In addition, unlike much of adulthood, so many changes occur during the adolescent period, and at different times for different individuals, so one cannot describe a ‘typical’ 14-year-old experience, for example. This may make it harder to determine differences by age. Lastly, the use of mean ages may minimise differences found according to age. Future research would benefit from longitudinal studies to understand how mentalizing changes across the span of adolescence.

Gender

Given that other studies have found gender differences in mentalizing (Rutherford et al., 2012) and in response to child maltreatment, it is notable that this study found no moderating effect of gender. However, this may be because boys and girls were not compared directly; but compared using percentage of females within the study. This was done because many of the studies reported only one sample score for mentalizing and did not discriminate between genders

in their analyses. It may also be because of the different types of abuse experienced by boys and girls (Asscher et al., 2015), and the differential effects of these upon mentalizing. Future research comparing genders directly may find interactions between gender and the impact of maltreatment upon mentalizing, and it would be helpful to explore this.

Mentalizing measure used

This review found a significant moderating effect of mentalizing measure type on the relationship between childhood maltreatment and adolescent mentalizing. Measures of both alexithymia and reflective function each had a significant negative relationship with childhood maltreatment, with worse performance associated with higher levels of maltreatment. Measures of facial emotion recognition, however, were not significantly associated with childhood maltreatment, though results leaned towards a positive association.

While it was predicted that child maltreatment would be associated with mentalizing, this positive relationship between childhood maltreatment and facial emotion recognition is also consistent with existing literature. Evidence has shown that people who have experienced maltreatment can be ‘better’ at facial emotion recognition, by dint of being more hypervigilant to fearful and angry faces (e.g., Sandre et al., 2018) as part of an adaptive response to be hyper vigilant to possible danger. The evidence is mixed, however, as some have found that maltreatment results in worse facial emotion recognition (da Silva Ferreira, Crippa, & de Lima Osório, 2014).

Mentalizing is a broad and multifaceted construct. This study suggests that while the 8 systems of mentalizing share commonalities, dividing mentalizing according to its internal and external components is most meaningful when exploring impacts of childhood maltreatment. Indeed, some studies have already chosen to assess internal (reflective functioning, alexithymia) and external (facial emotion recognition) mentalizing separately (e.g., Rutherford et al., 2012). A

complex construct such as mentalizing can only be fully understood and evaluated through use of a range of methods and measures. When selecting just one measure, as is the case for many studies, the limitations of the measure (how many dimensions of mentalizing dimensions it captures), and how the data is sourced (be it interview, self-report, implicit computer-based task), should be taken into consideration. While this review found that scores on RF and TAS measures appeared to share similar negative relationships with maltreatment history, more research is needed to explore how different mentalizing measures correspond to maltreatment history.

While the present study made the decision to analyse internalizing and externalizing mentalizing measures separately, subsequent moderator analyses of age, gender, and sample type and gender could not be run for facial emotion recognition studies alone, due to the small number of studies.

Sample type

A significant effect of sample type was found, with those in community/general population being more likely to develop mentalizing deficits after experience of childhood maltreatment than those in clinical samples. This may partly be driven by the large sample size of Herbert et al.'s (2018) community study ($n = 6,531$). It may also be because mental illness was not controlled for, and so the relationship between maltreatment and mentalizing in clinical samples may have been moderated or mediated by mental health difficulties. In addition, some community samples were college samples, and so class, age, and education may have played a role. Further research is needed to better understand this finding.

While it was predicted that childhood maltreatment would be associated with poorer adolescent mentalizing, it is somewhat surprising that the size of this relationship was not larger, given anecdotal understanding of the impacts of maltreatment upon psychological health and social functioning. This may be explained by the types of mentalizing measures employed by the

studies included in this review. There is growing evidence that a more accurate assessment of mentalizing abilities take place in high demand, emotionally charged experimental tasks - where 'hot mentalizing' can be studied. It may be that the tasks used in the papers within this review were insufficiently emotional or complex to be ecologically valid or meaningful enough to detect larger mentalizing deficits. Indeed, studies finding mentalizing deficits tend to be those employing ecologically valid experimental tasks with greater demands and higher emotional valence (Sharp & Roussouw, 2019).

For some, their 'true' mentalizing abilities may only be evident in high-stress scenarios where they cannot rely upon strategies that allow them to operate in a 'pretend-mode' of mentalizing (Ibid). People with fearful-avoidant attachments, for example, may use cognitive strategies to report what is going on without truly feeling it, affectively. While this form of mentalizing may be sufficient for every day, low-stress events, people who rely upon it may struggle when presented with stressful interpersonal events, e.g., when disagreeing with a partner, or attempting to manage their child's behaviour. So, while the measures included in this review may be good at assessing mentalizing in healthy general populations, they may not be sensitive enough, or 'stressful' enough to accurately assess how people mentalize in the very situations where mentalizing is most crucial. Mentalizing is a multifaceted and complex concept, and if measures fail to capture it in an ecologically valid way, the importance differences and subtleties may be missed.

Adolescence

Adolescence is widely regarded as a time of biological, social, and psychological flux, and it may be that mentalizing capacities shift significantly over the course of the lifetime. 'Adolescent hypermentalizing' has been documented among adolescents with emerging personality disorder (Sharp et al., 2016), and many adolescents are considered to display

‘excessive’ theory of mind (Dziobek et al., 2006). Relatedly, evidence indicates that adolescents are worse at RMET tasks than are adults (Sharp et al., 2016). Therefore, if the same adolescents sampled in this paper were to be followed up as adults, one might expect the impacts of childhood maltreatment upon mentalizing to become more pronounced over time - with increasing deficits in mentalizing as measured by reflective function and alexithymia; and increasing strengths in mentalizing as measured by facial emotion skills. Longitudinal studies would offer important insights into changes in mentalizing abilities over time.

The WHO (2019) defines childhood maltreatment as any forms of abuse until the age of 18. It may be that it is more challenging, or even inappropriate, to investigate the impacts of childhood maltreatment when it may be ongoing. While adolescence is an important period to study due to the shifts that occur during this time, it may be that studying the impact of maltreatment upon adult mentalizing makes it possible to take assess childhood maltreatment occurring at all ages. This adds further weight to the argument for more longitudinal research to understand how mentalizing changes over the span of adolescence and the life course.

There is understood to be a relationship between attachment and mentalizing (Crugnola et al., 2019), but because just one study included in this review employed a measure of attachment, it was not possible to explore the mediating impacts of attachment on the relationship between maltreatment and mentalizing as part of this review. Given the finding that people with fearful-attachment styles may ‘pseudo mentalize’ (Luyten et al., 2019), it would be interesting to control for attachment type.

Maltreatment type

Due to the small numbers of papers in this review, and because most studies did not specify the subtypes of maltreatment experienced by research participants, it was not possible to include maltreatment type as a moderator. This meant that potential differential moderating

effects of maltreatment types could not be determined. Research indicates that different forms of maltreatment may have different later life outcomes or consequences (Normal et al, 2012), however it is not yet known if different forms of maltreatment results in distinct mentalizing profiles. Berzenski & Yates (2022) found different forms of maltreatment had differential effects upon empathy, and Rnic et al (2015) found that different forms of maltreatment resulted in different theory of mind abilities. Together, these findings would suggest the importance of understanding how different forms of maltreatment may or may not differentially relate to mentalizing.

Strengths & Limitations

This paper has several strengths. It is the first of its kind to systematically review the relationship between child maltreatment and adolescent mentalizing and has important implications for clinical practice – particularly for services working with adolescents, but also for services supporting adults with a history of maltreatment. In addition, use of adolescent samples in this study likely reduces some of the problems associated with retrospective self-report found in adult samples, and therefore one may be able to draw more confident conclusions from this review. Moreover, the use of both clinical and community samples indicates that childhood maltreatment is related to mentalizing capacities even when looking at nonclinical samples. However, while this paper adds meaningfully to literature on child maltreatment and adolescent mentalizing, it is not without limitations.

One thing that is important to note is that there exists only very minimal data available on normative development of mentalizing in late childhood and adolescence (Taubner et al., 2016), meaning that it is harder to draw conclusions about the factors that shape the development of mentalizing during this phase. Although both maltreated and non-maltreated samples were

included in this review, more research is needed to understand normative development of mentalizing, so that more meaningful comparisons can be made.

While the present review's focus on the adolescent period is important, both clinically and theoretically, the sampling of participants from within this age group is not straightforward. Many people who experience childhood maltreatment do not report it until later in life, and those in community samples are perhaps even less likely to disclose. This may have resulted in underreporting of maltreatment history, which could have confounded the data. Most studies included in this review relied upon self-report, and future research should seek to identify abuse based upon clinician/practitioner report, through recruitment of research participants from children's social care. Longitudinal studies tracking mentalizing capabilities over the life course may also remove some of these barriers. An additional complication related to the age of participants included in this review is that they are at an age where child maltreatment may be ongoing. Therefore, it may not be possible to know if the present findings may be influenced by either ongoing maltreatment or historical maltreatment. These confounding effects may explain the finding that younger participants showed greater mentalizing deficits.

Finally, the papers included in this meta-analysis have significant heterogeneity. While this is to be expected given the breadth and complexity of mentalizing as a construct, and the diverse populations sampled, it makes it harder to confidently accept and generalise the conclusions – especially given the small number of studies eligible for this review.

Future research would benefit from a more all-encompassing mentalizing measure that more meaningfully taps into a range of mentalizing abilities. With a greater body of research, efforts can be made to explore specific profiles of effects of different maltreatment types upon distinct types of mentalizing. Due to the current meta-analysis' limited focus on studies published in English, German and Dutch, it is also worth noting that these results are only generalisable to such populations.

Despite the broad inclusion categories, as part of an attempt to capture as many studies as possible, just 16 studies were eligible for review, and most included minimal information regarding chronicity, type, severity, and age of onset of maltreatment. This means that there is a limit to the conclusions that can be drawn from this meta-analysis and more research is needed.

Conclusions

This is the first paper to systematically review the relationship between childhood maltreatment and adolescent mentalizing (See Table 3 for summary). This review demonstrated a small, significant relationship between childhood maltreatment and certain aspects of adolescent mentalizing, with greater levels of childhood maltreatment associated with increased levels of reflective function deficits, and increased levels of alexithymia. There was no relationship found between childhood maltreatment and adolescent facial emotion recognition, though this leaned towards a positive association, something that has previously been documented in the literature (e.g., Sandre et al., 2018).

This review contributes meaningfully to our understanding of the impacts of childhood maltreatment and has important consequences for how those with a history of childhood maltreatment can be best supported. Mentalizing deficits can cause significant difficulties for individuals, and therefore identification and better understanding of the relationship between maltreatment and mentalizing will help people to access more appropriate support.

16 papers were available for this review, and over half (10, 62.5%) were published within the past 5 years. This suggests there is growing interest in adolescent mentalizing, and that subsequent reviews should be conducted in the coming years.

Table 3. Summary of meta-analysis findings

Summary of findings
<ul style="list-style-type: none">• Significant small-sized, negative effect of childhood maltreatment upon mentalizing• Experience of childhood maltreatment associated with deficits in reflective function, increased levels of alexithymia, and increased facial emotion recognition abilities during adolescence• Gender and age did not moderate the relationship between childhood maltreatment and adolescent mentalizing• Adolescents from non-clinical samples more likely to display mentalizing deficits after childhood maltreatment than are adolescents from clinical samples

Research recommendations

This review offers several recommendations for future research (see Table 4 for an overview). Firstly, in order to better understand the relationship between maltreatment and mentalizing, future research studies need to capture mentalizing in more meaningful and valid ways. It is notable that for each of the studies included in this review, just a single measure was used to assess mentalizing. Mentalizing is a broad diagnostic category, and people can show strengths and weaknesses across each of the four domains (i.e., internal-external, cognitive-affective). Future research studies should aim to capture the wider spectrum of mentalizing, rather than focusing on one measure or one domain. This could be done by administering more than one mentalizing task, or through the development of a new all-encompassing mentalizing measure.

Secondly, and relatedly, future research studies should aim to increase the use of ‘hot’ mentalizing tasks that are more ecologically valid (e.g., Movie for the Assessment of Social Cognition, ‘MASC’, Dziobek et al., 2006; Adult Attachment Interview, ‘AAI’, Fonagy et al. 1996). Research has shown that mentalizing deficits may not always be noticeable until levels of arousal have increased. The AAI achieves this by including questions pertaining emotionally charged topics such as loss and separation (Luyten et al., 2019). Research into the relationship between maltreatment and mentalizing is still in its infancy, and as such is not yet clearly defined.

Future research is needed to better understand how different types of maltreatment impact different subdomains of mentalizing.

Including all categories of maltreatment together in our analysis, although necessary due to the small number of papers currently available, may have inadvertently led to this review failing to accurately capture the relationship between childhood maltreatment and adolescent mentalizing. Given what is known about the differential impacts of maltreatment according to chronicity, type, severity, and age of onset of maltreatment (e.g., Manly et al., 2001; Teicher et al., 2006), future research would benefit from providing greater detail about maltreatment experiences in their studies, and analysing maltreatment subtypes separately. This would allow researchers and clinicians to understand whether different forms of maltreatment (neglect vs abuse, or investigating specific abuse subtypes) have different effects upon later mentalizing. This would develop our understanding of who is most at risk of mentalizing difficulties, and to allow for targeted support.

It is known that mentalizing capacity develops in the context of the early attachment relationships, and evidence suggests that attachment security may mediate the relationship between childhood maltreatment and mentalizing deficits, however, just 1 of the papers included in this research included a measures of attachment security (Crugnola et al., 2019). Inclusion of measures of attachment would benefit future research so the mediating role of attachment can be better understood.

Evidence suggests that there may be differences in societal expectations around focus upon thoughts and feelings (i.e., Sayar et al., 2005), and this may impact mentalizing. The intention was to examine differences in the relationship according to ethnicity or minority ethnic status, however there were insufficient studies reporting participant ethnicity to explore this relationship.

Lastly, most of the studies included in this review were cross-sectional and so there is a limit to what can be concluded about the relationship between child maltreatment and mentalizing. Given the heavy social, psychological, and economic costs of childhood maltreatment (Teicher et al., 2021) and its dose-response relationship with later difficulties (Crawford et al., 2020), there is a great need for more prospective, longitudinal studies to understand changes in social cognition and mentalizing over the life course, especially during the flux of the adolescent period (Sharp & Roussouw, 2019).

Table 4. Implications for research and clinical practice

Research	Clinical Practice
<ul style="list-style-type: none"> • Longitudinal studies needed, to better understand link between childhood maltreatment and mentalizing abilities over the life course • More studies needed on adolescent mentalizing specifically • Future studies should explore specific relationships between age, type, and severity of maltreatment upon later mentalizing • Future studies investigating mentalizing should use ‘hot’ measures of mentalizing, such as MASC, Adult Attachment Interview, or similar • More research exploring mentalizing across cultures • Future meta-analyses should investigate external and internal mentalizing separately 	<ul style="list-style-type: none"> • A comprehensive assessment of maltreatment experiences should be conducted among young people presenting to services (e.g., type of maltreatment, age at onset, severity). • Where there are deficits, interventions should focus on developing young people’s mentalizing abilities • Through understanding where deficits lie (i.e., internal vs. external, Cog vs. auto), interventions can be tailored to the individual (i.e., psychoeducation prior to formal therapy)

Clinical recommendations

This study provides important lessons for clinicians (see Table 2 for an overview). With growing evidence of associations between childhood maltreatment, mentalizing difficulties, and poorer mental health outcomes in adolescence and adulthood (e.g., Herbert et al., 2018), and

given the importance of early intervention and of the essential social changes and developmental tasks that occur during the transition between childhood and adulthood, adolescence appears to represent a critical window to intervene. Addressing specific deficits in mentalizing may be a crucial step towards promoting recovery during teenage years (Herbert et al., 2018; Hauser et al., 2006). Future research investigating how different subtypes of maltreatment are associated, perhaps differentially, with later mentalizing will allow for more targeted clinical support.

What is more, given what is known about the impact of maltreatment on parental reflective function and parental sensitivity (Kristiansen et al., 2019), intervening during the adolescent period appears critical. By improving the mentalization skills of those who have experienced childhood maltreatment prior to these individuals engaging in adult romantic relationships and raising children, there is an opportunity to break or reduce the cycle of child maltreatment, trauma, and socio-emotional difficulties.

Fortunately, there is increasing evidence for the effectiveness of mentalization-based interventions (Bateman & Fonagy, 2013; Fonagy, Luyten & Allison, 2015; Roussouw & Fonagy, 2012). Knowing that it is possible to improve mentalizing skills means that it is helpful to understand the factors that impacts mentalizing abilities, to enable targeted treatment. If the link between childhood maltreatment and adverse outcomes in adulthood can be ameliorated by engagement in mentalizing interventions, then being able to detect mentalizing difficulties at an early age is crucial. Clinicians should conduct comprehensive assessments of clients' maltreatment histories and regularly conduct assessments into clients' mentalizing abilities.

Most psychological therapies encourage clients to make explicit reflections on their own and others' states of mind, and it is helpful for clinicians to be aware of how maltreatment history and/or mentalizing deficits can impact such tasks. As discussed earlier in the paper, clients with mentalizing deficits may be effective in one mentalizing domain but struggle in others (Fonagy & Bateman, 2019), and knowing this will allow clinicians to be more thoughtful in how they work

with clients. It may be that clients with a history of childhood maltreatment may benefit from initial psychoeducation and training on understanding and recognising own and others' thoughts and emotions prior to therapeutic work beginning.

As Teicher et al. (2021) powerfully highlight, childhood maltreatment represents the most significant and preventable risk factor for mental health difficulties. This review highlights the link between maltreatment and later mentalizing difficulties and, given what is known about the longer-term implications of mentalizing deficits and how these deficits interact with mental health problems and treatment outcomes, it is important that steps are taken to intervene so that children and young people have better outcomes.

This paper is the first of its kind to systematically investigate the potential relationship between childhood maltreatment and adolescent mentalizing. There is a wealth of evidence that experience of childhood maltreatment is associated with worse later life outcomes, and this review offers support to the theory that mentalizing deficits may act as the mechanism underlying this relationship – by showing that adolescents who experienced greater levels of maltreatment experienced greater mentalizing deficits. Little research has been conducted on mentalizing in adolescence, and therefore the present study provides a useful overview of mentalizing in this population and invites future research to build upon it.

References

- Adler, A., Gervinskaitė-Paulaitienė, L., Čekuolienė, D., & Barkauskienė, R. (2020). Childhood maltreatment and adolescents' externalizing problems: Mentalization and aggression justification as mediators. *Journal of Aggression, Maltreatment & Trauma*. 30:1, 54-69, DOI: 10.1080/10926771.2020.1783733
- Aival-Naveh, E., Rothschild-Yakar, L., & Kurman, J. (2019). Keeping culture in mind: A systematic review and initial conceptualization of mentalizing from a cross-cultural

perspective. *Clinical Psychology: Science and Practice*, e12300. <https://doi.org/10.1111/cpsp.12300>.

Al Qadri, Y. (2022) Childhood neglect and mentalization in adulthood: a meta-analysis.

Unpublished thesis.

American Psychological Association (2020). Alexithymia. APA Dict. Psychol. Retrieved from www.dictionary.apa.org/alexithymia

Asscher, J. J., Van der Put, C. E., & Stams, G. J. (2015). Gender Differences in the Impact of Abuse and Neglect Victimization on Adolescent Offending Behavior. *Journal of family violence*, 30(2), 215–225. <https://doi.org/10.1007/s10896-014-9668-4>

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., and Plumb, I. (2001a). The “Reading the Mind in the Eyes” Test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *J. Child Psychiatry* 42, 241–252. doi: 10.1111/1469-7610.00715

Baron-Cohen, S., Wheelwright, S., Spong, A., Scahill, V., and Lawson, J. (2001). Are intuitive physics and intuitive psychology independent? A test with children with Asperger syndrome. *Journal of Developmental and Learning Disorders*. 5:47–78.

Bateman, A., & Fonagy, P. (2010) Mentalization based treatment for borderline personality disorder. *World Psychiatry*. Feb; 9(1): 11–15.

Bateman, A., & Fonagy, P. (2013). Mentalization-based treatment. *Psychoanalytic Inquiry*, 33(6), 595–613.

Bateman, A. & Fonagy, P. (2019) Preface. In Eds A.W., Bateman & P. Fonagy, *Handbook of Mentalizing in Mental Health Practice*. (2019)

Begent, J. Simpson, J. & Gamper, L. (2019) Adolescence: An Overview. In *Transitioning Medical Care: Through Adolescence to Adulthood* Edited by Wood, D., Williams, A., Koyle, M.A. & Baird, A.D. Springer.

- Benarous, X., Guile, J. M., Consoli, A., & Cohen, D. (2015). A systematic review of the evidence for impaired cognitive theory of mind in maltreated children. *Frontiers in Psychiatry*, 6, 108.
- Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., Sapareto, E., & Ruggiero, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *The American journal of psychiatry*, 151(8), 1132–1136.
- Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T. & Zule, W. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse & Neglect*, 27(2), 169–190
- Bérubé, A., Turgeon, J., Blais, C., & Fiset, D. (2021). Emotion Recognition in Adults With a History of Childhood Maltreatment: A Systematic Review. *Trauma, Violence, & Abuse*. <https://doi.org/10.1177/15248380211029403>
- Berzenski S.R. & Yates, T.M.. (2022) The development of empathy in child maltreatment contexts. *Child Abuse & Neglect*. Nov;133:105827.
- Bifulco, A., Brown, G.W., Neubauer, A., Moran, P., & Harris, T. (1994). *Childhood Experience of Care and Abuse (CECA): Training Manual*. London: Royal Holloway, University of London.
- Bion, W.R. (1967a). *Second thoughts*. London: Maresfield Library.
- Blakemore, S.J (2012) Development of the social brain in adolescence. *J R Soc Med* 105(3):111–116,
- Blakemore, S.J. & Mills, K.L (2014) Is adolescence a sensitive period for sociocultural processing? *Annu Rev Psychol* 65:187–207
- Bleiberg E, Rossouw T, & Fonagy P (2012) Adolescent breakdown and emerging borderline personality disorder, in *Handbook of Mentalizing in Mental Health Practice*. Edited by Bateman A, Fonagy P. Arlington, VA, American Psychiatric Publishing, pp 463–510

- Bowlby, J. (1977). The making and breaking of affectional bonds: I. Aetiology and psychopathology in the light of attachment theory. *The British journal of psychiatry*, 130(3), 201-210.
- Bowlby J. (1982) Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry*. 52:664–78.
- Burnett, S., Thompson, S., Bird, G., & Blakemore, S. J. (2011). Pubertal development of the understanding of social emotions: Implications for education. *Learning and individual differences*, 21(6), 681-689.
- Choi-Kain, L. W., & Gunderson, J. G. (2008). Mentalization: Ontogeny, assessment, and application in the treatment of borderline personality disorder. *American Journal of Psychiatry*, 165(9), 1127-1135.
- Chung, M. C., & Chen, Z. S. (2020). Gender Differences in Child Abuse, Emotional Processing Difficulties, Alexithymia, Psychological Symptoms and Behavioural Problems among Chinese Adolescents. *Psychiatry Q*, 91(2), 321-332. <https://doi.org/10.1007/s11126-019-09700-w>
- Cicchetti, D., & Toth, S. L. (2005). Child Maltreatment. *Annual Review of Clinical Psychology*, 1(1), 409–438.
- Cohen, J. (1988). The effect size. *Statistical power analysis for the behavioral sciences*, 77-83.
- Cohen, P., Crawford, T. N., Johnson, J. G., & Kasen, S. (2005). The children in the community study of developmental course of personality disorder. *Journal of personality disorders*, 19(5), 466-486.
- Condon, E. M., Dettmer, A., Baker, E., McFaul, C., & Stover, C. S. (2022). Early life adversity and males: Biology, behavior, and implications for fathers' parenting. *Neuroscience & Biobehavioral Reviews*, 104531.

- Crawford, K. M., Choi, K., Davis, K. A., Zhu, Y., Soare, T. W., Smith, A. D., ... & Dunn, E. C. (2022). Exposure to early childhood maltreatment and its effect over time on social cognition. *Development and psychopathology*, 34(1), 409-419.
- Crugnola, R.C., Ierardi, E., Bottini, M., Verganti, C., & Albizzati, A. (2019). Childhood experiences of maltreatment, reflective functioning and attachment in adolescent and young adult mothers: Effects on mother-infant interaction and emotion regulation. *Child abuse & neglect*, 93, 277-290.
- Dadds, M.R., Hawes, D.J., & Merz, S. (2004). *The UNSW Facial Emotion Task*. University of New South Wales, Sydney, Australia.
- Debbane, M. & Nolte, T. (2019) Contemporary Neuroscientific Research. In Eds A. W., Bateman & P. Fonagy, *Handbook of Mentalizing in Mental Health Practice*
- Deeks J.J., Higgins, J.P., Altman, D.G. (2019) Chapter 10: Analysing data and undertaking meta-analyses. In Eds Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA. *Cochrane Handbook for Systematic Reviews of Interventions version 6.0* (updated July 2019). Cochrane, 2019. Available from www.training.cochrane.org/handbook.
- Descartes, R. (2008). *Meditations on first philosophy* (M.Moriarty, Trans.). Oxford University Press.
- Di Tella, M., Adenzato, M., Catmur, C., Miti, F., Castelli, L., & Ardito, R. B. (2020). The role of alexithymia in social cognition: Evidence from a non-clinical population. *Journal of Affective Disorders*, 273, 482-492.
- Duval, J., Ensink, K., Normandin, L., & Fonagy, P. (2018). Mentalizing mediates the association between childhood maltreatment and adolescent borderline and narcissistic personality traits. *Adolescent Psychiatry*, 8(3), 156–173.

- Duval, S., & Tweedie, R. (2000). Trim and fill: a simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*(2), 455-463.
- Dziobek I, Fleck S, Kalbe E, et al: Introducing MASC: a movie for the assessment of social cognition. *J Autism Dev Disord* 36(5):623–636, 2006 16755332
- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, *315*(7109), 629-634.
- Field, A. P., & Gillett, R. (2010). How to do a meta-analysis. *British Journal of Mathematical & Statistical Psychology*, *63*(3), 665-694. doi:10.1348/000711010x502733
- Fonagy, P., & Bateman, A. W. (2006). Mechanisms of change in mentalization-based treatment of BPD. *Journal of clinical psychology*, *62*(4), 411-430.
- Fonagy, P. & Bateman, A. (2019) Introduction. In Eds *Handbook of Mentalizing in Mental Health Practice*.
- Fonagy, P., Gergely, G., Jurist, E., & Target, M. (2002). *Affect regulation, mentalization and the development of the self*. New York: Other Press.
- Fonagy, P., Leigh, T., Steele, M., Kennedy, R., Mattoon, G., Target, M. & Gerber, A. (1996) The relation of attachment status, psychiatric classification, and response to psychotherapy. *J Consult Clin Psychol* 64(1):22–31
- Fonagy, P., & Luyten, P. (2009). A developmental, mentalization-based approach to the understanding and treatment of borderline personality disorder. *Development and psychopathology*, *21*(4), 1355-1381.
- Fonagy P, Luyten P, Allison E. (2015) Epistemic petrification and the restoration of epistemic trust: A new conceptualization of borderline personality disorder and its psychosocial treatment. *Journal of Personality Disorders*. 29(5):575-609. doi: 10.1521/pedi.2015.29.5.575

- Fonagy P, Luyten P (2016) A multilevel perspective on the development of borderline personality disorder, in *Developmental Psychopathology Vol 3: Maladaptation and Psychopathology*, 3rd Edition. Edited by Cicchetti D. New York, Wiley, 2016, pp 726–792
- Fonagy, P., Steele, H., Moran, G., Steele, M., & Higgitt, A. (1991a). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal*, *13*, 200–217.
- Fonagy, P. & Target, M. (1996) Playing with reality: I. Theory of mind and the normal development of psychic reality. *International Journal of Psychoanalysis*. *77*(Pt 2):217–233, 1996 8771375
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, *373*(9657), 68–81.
- Ha, C., Sharp, C., Ensink, K., Fonagy, P., & Cirino, P. (2013). The measurement of reflective function in adolescents with and without borderline traits. *Journal of adolescence*, *36*(6), 1215-1223.
- Harari, H., Shamay-Tsoory, S. G., Ravid, M., & Levkovitz, Y. (2010). Double dissociation between cognitive and affective empathy in borderline personality disorder. *Psychiatry research*, *175*(3), 277–279. <https://doi.org/10.1016/j.psychres.2009.03.002>
- Hauser, S. T., Allen, J. P., & Golden, E. (2008). *Out of the woods: Tales of resilient teens* (Vol. 4). Harvard University Press.
- Hebert, M., Boisjoli, C., Blais, M., & Oussaid, E. (2018). Alexithymia as a mediator of the relationship between child sexual abuse and psychological distress in adolescence: A short-term longitudinal study. *Psychiatry Research*, *260*, 468-472. <https://doi.org/https://dx.doi.org/10.1016/j.psychres.2017.12.022>

- Hedges, L., & Olkin, I. (1985) *Statistical methods for meta-analysis*. London: Academic Press.
- Higgins, J. P., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in medicine*, 21(11), 1539-1558.
- George, C., Kaplan, N., & Main, M. (1985). Adult Attachment Interview. *Unpublished manuscript*, Berkeley, CA: University of California.
- Kristiansen, V. R., Handeland, T. B., Lau, B., Söderstrøm, K., Håkansson, U., & Øie, M. G. (2019). Trauma in childhood and adolescence and impaired executive functions are associated with uncertain reflective functioning in mothers with substance use disorder. *Addictive behaviors reports*, 11, 100245.
- Kupfer, J., Brosig, B., Brähler, E., (2001) TAS-26. Toronto Alexithymie-Skala-26. Toronto Alexithymia Scale (TAS; Taylor, G.J., Ryan, D. & Bagby, R.M., 1985) – German version. Hogrefe, Göttingen.
- Lam, C. B., McHale, S. M., & Crouter, A. C. (2014). Time with peers from middle childhood to late adolescence: Developmental course and adjustment correlates. *Child development*, 85(4), 1677-1693.
- Leist, T., & Dadds, M. R. (2009). Adolescents' ability to read different emotional faces relates to their history of maltreatment and type of psychopathology [Psychological & Physical Disorders 3200]. *Clinical child psychology and psychiatry*, 14(2), 237-250.
- Lieberman, M.D (2007) Social cognitive neuroscience: a review of core processes. *Annu Rev Psychol* 58:259–289.
- Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. SAGE publications, Inc.
- Luyten, P., & Fonagy, P. (2019). Mentalizing and trauma. *Handbook of mentalizing in mental health practice*, 2, 79-99.
- Luyten, P., Malcorps, S., Fonagy, P., & Ensin, K. (2019) Assessment of Mentalizing. In Eds A. W., Bateman & P. Fonagy, *Handbook of Mentalizing in Mental Health Practice*

- Ludtke, J., In-Albon, T., Michel, C., & Schmid, M. (2016). Predictors for DSM-5 nonsuicidal self-injury in female adolescent inpatients: The role of childhood maltreatment, alexithymia, and dissociation. *Psychiatry Research*, 239, 346-352.
<https://doi.org/https://dx.doi.org/10.1016/j.psychres.2016.02.026>
- Majorano, M., Musetti, A., Brondino, M., & Corsano, P. (2015). Loneliness, emotional autonomy and motivation for solitary behavior during adolescence. *Journal of child and family studies*, 24(11), 3436–3447. <https://doi.org/10.1007/s10826-015-0145-3>
- Manly, J. T., Kim, J. E., Rogosch, F. A., & Cicchetti, D. (2001). Dimensions of child maltreatment and children's adjustment: contributions of developmental timing and subtype. *Development and psychopathology*, 13(4), 759–782.
- McAdams, D. P., & Olson, B. D. (2010). Personality development: Continuity and change over the life course. *Annual review of psychology*, 61, 517-542.
- McCrory E, De Brito SA, Viding E. (2012) The link between child abuse and psychopathology: a review of neurobiological and genetic research. *Journal of the Royal Society of Medicine*. 105:151– 156. DOI: 10.1258/2011.110222.
- Meehan, K. B., Levy, K. N., Reynoso, J. S., Hill, L. L., & Clarkin, J. F. (2009). Measuring reflective function with a multidimensional rating scale: comparison with scoring reflective function on the AAI. *Journal of the American Psychoanalytic Association*, 57(1), 208-213
- Melwani, S. (2022) Childhood abuse and mentalization in adulthood: A meta-analysis. *Unpublished thesis*.
- Meins, E., & Fernyhough, C. (1999). Linguistic acquisitional style and mentalizing development: The role of maternal mind-mindedness. *Cognitive Development*, 14(3), 363-380.

- Milone, A., Cerniglia, L., Cristofani, C., Inguaggiato, E., Levantini, V., Masi, G., Paciello, M., Simone, F., & Muratori, P. (2019). Empathy in Youths with Conduct Disorder and Callous-Unemotional Traits. *Neural Plasticity*, 2019, 9638973.
<https://doi.org/https://dx.doi.org/10.1155/2019/9638973>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of internal medicine*, 151(4), 264-269.
- Murray, J., Farrington, D. P., & Eisner, M. P. (2009). Drawing conclusions about causes from systematic reviews of risk factors: The Cambridge Quality Checklists. *Journal of Experimental Criminology*, 5(1), 1-23.
- Musetti, A., Starcevic, V., Boursier, V., Corsano, P., Billieux, J., & Schimmenti, A. (2021). Childhood emotional abuse and problematic social networking sites use in a sample of Italian adolescents: The mediating role of deficiencies in self-other differentiation and uncertain reflective functioning. *Journal of Clinical Psychology*, 77(7), 1666-1684.
<https://doi.org/https://dx.doi.org/10.1002/jclp.23138>
- Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: a systematic review and meta-analysis. *PLoS medicine*, 9(11), e1001349.
- Outcalt, J., Dimaggio, G., Popolo, R., Buck, K., Chaudoin-Patzoldt, K. A., Kukla, M., Olesek, K. L., & Lysaker, P. H. (2015). Metacognition moderates the relationship of disturbances in attachment with severity of borderline personality disorder among persons in treatment of substance use disorders. *Comprehensive psychiatry*, 64, 22–28.
<https://doi.org/10.1016/j.comppsy.2015.10.002>

- Penner, F., Gambin, M., & Sharp, C. (2019). Childhood maltreatment and identity diffusion among inpatient adolescents: The role of reflective function. *Journal of adolescence*, 76, 65-74. <https://doi.org/https://dx.doi.org/10.1016/j.adolescence.2019.08.002>
- Pollack, S.D., Cicchetti, D., Klorman, R., & Brumaghim, J.T. (1997). Cognitive brain event-related potentials and emotion processing in maltreated children. *Child Development*, 68, 773–787.
- Protic, S., Wittmann, L., Taubner, S., & Dimitrijevic, A. (2020). Differences in attachment dimensions and reflective functioning between traumatized juvenile offenders and maltreated non-delinquent adolescents from care services. *Child Abuse & Neglect*, 103, 104420. <https://doi.org/https://dx.doi.org/10.1016/j.chiabu.2020.104420>
- Quek, J., Newman, L. K., Bennett, C., Gordon, M. S., Saeedi, N., & Melvin, G. A. (2017). Reflective function mediates the relationship between emotional maltreatment and borderline pathology in adolescents: A preliminary investigation. *Child Abuse & Neglect*, 72, 215-226. <https://doi.org/https://dx.doi.org/10.1016/j.chiabu.2017.08.008>
- Rnic, K., Sabbagh, M. A., Washburn, D., Bagby, R. M., Ravindran, A., Kennedy, J. L., ... & Harkness, K. L. (2018). Childhood emotional abuse, physical abuse, and neglect are associated with theory of mind decoding accuracy in young adults with depression. *Psychiatry research*, 268, 501-507.
- Romanou, E., & Belton, E. (2020) National programmes. Sourced from [researchinpractice.org.uk](https://www.researchinpractice.org.uk)
- de Rosnay M, & Harris, P.L. (2002) Individual differences in children's understanding of emotion: the roles of attachment and language. *Attach Hum Dev* 4(1):39–54,
- Rutherford, H. J., Wareham, J. D., Vrouva, I., Mayes, L. C., Fonagy, P., & Potenza, M. N. (2012). Sex differences moderate the relationship between adolescent language and mentalization. *Personality disorders*, 3(4), 393–405.

- Sandre, A., Ethridge, P., Kim, I., & Weinberg, A. (2018). Childhood maltreatment is associated with increased neural response to ambiguous threatening facial expressions in adulthood: Evidence from the late positive potential. *Cognitive, affective & behavioral neuroscience*, 18(1), 143–154.
- Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health*, 2(3), 223-228
- Sayar, K., Kose, S., Grabe, H. J., & Topbas, M. (2005). Alexithymia and dissociative tendencies in an adolescent sample from Eastern Turkey. *Psychiatry and Clinical Neurosciences*, 59(2), 127-134. <https://doi.org/10.1111/j.1440-1819.2005.01346.x>
- Sharp, C. & Rossouw, T. (2019) Borderline Personality Pathology in Adolescence. In Eds A. W., Bateman & P. Fonagy, *Handbook of Mentalizing in Mental Health Practice*. (2019)
- Sharp C, Venta A, Vanwoerden S, Schramm, A., Ha, C., Newlin, E., Reddy, R. & Fonagy, P. (2016) First empirical evaluation of the link between attachment, social cognition and borderline features in adolescents. *Comprehensive Psychiatry* 64:4–11
- Sifneos P. (1972) *Short-term psychotherapy and emotional crisis*. Cambridge: Harvard University Press
- da Silva Ferreira, G. C., Crippa, J. A., & de Lima Osório, F. (2014). Facial emotion processing and recognition among maltreated children: a systematic literature review. *Frontiers in psychology*, 5, 1460.
- Simon, M., Németh, N., Gálber, M., Lakner, E., Csernel, E., Tényi, T., & Czéh, B. (2019). Childhood adversity impairs theory of mind abilities in adult patients with major depressive disorder. *Frontiers in psychiatry*, 867.
- Smith, P. K., Cowie, H., & Blades, M. (2015). *Understanding children's development*. John Wiley & Sons.

- Taylor, G.J., Bagby, R.M., Parker, J.D., 1992. The Revised Toronto Alexithymia Scale: some reliability, validity, and normative data. *Psychother. Psychosom.* 57, 34–41.
- Taubner, S., & Curth, C. (2013). Mentalization mediates the relation between early traumatic experiences and aggressive behavior in adolescence. *Psihologija*, 46(2), 177-192.
<https://doi.org/10.2298/psi1302177t>
- Taubner, S., Zimmermann, L., Ramberg, A., & Schroder, P. (2016). Mentalization Mediates the Relationship between Early Maltreatment and Potential for Violence in Adolescence. *Psychopathology*, 49(4), 236-246.
- Teicher, M. H., Samson, J. A., Polcari, A., & McGreenery, C. E. (2006). Sticks, stones, and hurtful words: relative effects of various forms of childhood maltreatment. *The American journal of psychiatry*, 163(6), 993–1000. <https://doi.org/10.1176/ajp.2006.163.6.993>
- Teicher, M. H., Gordon, J. B., & Nemeroff, C. B. (2021). Recognizing the importance of childhood maltreatment as a critical factor in psychiatric diagnoses, treatment, research, prevention, and education. *Molecular psychiatry*, 1-8.
- Waller, R., McCabe, H. K., Dotterer, H. L., Neumann, C. S., & Hyde, L. W. (2018). Unique and Interactive Associations Between Maltreatment and Complex Emotion Recognition Deficits and Psychopathic Traits in an Undergraduate Sample. *Journal of Personality Disorders*, 32(4), 543-561. https://doi.org/https://dx.doi.org/10.1521/pedi_2017_31_314
- Warrier, V., & Baron-Cohen, S. (2018). Genetic contribution to ‘theory of mind’ in adolescence. *Scientific reports*, 8(1), 1-9.
- Winnicott, D.W. (1971) *Playing and Reality*. London: Tavistock Publications Limited.
- World Health Organisation (2019) Child Maltreatment Fact Sheet. Sourced from:
www.who.int/news-room/fact-sheets/detail/child-maltreatment

Part 2. Empirical Paper

Investigating associations between maternal mental health, maternal Mind-Mindedness, and infant attachment security in a socioeconomically disadvantaged population

Abstract

Aims: The early parent-infant relationship plays a key role in the development of healthy and secure attachment relationships (Bowlby, 1969). In turn, secure attachment relationships lay the foundation for many optimal life outcomes. Maternal mental health problems are considered to impact infant attachment security, but less is known about the mechanisms underlying this, especially in highly disadvantaged, low-socioeconomic status samples. The aim of this research was to understand the role of maternal Mind-Mindedness in the pathway between maternal mental health and infant attachment outcomes.

Methods: As part of a joint thesis, the present study involved coding and analysing data from a secondary dataset. The original project recruited mother-infant pairs to a community home-visiting programme aimed at supporting vulnerable, high-risk first-time mothers. The present sample consisted of the 80 mother-infant pairs who provided the relevant data. Data included measures of maternal mental health (anxiety, depression, post-traumatic stress), infant attachment security, and video-recorded mother-infant interactions transcribed and coded for maternal Mind-Mindedness (Meins & Fernyhough, 2006). Data were analysed using bivariate correlation analyses, hierarchical regression analyses, and mediation and moderation analyses, using a range of socioeconomic status variable as covariates.

Results: No significant relationships were found between maternal mental health and either maternal Mind-Mindedness or infant attachment security. Maternal mind-mindedness neither mediated nor moderated the relationship between maternal mental health and infant attachment security. Socioeconomic status variables, when included as covariates, accounted for more of the variance than maternal mental health or caregiving factors in this relationship. Household income level was found to be negatively associated with maternal depression and

maternal trauma symptoms. Level of maternal education was significantly positively associated with infant attachment security, and marital/cohabitation status was significantly positively associated with Mind-Mindedness levels.

Conclusions: This is one of the first studies to investigate relationships between maternal mental health, maternal Mind-Mindedness, and infant attachment security in a highly disadvantaged, low socioeconomic status sample. While no significant influence of maternal mental health and maternal Mind-Mindedness was found, this was understood in the context of the mediating impact of a wide range of socioeconomic factors, many of which were not assessed in this study. More research is needed to better understand the role of socioeconomic factors upon the mother-infant relationship.

Introduction

The quality of caregiving during the early years is of critical importance for children's outcomes, with the first 1,000 days of a child's life considered crucial for development (Health and Social Care Committee, 2019). Yet, despite parents' intentions to provide high quality care and to achieve the best outcomes for their children, caregiving quality and child development face multiple challenges, and this is particularly the case for families living in poverty who are at higher risk of experiencing a range of distal risks to child development, including parental mental health problems, relationship problems, and domestic violence (Gershoff et al., 2007; Ho et al., 2022; Mari & Keizer, 2021; Mayer, 2002; Seecombe, 2000; Singletary et al., 2022).

Given the consequences of poorer-quality caregiving for child development, it is important to understand the mechanisms driving differences in children's outcomes in such high-risk circumstances, so that parents can be supported to effectively engage with, and manage, the important task of raising a child (Erikson, Julian & Muzik, 2019). With 1 in 5 mothers experiencing mental health difficulties during the first 2 years of their child's life (Bauer et al., 2014), and with 1 in 3 children living in poverty (Joseph Rowntree Foundation, 2022) it is imperative - from both an economic and ethical standpoint - that we identify how, and through what mechanisms, challenging early circumstances impact the developing child. This knowledge will assist policymakers and practitioners in supporting parents and children to achieve optimal developmental outcomes. Extensive evidence indicates that parental caregiving and early attachment security are important factors in children's developmental outcomes in the context of social and economic adversity (e.g., Fearon & Belsky, 2018).

Multiple factors have been put forward in an attempt to understand pathways towards children's differential outcomes. Recent research suggests that by Mind-Mindedness (Meins et al., 2001), defined as the ability of a parent to think of the infant in terms of mental states in the course of routine caregiving interactions may play an important role in mediating and possibly

moderating the relationship between psychosocial adversity, such as poor maternal mental health and infant attachment security.

The current study examines the relationships between maternal mental health and maternal Mind-Mindedness in the development of attachment in a sample of highly disadvantaged young first-time mothers.

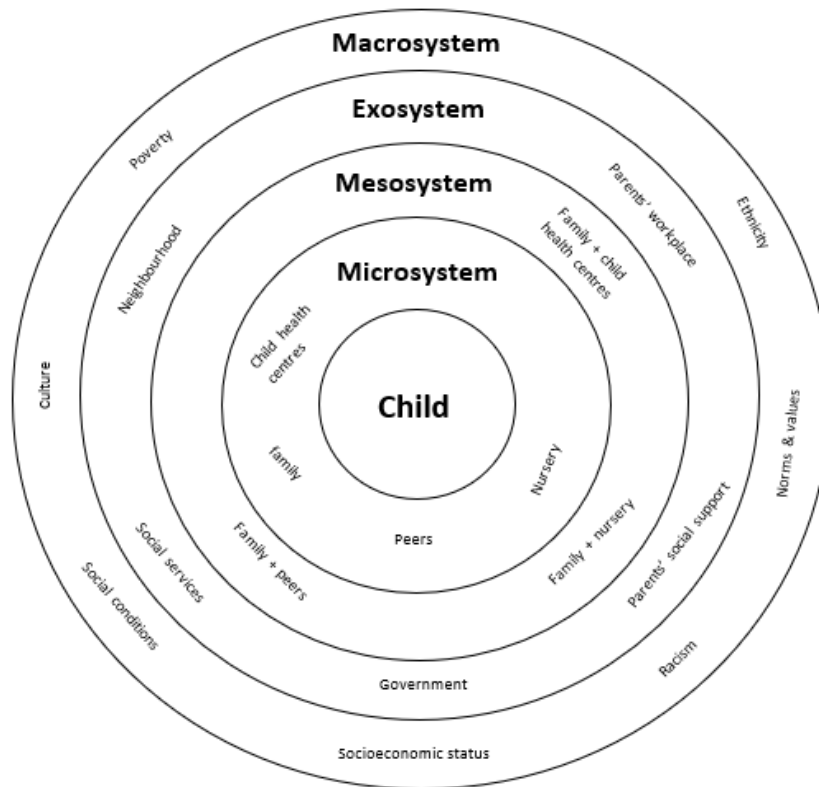
An ecological perspective on child development

An ecological perspective of child development sees the parent-infant relationship as multiply determined; with families powerfully influenced, both directly and indirectly, by a broad network of relationships and systems (Roubinov & Boyce, 2017, Belsky, 2005). Bronfenbrenner's (1977) ecological systems theory sees a child's developmental trajectory as affected by interactions with a complex, nested system of relationships: the microsystem, mesosystem, exosystem, macrosystem, and the chronosystem (See Figure 1). A recent study of a sample of socioeconomically disadvantaged children concluded that the day-care environment and the wider neighbourhood significantly impacted children's development (Souza-Morais et al., 2021). Bronfenbrenner's (1977) work expands upon Ainsworth's attachment theory by highlighting the many different contextual factors that influence how able a mother is to provide high quality care, and how these factors shape child development both directly and indirectly.

Socioeconomic status affects access to resources (financial, cultural), education, healthcare, nutrition, maternal responsiveness, and the levels of trauma and stress that parents and their children will experience (Bradley & Corwyn, 2002; Saegert et al., 2006). Socioeconomic status has a range of implications for child development (Bradley & Corwyn, 2002; McLoyd, 1998; de Souza Morais, 2021, Thorup et al., 2022), including higher rates of

attachment insecurity found in infants from areas of low-SES and high social disadvantage (Lyons-Ruth et al., 1990).

Figure 1. Bronfenbrenner's (1977) Ecological Systems Theory model



Belsky (2005) argues that looking at the family ecology more broadly allows us to understand why infants raised in ‘well-resourced’ family ecologies with an accumulation of positive factors (such as a good network of support, strong educational background, good maternal mental health, sensitive parenting, parents with a good relationship) will have a bolstered parent-infant relationship and be more likely to develop a secure attachment to their mother. Similarly, it provides a framework for understanding why infants raised in ‘under-resourced’ and multiply disadvantaged families (e.g., where the mother is experiencing mental health difficulties, is in receipt of low-income, single-parent family, little social support, and low educational background), may be more likely to develop an insecure attachment due to there being multiple factors working against them, as a family. Together, this suggests that

research should consider the influence of broader contextual factors when investigating maternal caregiving quality and children's outcomes.

Maternal mental health and children's outcomes

The relationship between maternal mental health and children's social, emotional and cognitive developmental outcomes is well established (Barker et al., 2011; Meaney, 2018; Kingston, Tough & Whitfield, 2012; Goodman et al., 2011; Wisner, Chambers & Sit, 2006; Power et al., 2001), with a recent economic analysis estimating the cost of untreated maternal mental health problems on negative child outcomes at £5.8 billion annually in the UK, due to additional health and social care use, support for emotional and behavioural problems, and special educational needs provision (Bauer et al., 2014). While many factors play a role in the relationship between maternal mental health problems and children's outcomes, the key mechanisms underlying this pathway are unclear. Infant attachment security is thought to represent an important mechanism for understanding the association between maternal mental health problems and poorer child developmental outcomes, but more knowledge is needed about the factors that influence infant attachment security.

The role of attachment

Bowlby (1982) proposed that a child's early care experiences provide them with an enduring relational template or 'internal working model' of how relationships function, and of how others will treat them. Ainsworth's (1973) concept of attachment security is considered universal, with infants broadly assessed as being either securely or insecurely attached. Secure attachments are associated with a range of positive outcomes across the life span, including higher self-esteem, better emotion regulation, greater levels of trust and relationship satisfaction, and better health outcomes (Bartholomew & Horowitz, 1991; Groh et al., 2016; Ranson &

Urichuk, 2008). Insecure attachments are associated with a wide range of negative outcomes including greater risk of mental health difficulties, behavioural problems, and relational difficulties (Williams, Biscaro & Clinton, 2019; Bachmann et al., 2019; Schneider, Atkinson, & Tardif, 2001; Shaw et al., 1997; Sroufe, 2005).

Maternal mental health and infant attachment security

The association between maternal mental health and infant attachment security is well documented, with most studies finding that increases in maternal mental difficulties are associated with decreases in infant attachment security (Atkinson et al, 2000; Erikson, Julian, & Muzik, 2019; Galbally et al., 2021; Shonkoff & Phillips, 2000). Barnes & Theule's (2019) meta-analysis found a significant relationship between maternal depression and infant attachment security, with infants of depressed mothers being nearly twice as likely to have an insecure attachment than infants of non-depressed mothers. Sliwerski et al.'s (2021) meta-analysis found a similarly robust relationship between maternal depression and infant attachment security however the mechanisms through which infant attachment security is shaped by maternal mental health are unclear (Risi, Pickard and Bird, 2021).

The quality of the early mother-infant attachment relationship is considered to be heavily influenced by the mother's ability to accurately understand her infant's behaviours and communications (Fonagy et al., 2002), to reflect upon her child's mental states (Meins et al., 2001) and to act in sensitive, responsive, and consistent manner (Ainsworth, 1973; Thompson, 2006). Mothers experiencing mental health difficulties have been found to display less sensitive parenting behaviours and a reduced tendency towards mentalizing of the infant during caregiving interactions (Nicol-Harper et al., 2007; McMahon & Meins, 2012; Feldman et al., 2009; Pawlby et al., 2010).

However, the fact that many mothers with mental health problems continue to provide nurturing environments for their children suggests maternal mental health problems alone do not create insecure attachments, and that the association between maternal mental health difficulties and infant attachment security may be helpfully understood in terms of the mediating or moderating impact of caregiving.

Maternal sensitivity

Maternal sensitivity has, for many years, been posited as the crucial mechanism through which maternal mental health is associated with infant attachment security. There is a wealth of evidence demonstrating an association between maternal mental health problems and reduced maternal sensitivity (Bernard et al., 2018; Frigerio & Nazzari, 2021), and between maternal sensitivity and infant attachment security (Gratz et al., 2014; Sagi et al., 2002; Cossette-Cota, Bussi eres & Dubois-Comtois, 2021; De Wolff & van IJzendoorn, 1997).

However, while the association between maternal sensitivity and attachment security is reliable, the size of its effect is modest, often not above $r = 0.22$ (De Wolff & van IJzendoorn, 1997). For this reason, it is important to consider which other measures of caregiving behaviour might act as a more significant mechanism underlying the relationship between maternal mental health and infant attachment security; and to ascertain the possible mediating or moderating role of factors unrelated to caregiving that may influence this association.

The role of maternal Mind-Mindedness

The construct of Mind-Mindedness was developed by Meins et al. (2001) in the context of research into attachment and has been proposed as a ‘reinterpretation’ of maternal sensitivity. Mind-Mindedness (Meins et al., 2001) refers to a mother’s inclination “to treat her infant as an individual with a mind, rather than merely as a creature with needs that must be satisfied” (Meins

et al., 2001, p. 638), and reflects a parent's ability to use appropriate mind-related comments to communicate knowledge about their infants' internal mental state (Meins et al., 2001). Mind-Mindedness differs from sensitivity in that it considers a parent's ability and willingness to see the child as an intentional agent – something lacking in measures of maternal sensitivity (Aldrich, Chen & Alfieri, 2021). Importantly, Mind-Mindedness has been found to predict infant attachment security even after controlling for maternal sensitivity (Aldrich, Chen & Alfieri, 2021).

According to Meins et al's (2006) framework, a mother demonstrates Mind-Mindedness when she appropriately interprets and explains her child's behaviour using descriptors of their mental state, by referencing their emotions, desires, intentions, thoughts, or memories. Parents who display more of such comments are found to be more attuned to their child's needs – something that is necessary to understand and respond to their infant (Beeghly, Bretherton, & Mervis, 1986).

Mind-Mindedness appears to be a useful and meaningful way of determining differences in parenting quality and is identifiable in mother-infant pairs with infants as young as 6 months (Farrow & Blissett, 2015). Mind-Mindedness is positively associated with infant attachment security and has been shown to be a better predictor of attachment security than maternal sensitivity alone (Laranjo et al., 2008; Meins et al., 2012). Mind-Mindedness is positively associated with, and predicts, infant emotion regulation and a range of sociocognitive developmental outcomes (Zeegers et al., 2018; Gagné, Bernier & McMahon, 2018; Hughes, Aldercotte. & Foley, 2016).

The relationship between maternal mental health and maternal mind-mindedness

The relationship between maternal mental health and Mind-Mindedness is not well understood, with few studies conducted, and mixed findings (McMahon & Bernier, 2017). While

Bigelow et al. (2018) found no relationship between maternal depression and Mind-Mindedness at 12-months postpartum, and Fishburn et al. (2017) found no association between maternal anxiety and Mind-Mindedness ability, Milligan et al. (2015) found an association between maternal depression and Mind-Mindedness, and Camisasca et al. (2017) found an association between birth trauma symptoms and reduced Mind-Mindedness comments. As yet, it is unclear what drives these differential relationships with Mind-Mindedness. It may be that the different profiles of these conditions result in different mother-infant interactions. Pawlby et al. (2010), for example, suggest that the social withdrawal, impaired concentration, irritability, and fatigue associated with depression may hinder mothers from ‘tuning in’ to their infants’ internal states.

While Mind-Mindedness appears to be important in the development of a secure infant attachment, one must also consider the wider social context in which families live, as a caregiver’s ability to parent is largely influenced by their environment (Bronfenbrenner, 1977). During infancy, the environment in which the child is nurtured plays a significant role in infant attachment security, and research has shown that a stressful early environment (contributed to by factors such as lack of social support, lack of financial resources, and lower social class) can, independently of a mother’s ability to provide quality parenting, significantly impact the quality of the early attachment (Roisman & Fraley, 2008).

The role of poverty on mind-mindedness and maternal mental health

It is important to note that most studies of mother-infant relationships rely upon non-clinical or low-risk, middle-class samples, and so our understanding of the associations between maternal mental health, Mind-Mindedness and infant attachment security is largely limited to this subgroup of society and may therefore not be generalisable to more high-risk samples, those living in poverty, or those experiencing high levels of mental health difficulty.

It is important to consider the role of poverty on parenting (La Placa & Corlyon, 2016). It is known that mentalizing capacity is impacted by stress, and that even those who can mentalize well in low-stress situations can struggle when under pressure or emotional stress (Sharp & Roussouw, 2019). Therefore, for mothers raising infants within high-risk, low-SES environments where resources are scarce, and levels of environmental stress are higher, one might imagine that the ability to provide high levels of Mind-Mindedness will be impaired, which in turn may result in less favourable child developmental outcomes. Brophy-Herb et al. (2012) found that low SES mothers displayed more difficulties in mentalizing their children than high-SES mothers.

Study aims

This study will investigate maternal mental health, maternal Mind-Mindedness, and infant attachment security in a sample of mother-infant pairs living in low-SES, multiply disadvantaged contexts, in 3 socially deprived areas of the UK. Participants were drawn from a clinical trial of a home visiting programme, though the effects of the intervention are not the focus of this thesis. This is one of the first studies to look at associations between maternal mental health, maternal Mind-Mindedness, and infant attachment security among a low-SES sample.

Research questions and hypotheses

In this high-risk sample of young, socioeconomically disadvantaged mother-infant pairs:

1. Does maternal mental health predict maternal Mind-Mindedness? We hypothesise that higher levels of maternal mental health difficulty will be associated with lower levels of Mind-Mindedness.

2. Does maternal mental health predict infant attachment security? We hypothesise that higher levels of maternal mental health difficulty will be associated with lower levels of infant attachment security.
3. Does Mind-Mindedness mediate the association between maternal mental health difficulties and infant attachment security? We hypothesise that maternal Mind-Mindedness will significantly mediate the common variance between maternal mental health and infant attachment security.
4. Does Mind-Mindedness moderate the association between maternal mental health difficulties and infant attachment security? We hypothesise that higher levels of maternal Mind-Mindedness will reduce the impact of maternal mental health difficulties on infant attachment insecurity.

Methods

Setting

The present study used secondary data from a randomised clinical trial of a community-home-visiting programme aimed at supporting vulnerable young mothers by improving maternal reflective function, infant attachment security, and a range of additional maternal and infant outcomes (for further information, see Longhi et al., 2019). These home-visiting programmes took place across 3 areas of the UK where rates of socio-economic disadvantage were high. The present study was conducted in collaboration with two other UCL Clinical Psychology Doctoral trainees, Yaman Al Qadri and Samara Melwani. Our unique contributions are detailed in the appendix.

Recruitment

The present study analysed secondary data from a parenting intervention trial, ‘Minding the Baby’ (MTB, Longhi et al., 2019). For the MTB trial, eligible pregnant women (inclusion and exclusion criteria below) living in 1 of the 3 UK cities associated with the study were referred by research nurses working in antenatal clinics, and by professionals working in the community. Women were randomly assigned to receive either the ‘MTB’ intervention and ‘care as usual’, or ‘care as usual’ only. ‘Care as usual’ varied by individual need and location, but encompassed standard community care provision including GPs, community midwives, social workers, mental health services and support workers.

Formal written consent was obtained by the research team after the mothers had been referred by the clinic or community partners. Process consent was obtained by mothers at each point of the study. Level of dropout was high, and participants for the present study consisted of those remaining in the study at 24-months postpartum, when the measurement of attachment security took place. Researchers visited participants in their homes to conduct video recordings of mother-infant interactions, and complete experimental tasks.

Inclusion criteria

Women eligible to participate were those who were expecting their first baby and:

(1) Aged 19 or under, OR

(2) Aged between 20 and 25 and answering yes to one or more of the following: eligible for means tested benefits; not entitled to employer maternity pay; living in sheltered accommodation; living in a postcode within the highest quintile of social deprivation, according to UK national statistics.

Exclusion criteria

Women ineligible to participate were those diagnosed with a psychotic illness; those experiencing chronic drug dependence or who abused substances; those with a profound or severe learning disability; those requiring the use of an interpreter; those with a life-threatening illness; those expecting a baby due to have a life-threatening illness; and those expecting a baby due to have a profound or severe learning disability.

Sample size

In the original study, 140 mother-infant pairs were successfully recruited at baseline, however the level of dropout was high. The sample for the present study consisted of the 80 mother-infant pairs who had completed the maternal mental health questionnaires, took part in the home visit at 12-months postpartum, and remained in the study at 24-months postpartum. A total of 80 pairings had data for all 3 timepoints, though not all 80 mother-infant pairs had data for all measures.

Sample characteristics

The means and standard deviations of sociodemographic variables, including maternal age, maternal education level, ethnicity, marital status, and household income are shown in Table 1.

Table 1. Table to show summary of sample characteristics

	<u>M (SD)</u>	<u>Range</u>
Maternal Age at baseline (years)	21.5 (2.42)	15.16-25.95
<u>Education level (n=80)</u>		
	<u>n</u>	<u>%</u>
None	6	7.50%
GCSES or equivalent	25	31.30%
A-level or equivalent	10	12.5%
NVQ, HND or equivalent	30	37.5%
Degree	6	7.5%
Postgraduate Degree	2	2.50%
Missing data	1	1.30%
<u>Ethnicity (n=80)</u>		
White	67	83.75%
Asian	4	5%
Black	5	6.25%
Mixed ethnicity	4	5%
<u>Marital/cohabitation status (n=80)</u>		
Single	34	50 %
Married & living apart	5	6.3%
Unmarried & cohabiting	25	31.3%
Separated	1	1.3%
Married & cohabiting	9	11.3%
<u>Household income (n=76)</u>		
< £10,000 p/a	39	48.8%
£10,000 - £20,000 p/a	15	18.8%
£20,000 - £30,000 p/a	14	17.5%
£30,000 - £50,000 p/a	7	8.8%
> £50,000 p/a	1	1.3%

Note: GCSE General Certificate of Secondary Education; A-Level = Advanced Level qualification; NVQ = National Vocational Qualification; HND = Higher National Diploma

Power calculation

Based on results from Barnes & Theule (2019), on the association between maternal depression and infant attachment security, it was estimated that the main effect of maternal mental health on infant attachment security would require 77 participants for 80% at alpha = .05 (Faul et al., 2009). The sample size of the present study was 80, indicating a sufficient sample size.

Research design

This study is correlational and longitudinal in design, with data assessed at multiple timepoints. The main independent variables were maternal mental health (measured by depression, maternal anxiety, and maternal trauma). Dependent variables were infant attachment security and maternal Mind-Mindedness, though Mind-Mindedness was included as a potential mediator or moderator.

Infant attachment security data was measured at 24 months. Maternal Mind-Mindedness was measured at 12 months, by coding mother-infant interaction videos recorded during the 12-months postpartum research visit. The present study was particularly interested to understand how maternal Mind-Mindedness mediates or moderates the relationship between maternal mental health and infant attachment security and so the decision was made to use concurrent measures of maternal mental health, where possible. Therefore, although data was available for each research visit, maternal depression and maternal anxiety scores were both measured at 12-months postpartum. Maternal trauma scores were assessed only at baseline but were still included as it was considered important to assess associations between maternal trauma and mother-infant factors, and it was understood that this measure would still provide a meaningful insight into the level of trauma mothers had experienced while pregnant.

In order to investigate the role of socioeconomic status on the mother-infant relationship, household income, level of maternal education, and marital/cohabitation status were included as covariates. Although the study uses a sample that was part of a clinical intervention, the effects of treatment were not the focus of this study, and treatment group was included only as a covariate.

Measures

Maternal mental health:

Maternal anxiety: The State-Trait Anxiety Inventory (STAI) is a 40-item, self-report questionnaire that assesses the presence and severity of both current anxiety symptoms ('state' anxiety) and one's general tendency to be anxious ('trait' anxiety). Respondents rate each item on a four-point Likert scale, with higher scores indicating greater anxiety. Spielberger (1989) considers the STAI a reliable and sensitive measure of anxiety with a strong evidence base. Due to high correlation between state and trait measures, only state anxiety data were chosen for the present analyses.

Maternal depression: Cox et al's (1987) Edinburgh Post-Natal Depression Scale (EPDS) is a 10-item, self-report scale designed to screen for postnatal depression. On a four-point Likert scale, respondents rate how often they have felt a particular way during the previous week. Total scores can range from 0 to 30. Scores more than 10 indicate a provisional diagnosis of depression. The EPDS is well-used and considered highly valid (E.g., Sheeder et al., 2009; Hewitt et al., 2010).

Maternal trauma: The PTSD checklist for DSM-5 (PCL-5, Blevins et al., 2015, Weathers et al., 2013) was developed in line with the diagnostic criteria of the DSM-5. The PCL-5 is a 20-item self-report scale assessing the intensity of the 20 criteria for PTSD symptoms in the DSM-5. On a five-point Likert scale, respondents rate by each item during the past month (0 = not at all, to 4 = extremely). Scores higher than 33 indicate provisional diagnosis of PTSD.

Infant attachment security

Infant attachment security was measured using the 'Attachment Q-sort' (AQS, Waters and Dean, 1985) during the 24-months postpartum research visit. Attachment security was based on observations of mother-infant interactions over a period of approximately 1.5 hours. Directly after each visit, trained researchers scored infant attachment security according to the AQS's 100 items, which cover a wide range of infant behaviours including social understanding, emotional response,

and both secure base and exploratory behaviours. Assessors sort items according to the degree to which they are exhibited by the infant. Overall scores for each infant were then calculated, resulting in a score ranging from +1.0 (very secure) to -1.0 (very insecure). The original trial, from which these scores came, established inter-rater reliability in 17 cases using an independent assessor who scored interactions from video recordings. Inter-rater reliability was considered ‘acceptable’ (intra-class correlation of .71). Cadman, Diamond and Fearon’s (2017) meta-analysis on AQS validity found observer AQS to be a valid measure of infant attachment, especially after long periods of observation such as that employed in the original study.

Maternal Mind-Mindedness

To measure maternal Mind-Mindedness, the present study coded videos of mother-interactions recorded during the 12-months postpartum research visit. Videos varied in length from 25 to 40 minutes and included both mother-infant ‘free play’ and a series of mother-infant games as part of the study protocol. As the whole mother-infant interaction session was rated as one entity and the individual games did not form part of our analysis, these separate games will not be described here. However, an overview of the tasks can be found in Longhi et al.’s (2019) evaluation of the original study.

All videos were manually transcribed before coding. During coding, each comment made by the mother was coded using the Mind-Mindedness coding manual (Meins & Fernyhough, 2015). First, each comment was classified as either directed at the child’s mental state or not (i.e., mind-related, or not mind-related). The mind-related comments were then categorised according to specific mental state domains: (1) cognitions (e.g., “you remembered this from the party”), (2) preferences (e.g., “you don’t like this book!”), and (3) emotions (e.g., “you’re so happy with that, aren’t you!”). In addition, comments where the mother was talking on behalf of the baby (e.g.,

“mummy, I want that toy again”), and referring to the infant’s epistemic states (e.g., “you’re teasing me”) were classed as mind related.

Each of these comments/utterances was then coded as either ‘appropriate’ or ‘non-attuned’. Comments were coded as appropriate and mind-related if one of the following conditions was met: (1) the coder agreed with the mother’s description of the infant’s internal state; (2) the comment appropriately connected the infant’s current activity with similar events in the past or future (e.g., “do you remember the cake you had at your birthday last week?”); or (3) the mother voiced (using the first person) what the infant might say if he/she could speak. Comments were classed as ‘non-attuned’ if the coder believed the mother misread the infant’s internal state, or the comment referred to a past or future event with no obvious relation to the infant’s current activity (e.g., “I think we should go to nanny’s later”). Where there was uncertainty around Mind-Mindedness coding, these were discussed between coders (HM, YA SM) until a resolution was found. Dr Elizabeth Meins kindly provided guidance on aspects of coding that needed further input. A full exploration of these different subcategories of Mind-Mindedness can be found in Alqadri’s (2022) report.

Kendall’s Coefficient of Concordance was used to determine inter-rater reliability from 12 cases, representing 15% of videos. Inter-rater reliability was considered ‘very good’ (intra-class correlation of .97).

Socioeconomic status

To investigate the role of socioeconomic status on the mother-infant relationship, household income, level of maternal education (highest level achieved), and marital/cohabitation status were included as covariates.

Ethical considerations

The current study used secondary data from a trial which had received NHS ethics approval. All participants gave full written consent at the start of the study and re-consented at the 12- and 24-months' follow-up appointments.

Data analysis procedures

The present study investigated the effect of maternal mental health on infant attachment security and maternal Mind-Mindedness, whilst using a range of socioeconomic status characteristics as covariates (household income, maternal education, and marital/cohabitation status). All statistical analyses were performed using IBM SPSS Statistics (Version 28). Data was assessed for normality: data were considered 'non-normally' distributed if skewness and kurtosis scores were not between ± 1.96 , if the Kolmogorov-Smirnov test was significant at $p < .01$, and if the histograms appeared to deviate markedly from a normal distribution. To test assumptions of linearity, normality, and homoscedasticity in the regression analyses, scatterplots and histograms were examined. Collinearity statistics tested for multicollinearity, and the Durbin-Watson's test was carried out to test for autocorrelation of the data.

Maternal Mind-Mindedness scores were determined by calculating the total number of (appropriate/attuned) comments mothers made towards their infant children and calculating the proportion of these which were Mind-Mindedness in nature. This was done to control for verbosity, in line with the Meins & Fernyhough's (2015) manual, because mothers' verbal output varied considerably and because there was some variation in video duration.

As the present study was interested in the mechanisms through which one variable affects another, a regression-based path-analytic framework was used, involving the principles of mediation and moderation analysis (Hayes, 2013).

Initial analyses tested associations between all key study variables. Regression analyses tested the associations between maternal mental health (anxiety, depression, trauma, overall mental health score) and infant attachment security, controlling for covariates. Regression analyses also tested the associations between maternal mental health (anxiety, depression, trauma, overall mental health score) and maternal Mind-Mindedness.

Potential mediating effects of maternal Mind-Mindedness were tested using a linear regression analysis using bootstrapped tests of the indirect effect, following the process developed by Hayes (2013). To test moderation, the interaction effect between maternal mental health and maternal Mind-Mindedness was examined to see whether the effect was significant in predicting infant attachment security at 24 months, this was done using Hayes' (2013) SPSS PROCESS macro.

Results

The results are presented in 5 sections. In section 1, I will first describe how data were prepared, before detailing the steps taken to assess for normality of distribution and outliers. In section 2, I will provide an overview of the descriptive statistics for this research. In section 3, I will detail the correlational analyses conducted to determine associations between independent variables (depression, anxiety, and trauma) and dependent variables (maternal Mind-Mindedness at 12 months, infant attachment security at 24 months). In section 4, I will look at the regression analyses conducted to investigate whether the main independent variables (depression, anxiety, and trauma) were associated with infant attachment security at 24 months or maternal Mind-Mindedness at 12 months, whilst using marital status and household income as potential covariates). In section 5, I will report on the mediating or moderating effects of maternal Mind-Mindedness on the pathway between maternal mental health and infant attachment security. Lastly, in section 6, I will briefly consider a possible interaction effect between intervention group and maternal mental health problems.

(1) Data preparation & assessing for normality

Before conducting the main analyses, the data was examined for outliers and normality. Normality of the variables was examined visually using histograms in addition to conducting Kolmogorov-Smirnov (K-S) tests. K-S tests found that normal distribution was present for both infant attachment security at 24-months ($p > .05$), and maternal Mind-Mindedness at 12-months ($p > .05$).

(2) Descriptive statistics

The main independent variables (predictors) were maternal depression, maternal anxiety, and maternal trauma symptoms. The dependent variables (outcomes) were maternal Mind-Mindedness at 12-months postpartum and infant attachment security at 24-months postpartum. Descriptive statistics (means, standard deviations, range) were calculated for each variable (See Table 2).

These scores indicate that mean maternal depression score was below the clinical cut-off of 10 on the EPDS indicating that this sample was, on average, not clinically depressed. For maternal anxiety, scores of 37 and below are considered 'low or no anxiety'. For maternal trauma/PTSD, scores of 33 or more indicate provisional diagnosis of PTSD, the sample's mean score of 37.7 shows the level of trauma experienced by this sample. Mothers' mean Mind-Mindedness score of 6.9% is lower than found in many other studies (9% Longobardi, Spataro & Calabo, 2022; 10% Helmerhorst, Colonna & Fekken, 2019) though not as low as typically reported by Meins team (e.g., 5.34%: Meins et al., 2012).

Table 2. Table to show descriptive statistics of the data in the present study

	N	Mean (SD)	Range
Depression (at 12-months postpartum)	80	8.21 (6.0)	0 - 23
Anxiety (at 12-months postpartum)	80	34.1 (8.3)	20 - 58
Trauma/PTSD (at baseline)	80	37.7 (17.9)	17 - 83
Attachment security	75	.260	-.361 - .713
Maternal mind-mindedness	80	6.9 (4.19)	0 - 17.4

NOTE: N = number of mother-infant pairs, SD = standard deviation.

(3) Correlational analyses

Maternal mental health and maternal mind-mindedness

To test the hypothesis that maternal mental health was positively associated with maternal Mind-Mindedness, two-tailed bivariate correlations were run. No significant relationships were found between Mind-Mindedness and maternal depression ($r = -.17, p = .13$), maternal anxiety ($r = -.15, p = .17$), or maternal trauma ($r = -.07, p = .56$), indicating that maternal mental health was not associated with maternal Mind-Mindedness for this sample (See Table 3).

Maternal mental health and infant attachment security

To test the hypothesis that maternal mental health would be negatively associated with infant attachment security, two-tailed bivariate correlations were run. No correlation was found between infant attachment security at 24 months with maternal depression ($r = -0.08, p = .50$), with maternal anxiety ($r = -.04, p = .74$), or with maternal trauma ($r = -.02, p = .87$), indicating that maternal mental health was not associated with infant attachment security for this sample (See Table 3).

Table 3. Table to show Pearson's correlations for maternal mental health (anxiety, depression, and trauma), Maternal Mind-Mindedness, Infant attachment security and sociodemographic variables

	1	2	3	4	5	6	7	8	9
1 Maternal Anxiety	--								
2 Maternal Depression	-0.735**	--							
3 Maternal Trauma	0.499**	0.544**	--						
4 Overall Maternal MH at 12m	0.952**	0.907**	0.555**	--					
5 Maternal Mind-Mindedness	-0.175	-0.186	-0.076	-0.193	--				
6 Infant Attachment Security	-0.039	-0.079	-0.019	-0.06	0.047	--			
7 Income	-0.1	-0.256*	-0.282*	-0.179	0.094	0.083	--		
8 Marital Status	-0.052	1.172	-0.116	-0.11	0.29**	0.117	0.231*	--	
9 Education	-0.083	-0.128	-0.053	-0.108	0.058	0.280*	0.265*	0.148	--

* $P < 0.05$, ** $P < 0.01$

Socio-economic status variables

The socioeconomic status variables of household income, marital status, and maternal education level were investigated as potential covariates. As can be seen in Table 3, household income was significantly related to the independent variables of maternal depression ($r = -0.26, p < 0.05$) and maternal trauma ($r = -0.28, p < 0.05$). There was a significant relationship between marital status and maternal Mind-Mindedness scores at 12-months postpartum ($r = .29, p < 0.01$). Education was significantly related to infant attachment security ($r = .28, p < 0.05$). Based on this, marital status, household income, and maternal education were included as covariates in subsequent hierarchical regression analyses.

(4) Regression analyses

To test the prediction that maternal mental health predicted maternal Mind-Mindedness, regression analyses were conducted, using socioeconomic variables as covariates. Socioeconomic variables were included in the first block, and maternal mental health variables were included in the second block. Scatterplots and a histogram showed that the assumptions of linearity, normality and homoscedasticity were met. Collinearity statistics showed that there was no multicollinearity. The Durbin-Watson's test indicated no auto-correlation in the data (2.15).

The hierarchical multiple regression revealed that in model one, marital status, household income and maternal education level accounted for 8.8% of the variation in maternal Mind-Mindedness but did not contribute significantly to the regression model ($F_{3,71} = 2.72, p = .088$). Introducing the maternal mental health variables in model two explained an additional 2.1% of variation in maternal Mind-Mindedness. This change was also not significant ($\Delta F_{3,68} = .544, p = .208, \Delta R^2 = .033$). When all variables were included in the model, neither maternal depression, anxiety, nor trauma were found to be significant independent predictors of maternal Mind-Mindedness. Results are shown in Table 4.

Table 4. Table showing summary of Hierarchical regression analysis for variables predicting Mind-Mindedness (n=75)

Variable	B	SE B	β	t	P value	R2	ΔR^2
Step 1						.088	.088
Income	.168	.465	.044	.360	.720		
Marital status	.629	.268	.274	2.342	.022		
Maternal education	.337	1.013	.039	.332	.741		
Step 2						.109	0.021
Maternal depression	-0.032	0.129	-0.046	-0.248	0.805		
Maternal anxiety	-0.069	0.088	-0.136	-0.778	0.439		
Maternal trauma	0.017	0.033	0.073	0.517	0.607		

To test the prediction that maternal mental health predicts infant attachment security, regression analyses were conducted, using socioeconomic variables as covariates. Socioeconomic variables were included in the first block, and maternal mental health variables were included in the second block. Scatterplots and a histogram showed that the assumptions of linearity, normality and homoscedasticity were met. Collinearity statistics showed that there was no multicollinearity. The Durbin-Watson's test indicated no auto-correlation in the data (2.0).

The hierarchical multiple regression revealed that in model one, marital status, household income and maternal education level did not contribute significantly to the regression model ($F(3,68) = 1.74, p = .17$) and accounted for 7.2% of the variation in infant attachment security. Introducing the maternal mental variables in model two explained an additional 0.1% of variation in infant attachment security. This change was also not significant ($\Delta F(3,64) = .029, p = .54, \Delta R^2 = .00$). When all variables were included in the model, neither maternal depression, anxiety, nor trauma were found to be significant independent predictors of infant attachment security. Results shown in Table 5.

Table 5. Table showing hierarchical regression analysis for variables predicting infant attachment security

Variable	B	SE B	β	t	P value	R2	$\Delta R2$
Step 1						.072	.072
Income	-.002	.030	-.008	-.061	.951		
Marital status	.012	.017	.087	-.715	.477		
Maternal education	.131	.066	.246	1.996	.050		
Step 2						.074	.001
Maternal depression	-.001	.008	-.019	-.100	.920		
Maternal anxiety	-.001	.006	-.019	.101	.920		
Maternal trauma	.001	.002	.040	.271	.787		

(5) Mediation & Moderation analyses

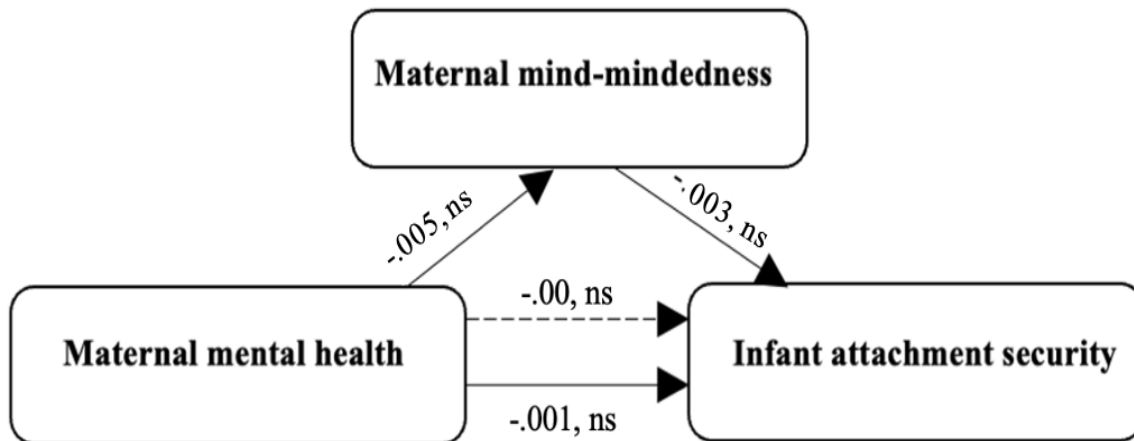
Mediation analysis

To establish any mediating effects, and assess for shared variance, a regression was conducted using the SPSS PROCESS macro (Hayes, 2013). An overall “maternal mental health” score was calculated by summing maternal anxiety, depression, and trauma scores. To avoid problems of collinearity, maternal mental health and Mind-Mindedness scores were mean centred (Aiken & West, 1991).

In step 1 of the mediation model, the regression of maternal mental health on the potential mediator, maternal Mind-Mindedness, was found to be non-significant ($b = -.01$, $t(65) = -.18$, $p = .86$). Step 2 showed that the potential mediator (maternal Mind-Mindedness), controlling for maternal mental health, was not a significant predictor of infant attachment security ($b = -.00$, $t(64) = -.32$, $p = .75$). Step 3 revealed that, when controlling for the potential mediator (maternal Mind-Mindedness), maternal mental health was not a significant predictor of infant attachment security ($b = .00$, $t(65) = .06$, $p = .96$). The final step of the mediation model showed that the indirect effect of maternal mental health on infant attachment security, when mediated by maternal Mind-Mindedness, was non-significant ($b = .00$, 95% CI [-.01, .01]). It was found that maternal Mind-Mindedness did not significantly mediate the pathway between maternal

mental health and infant attachment security, when controlling for household income and marital status. Results are depicted in Figure 2.

Figure 2. Mediation model of maternal mind-mindedness between maternal mental health and infant security. Note, dotted line = indirect effect.



Moderation analysis

To investigate the hypothesis that maternal Mind-Mindedness moderates the relationship between maternal mental health and infant attachment security, moderator analyses were performed using SPSS PROCESS macro (Hayes, 2013). In the first step, two variables were included: Mind-Mindedness and maternal mental health. These variables accounted for a non-significant amount of variance in infant attachment security ($R^2 = .00$, $F(2, 72) = .05$, $p = .95$). Next, and to avoid potentially problematic multicollinearity, maternal Mind-Mindedness and maternal mental health variables were mean centred, and a new interaction term of ‘maternal Mind-Mindedness X maternal mental health’ was created (Aiken & West, 1991). This interaction term was then added to the model. The model was found not to significantly account for the variance in infant attachment security ($\Delta R^2 = .04$, $\Delta F(1, 71) = 2.74$, $p = .10$, $B = -.00$, $t(3) = -1.43$, $p = .16$). This means that Mind-Mindedness

did not moderate any effects of maternal mental health on infant attachment security for this sample.

Table 6. Table showing interaction of maternal mental health and maternal mind-mindedness in predicting infant attachment security (n=70)

Variable	b	SE	t	p value	R	ΔR ²
Regression Model					0.22	
Maternal mental health	0.00	0.00	0.12	0.92		
Maternal mind-mindedness	0.00	0.02	1.14	0.26		
Interaction	0.00	0.00	-1.43	0.16		0.04

(6) Interaction between intervention and maternal mental health

A linear regression was run to determine if there was an interaction between intervention and maternal mental health. After computing a new variable, ‘intervention group X maternal mental health’, a linear regression showed no significant interaction between maternal mental health and intervention group in predicting attachment security ($b = -.038$, $t(79) = -.559$, $p = .578$).

Discussion

This paper is one of the first to investigate associations between maternal mental health, maternal Mind-Mindedness, and infant attachment security in a sample of multiply disadvantaged mother-infant pairs from low socioeconomic status regions of the UK. Given that maternal mental health problems affect 1 in 5 mothers during the pre- and post-natal period (Bauer et al., 2014), that 1 in 3 British children live in poverty (Joseph Rowntree Foundation, 2022), and given the lasting negative implications of infant attachment insecurity, it is critical that we better understand these relationships. Results demonstrated that, for this highly disadvantaged sample, there were no significant relationships between maternal mental health, maternal Mind-Mindedness, and infant attachment security. That this stands in contrast with much of the extant literature adds meaningfully to our understanding of these variables within the understudied population of high-risk, low-SES mother-infant pairs. In line with the ecological models of Bronfenbrenner (1977) and Belsky (2005), socioeconomic variables were found to be significantly associated with a range of maternal and infant variables. The findings will now be discussed.

Overview of sample characteristics

The data confirm that this was a multiply disadvantaged sample. Around half (49%) of the sample had a household income of under £10,000, mean trauma/PTSD scores from the PCL-5 were in the clinical range, and half (51%) were single or separated from the father of their child. Half had just college-level education (GCSEs or A-Levels) or below (51%). It is important to situate the families within these socioeconomic and psychological contexts when interpreting the following data.

The relationship between maternal mental health and Mind-Mindedness

Contrary to our hypothesis, this study did not find a negative association or predictive relationship between maternal mental health and maternal Mind-Mindedness. Indeed, no significant relationships were found between any individual aspect of mental health (anxiety, depression, trauma) and maternal Mind-Mindedness. Research into this relationship is in its infancy, with mixed findings. The result from this study appears to confirm findings by Pawlby et al. (2010), who found that mothers with depression and schizophrenia were able to be Mind-Minded and responsive towards their infants.

A second interpretation of this lack of significant association may be that the high levels of trauma scores confounded the association in this sample. The fact that the sample's mean maternal trauma/PTSD score was in the clinical range indicates that, on average, mothers in this study were experiencing high levels of PTSD symptoms such as flashbacks, nightmares, and being easily startled. This high level of trauma symptomatology confirms and highlights the challenges associated with poverty and low-SES status (Bronfenbrenner, 1977), and it may be that as the broader sample was so highly traumatised, it may not have been possible to meaningfully determine differences between mothers with 'higher' and 'lower' levels with trauma symptoms.

To better understand these high trauma scores and aid our understanding of the association between trauma/PTSD and Mind-Mindedness specifically, it would have been helpful to administer the Adverse Childhood Experiences questionnaire (ACE, Felitti et al., 1998). The ACE questionnaire would allow us to determine if the number or type of challenging life events the women had experienced was associated with their ability to provide high quality Mind-Minded caregiving, or their infant's subsequent level of attachment security. In particular, it would have been interesting to determine if certain types of childhood maltreatment were associated with reduced Mind-Mindedness scores in the present sample.

Childhood maltreatment is associated with later mentalizing difficulties (e.g., Maris, 2022), including difficulties in reporting on one's feelings and thoughts. As Mind-Mindedness is a type of mentalizing, we might expect mothers who had experienced maltreatment to have difficulties with mentalizing their infant's mind.

Difficulties in mentalizing may also have influenced the validity of self-report measures of maternal mental health, which may have confounded the data, and impacted a potential association between maternal mental health scores and Mind-Mindedness. A measure of the mothers' mentalizing skills, such as the Toronto Alexithymia Scale-20 (Bagby et al., 1994) would have helped determine if the mothers in this sample had mentalizing difficulties more generally, or in relation only to their child. Future research may benefit from exploring how both maternal experience of maltreatment mediates or moderates the relationship between maternal mental health and Mind-Mindedness.

The relationship between maternal mental health and infant attachment security

Despite considerable evidence to the contrary (Atkinson et al, 2000; Barnes and Theule, 2019; Erikson, Julian, & Muzik, 2019; Galbally et al., 2021; Shonkoff & Phillips, 2000; Sliwerski et al., 2021), this study found no significant relationship between maternal mental health and infant attachment security. Given the well-established nature of this relationship, this finding is surprising. There are a number of reasons why a non-significant association between maternal mental health and infant attachment security may have been found for this sample.

Firstly, it may be an issue of measurement. As above, possible difficulties in mentalizing may have resulted in mothers struggling to accurately report on their feelings and thoughts, which may have resulted in them providing somewhat inaccurate assessments of their level of mental health difficulty. Related to this, it was notable during video recordings that many mothers could not understand many of the questions asked in these maternal mental

health questionnaires, and so for those whose level of education meant that they could not understand the questions and also felt unable to query, inaccurate answers may have been provided.

Another issue of measurement concerns mothers' perceptions about the potential consequences of their responses. Given the high-risk nature of this sample, mothers may have consciously underreported; to offer a more 'favourable' picture of their level of mental health difficulty due to social desirability bias, to concerns about judgement from either the research team and clinicians, or perhaps even fears about involvement of children's social care due to being considered 'unfit' mothers. A final possibility around measurement considers that maternal mental health was measured at the 'wrong' time to find an association with infant attachment security, with research suggesting that the timing of depression moderates its effects on child development (Barker, 2013).

A second interpretation of this finding is that while reported levels of trauma symptoms were very high for this sample, levels of anxiety and depression were in the low, non-clinical range. It may be that the association between maternal mental health and attachment security is only found where levels of anxiety and depression are high (Toth et al., 2009), and therefore that the lower levels of maternal anxiety and depression among the mothers in this study did not result in any difficulties in the mother-infant attachment relationship.

A third interpretation is that other factors not assessed in this study mediated or moderated the association between maternal mental health and infant attachment security. It is important to note, however, that although meta-analyses have found an overall significant relationship between maternal mental health and attachment (Atkinson et al, 2000), there is heterogeneity to findings, and not all find this to be the case.

The role of Mind-Mindedness on the relationship between maternal mental health and infant attachment security

Contrary to our hypotheses, maternal Mind-Mindedness was found to have no significant moderating or mediating role on the relationship between maternal mental health and infant attachment security. Previous research has found that Mind-Mindedness significantly predicts infant attachment security (Aldrich, Chen & Alfieri, 2021, Laranjo et al., 2008; Meins et al., 2012), and so this result is surprising. However, much of the research has focused on higher-SES samples, and there is evidence that both that low-SES mothers displayed more difficulties in mentalizing their children (Brophy-Herb et al., 2012), but also that the strengths of effects of maternal Mind-Mindedness on child development may be weaker for low-SES than high-SES mothers (Aldrich, Chen & Alfieri, 2020; Arikan & Kumru, 2021). It may therefore be that for samples such as that recruited in the present study, the impact of stressors in their environment overrides or dampens the benefits of Mind-Mindedness which may, in turn, limit the extent to which it influences the relationship between maternal mental health and infant attachment security.

In addition, while the Mind-Mindedness framework's sole focus on language was heralded as offering a new way to understand caregiving behaviours, and how these behaviours influence infant attachment security, it may be that it is less suitable for low-SES samples where education level is lower, and so a language-based measure may not fairly or accurately capture mothers' ability to mentalize their infants.

Despite its strengths, Mind-Mindedness misses out on the growing body of research exploring nonverbal interactive processes and parental embodied mentalizing (Shai & Belsky, 2017). During coding, it was notable how different the physical interactions between mothers and their infants were, with some frequently touching and physically soothing their baby, and

others displaying very minimal physical interaction – differences that were not assessed with the Mind-Mindedness framework (Meins et al., 2006). Future research may wish to better understand the correlations between these different measures of mentalizing parenting behaviours.

The associations between socioeconomic status and mother-infant outcomes

The findings from this study of a sample of multiply disadvantaged, low-SES mother-infant pairs appear to confirm the importance and relevance of Bronfenbrenner's (1977) ecological systems theory in highlighting the many impacts of socioeconomic status and social context upon child development and emphasises the multiply determined nature of the parent-infant relationship (Belsky, 2005).

In line with work by Bronfenbrenner (1977) and Belsky (2005), higher levels of socioeconomic deprivation were associated with worse outcomes for mothers, infants, and the mother-infant relationship. Household income was negatively associated with depression and trauma scores, indicating that mothers in lower-income households experienced worse mental health than those in higher income households. Given that all families participating in this study were from low-SES households, it is particularly striking that this association was found.

While this research focused on mothers, a significant positive relationship was found between marital/cohabitation status and maternal Mind-mindedness, appearing to indicate that the presence of two parents involved in the child's care leads to increases in maternal Mind-Minded behaviours. It is unclear what drives this association, but the finding appears to confirm the proposed influence of the wider microsystem/family level on child development. Research has highlighted the value of father involvement (e.g., Allport et al., 2018; Olsavsky et al., 2020; Wang, Wu, & Phelp, 2021) and so despite the challenges associated with fathering research (Schoppe-Sullivan & Fagan, 2020), more investigation is needed to better understand

the association between having married or cohabiting parents, and increases in maternal Mind-Mindedness.

It is notable, and in-line with Liu (2011) and Schechter's (2013) work, that maternal education was significantly positively correlated with infant attachment security. This finding appears to confirm Schechter's (2013) hypothesis that increased access to education not only provides mothers with a richer understanding of how to forge positive relationships with others, but also a better level of health literacy and, in turn, mastery of their own health and wellbeing.

This study also found that socioeconomic variables accounted for greater proportion of the variance in maternal Mind-Mindedness and infant attachment security than did maternal mental health, which may indicate that efforts to support mothers and infants through targeted mental health or caregiving interventions may not have the desired outcomes unless sufficient concurrent social and/or economic support is provided.

Bronfenbrenner's (1977) work resulted in a significant shift to a more nuanced, multifaceted interpretation of the factors influencing child development, and offered insight into ways in which high levels of socioeconomic deprivation can impact the developing child, from the direct microsystem level, through to the many interactions with wider systems and their indirect effects on the child. This study has confirmed that a wide range of factors influence child development.

Clinical implications

This research offers important implications for how best to support mothers and infants experiencing socioeconomic disadvantage. It does so by encouraging us to look beyond the immediate mother-infant relationship by highlighting the need for a broader range of support for mothers and infants. The research emphasises the importance of maternal education level,

household income, and the benefits of having two parents involved in a child's care. By understanding how a range of factors in a child's network may affect their development, more targeted support can be provided, such as by encouraging the involvement both parents in any parenting programmes offered, by ensuring that adequate maternity pay and child welfare benefits are provided so that families' basic needs can be met, and by supporting young girls and women to stay longer in education. This research can help meaningfully inform policy aimed at supporting multiply disadvantaged families.

The PTSD scores of the mothers who participated in this research were, on average, within the clinical range; indicating that most mothers who participated were experiencing high levels of distress and may benefit from psychological support. While maternal mental health was not found to be associated with maternal Mind-Mindedness or infant attachment security in this study, improving maternal mental health should remain a priority. Routine screening for PTSD, and the offering of therapeutic work where clinically indicated, should be considered within services that support mothers and infants from socioeconomically disadvantaged communities, such as children's centres.

Limitations

This is one of the first studies to investigate the role of maternal Mind-Mindedness on the relationship between maternal mental health and infant attachment security in a high-risk, low-SES sample. Due to the challenges of engaging high-risk samples, most research focuses on middle-class or unrepresentative samples. A real strength of the present study is its ability to understand the factors associated with caregiving behaviours and infant attachment outcomes in this rarely studied population. However, despite its strengths, this study has several limitations, largely related to the challenges of using a secondary dataset.

Firstly, using a secondary dataset meant that there was no control over the study set-up, and so the conditions for coding maternal Mind-Mindedness were not ideal. For example, in

the present study, we (YA, SM, and HM) coded and rated maternal Mind-Mindedness (Meins et al., 2006) from videos of mother-infant interaction recorded during the 12-months postpartum research visit. In the original study, these same recorded interactions were used to assess for a number of different variables including infant temperament and maternal sensitivity (Longhi et al., 2019). The interactions included 7 tasks including the mother being required to ignore her child while she completed questionnaires, the child being provided with a slightly-too-complex toy with which to play without maternal involvement, seeing how the infant responds to having its toys removed prematurely, as well a brief period of free-play. While this series of tasks may have been well suited to the original study's aims, they may not have been conducive to assessing and rating maternal Mind-Mindedness. Meins et al's (2001, 2006, 2012) research team use only a free-play session to assess Mind-Mindedness; with this approach outlined in their manual. Due to the short duration of the free-play session included within our videos, it was not possible to code only these for the present study. Had a full-length free-play session been included, different Mind-Mindedness scores may have been obtained which in turn may have altered the association between it and both maternal mental health and infant attachment security.

A second limitation of this study is its high levels of dropout, which may lead to concerns about whether the mothers who remained in the study when their infant was 24 months of age are representative of the wider initial group of mothers sampled. Reassuringly, the original study report found no differences between those that remained in the study and those that dropped out, according to initial depression scores and partner status (Longhi et al., 2019), however, it is not known if those who dropped out would have been rated as significantly different on the Mind-Mindedness measure used in the present study.

Lastly and relatedly, although the sample size was deemed sufficient to find an effect according to our power calculation, there may have been limited statistical power to detect

smaller effects. It is possible, therefore, that the true effect of the main variables studied may have been overlooked as a consequence of low statistical power.

Conclusions

This study set out to explore the relationships between maternal mental health, maternal Mind-Mindedness, infant attachment security, and a range of socioeconomic variables in a sample of highly disadvantaged mother-infant pairs. The findings of this study add meaningfully to our understanding of the mother-infant relationship. The study highlighted that despite the overwhelming evidence of the association between maternal mental health difficulties and infant attachment insecurity, and the ongoing efforts to understand the small effect size of this relationship, we are still faced with a quandary surrounding the samples where this relationship is not found (such as the present sample), and in our efforts to capture the additional as-yet-identified factors that explain the remainder of the variance in this association. In addition, this study has highlighted the powerful associations between the mother-infant relationship and socioeconomic variables, which have important implications for interventions aimed at improving attachment security.

This research appears to show that in this sample of high-risk, socioeconomically disadvantaged mother-infant pairs, there is little relationship between maternal mental health and infant attachment, and that, within the limitations of the measures we chose, Mind-Mindedness does not play a clear role in the relationship between maternal mental health and infant attachment outcomes. This research also indicates that maternal education, parent marital/cohabitation status and household income account for more of the variance associated with both infant attachment security and maternal Mind-Mindedness than aforementioned maternal factors - adding to our understanding of the impacts of a range of socioeconomic variables on parent and infant outcomes, and confirming Belsky (2005) and Bronfenbrenner's

(1979) proposals which highlight the need to view a child's development as part of a broader socioeconomic context.

The mothers in this study faced significant levels of socioeconomic disadvantage yet, despite this, they continued to try and provide support for their infants and were willing to participate in a time-consuming study to better their child's outcomes. Clinicians and policymakers alike must remember that most parents are trying to do their best – sometimes in a political and social system that works against them. In light of this, 'good enough' (Winnicott, 1971) parenting should be lauded.

More research is needed to better understand the experience of raising children in highly disadvantaged, low-SES environments. Future research would benefit from including more questions about people's experiences of racism (Silverio et al., 2022; Shonkoff, Slopen & Williams, 2020), and of the impacts of significant world events such as the Covid pandemic (Sonuga-Barke & Fearon, 2021), and how these impact family life.

The first 1,000 days of an infant's life have enduring consequences, including the formation of infant attachment security. This research has demonstrated how various aspects of the network around the child can shape their development; from the broader macrosystem impacts of socioeconomic status, the exosystem impacts of income and maternal education, and the microsystem impacts of parental marital/cohabitation status, and maternal mental health. More research is needed to determine how young children are affected by both their families and their wider socioeconomic context, so that policy can be influenced to address these inequalities (Marmot, 2020).

References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Oxford: Lawrence Erlbaum.
- Aldrich, N. J., Chen, J., & Alfieri, L. (2021). Evaluating associations between parental mind-mindedness and children's developmental capacities through meta-analysis. *Developmental Review*, 60, 100946.
- Allport, B. S., Johnson, S., Aqil, A., Labrique, A. B., Nelson, T., Angela, K. C., ... & Marcell, A. V. (2018). Promoting father involvement for child and family health. *Academic pediatrics*, 18(7), 746-753.
- Alqadri, Y. (2022) *Minding the baby: Examining the impact of a reflective home-visiting programme in promoting maternal Mind-Mindedness. Unpublished thesis.*
- Arikan, G., & Kumru, A. (2021). Patterns of Associations Between Maternal Symptoms and Child Problem Behaviors: The Mediating Role of Mentalization, Negative Intentionality, and Unsupportive Emotion Socialization. *Child psychiatry and human development*, 52(4), 640–653.
- Atkinson, L., Paglia, A., Coolbear, J., Niccols, A., Parker, C.H. & Guger, S. (2000) Attachment security: A meta-analysis of maternal mental health correlates. *Clinical Psychology Review*. 20:1019–40.
- Bachmann, C. J., Beecham, J., O'Connor, T. G., Briskman, J., & Scott, S. (2022). A good investment: longer-term cost savings of sensitive parenting in childhood. *Journal of child psychology and psychiatry, and allied disciplines*, 63(1), 78–87.

- Bachmann, C. J., Beecham, J., O'Connor, T. G., Scott, A., Briskman, J., & Scott, S. (2019).
The cost of love: financial consequences of insecure attachment in antisocial youth.
Journal of child psychology and psychiatry, and allied disciplines, 60(12), 1343–1350.
- Barker E. D. (2013). The duration and timing of maternal depression as a moderator of the
relationship between dependent interpersonal stress, contextual risk and early child
dysregulation. *Psychological medicine*, 43(8), 1587–1596.
<https://doi.org/10.1017/S0033291712002450>
- Beeghly M, Bretherton I, & Mervis CB (1986). Mothers' internal state language to toddlers.
British Journal of Developmental Psychology, 4(3), 247–261.
- Belsky, J. (2005). Attachment theory and research in ecological perspective. In K. E.
Grossmann, K. Grossmann, & E. Waters (Eds.), *Attachment from infancy to adulthood:
The major longitudinal studies* (pp. 71-97). New York: Guilford Press.
- Bigelow, A.E., Beebe, B., Power, M., Stafford, A.L., Ewing, J., Egleson, A. & Kaminer, T.
(2018) Longitudinal relations among maternal depressive symptoms, maternal mind-
mindedness, and infant attachment behavior. *Infant Behav. Dev.* 51, 33–44.
- Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The
Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Development and initial
psychometric evaluation. *Journal of Traumatic Stress*, 28(6), 489-498.
- Bowlby J. (1982) Attachment and loss: Retrospect and prospect. *American Journal of
Orthopsychiatry*. 52:664–78.
- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development.
Annual review of psychology, 53(1), 371-399.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development.
American psychologist, 32(7), 513.

- Cadman, T., Diamond, P. R., & Fearon, P. (2018). Reassessing the validity of the attachment Q-sort: An updated meta-analysis. *Infant and Child Development*, 27(1), e2034.
- Camisasca, E, Procaccia, R., Miragoli, S., Valtolino, G.G. & Di Blasio, P. (2017) Maternal mind-mindedness as a linking mechanism between childbirth-related posttraumatic stress symptoms and parenting stress *Health Care for Women International*, 38, 593-612
- De Wolff, M. S., & Van Ijzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child development*, 68(4), 571-591.
- Erickson, N., Julian, M., & Muzik, M. (2019). Perinatal depression, PTSD, and trauma: Impact on mother-infant attachment and interventions to mitigate the transmission of risk. *International review of psychiatry*, 31(3), 245–263.
- Farrow, C. & Blissett, J (2015) Maternal mind-mindedness during infancy, general parenting sensitivity and observed feeding behavior: A longitudinal study *Attachment & Human Development*, 16, 230-241.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160.
- Fearon, R. P., & Belsky, J. (2018). *Precursors of attachment security*. Guilford Publications.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245–258.
[https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)

- Fishburn, S., Meins, E., Greenhow, S., Jones, C., Hackett, S., Biehal, N., Baldwin, H., Cusworth, L., & Wade, J. (2017). Mind-mindedness in parents of looked-after children. *Developmental psychology*, 53(10), 1954–1965.
- Fonagy, P., Gergely, G., Jurist, E. & Target, M. (2002) *Affect regulation, mentalization, and the development of the self*. New York: Other Books, Inc.
- Gagné, C., Bernier, A., & McMahon, C. A. (2018). The role of paternal mind-mindedness in preschoolers' self-regulated conduct. *Infant and Child Development*, 27(3), 1–12.
<https://doi.org/10.1002/icd.2081>
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.
- Health and Social Care Committee (2019) *First 1000 days of life*. United Kingdom House of Commons.
- Hewitt, C. E., Gilbody, S. M., Mann, R., & Brealey, S. (2010). Instruments to identify post-natal depression: Which methods have been the most extensively validated, in what setting and in which language? *International journal of psychiatry in clinical practice*, 14(1), 72–76.
- Kingston, D., Tough, S., & Whitfield, H. (2012). Prenatal and postpartum maternal psychological distress and infant development: A systematic review. *Child Psychiatry and Human Development*, 43, 683–714.
- La Placa, V., & Corlyon, J. (2016). Unpacking the relationship between parenting and poverty: Theory, evidence and policy. *Social Policy and Society*, 15(1), 11–28.
- Laranjo, J., Bernier, A., & Meins, E. (2008). Associations between maternal mind-mindedness and infant attachment security: Investigating the mediating role of maternal sensitivity. *Infant Behavior & Development*, 31(4), 688-695.

- Liu, W.M. (2011). Social class, classism, and mental and physical health. In *Social class and classism in the helping professions*. pp. 23-45. SAGE Publications, Inc.
- Longhi, E., Murray, L., Wellsted, D., Hunter, R., Mackenzie, K., Taylor-Colls, S., Fonagy, P. & Fearon, P. (2019). *Minding the Baby® (MTB) home-visiting programme for vulnerable young mothers: results of a randomised controlled trial in the UK*. London: NSPCC.
- Longobardi, E., Spataro, P., & Calabrò, M. (2022). Maternal mind-mindedness and communicative functions in free-play and mealtime contexts: Stability, continuity and relations with child language at 16 months. *Journal of child language*, 49(4), 635–660.
- Lyons-Ruth, K., Connell, D.B., Grunebaum, H.U. & Botein, S. (1990) *Infants at Social Risk: Maternal Depression and Family Support Services as Mediators of Infant Development and Security of Attachment*. *Child Dev.* 61, 85–98.
- Marmot, M. (2020). Health equity in England: The Marmot review 10 years on. *Bmj*, 368.
- McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American Psychologist*, 53(2), 185–204.
- McMahon, C.A., & Bernier, A. (2017). Twenty years of research on parental mind-mindedness: Empirical findings, theoretical and methodological challenges, and new directions. *Developmental Review*, 46, 54-80.
- McMahon, C. A., & Meins, E. (2012). Mind-mindedness, parenting stress, and emotional availability in mothers of preschoolers. *Early Childhood Research Quarterly*, 27(2), 245–252.
- Meins, E., & Fernyhough, C. (2006). *Mind-mindedness coding manual*. Unpublished manuscript. Durham University, Durham, UK, 82.

- Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment at 12 months. *Journal of Child Psychology and Psychiatry*, 42, 637–648.
- Meins, E., Fernyhough, C., de Rosnay, M., Arnott, B., Leekham, S.R., & Turner, M. (2012). Mind-Mindedness as a Multidimensional Construct: Appropriate and Nonattuned Mind-Related Comments Independently Predict Infant–Mother Attachment in a Socially Diverse Sample. *Infancy* 17(4): 393-415.
- Melwani, S. (2022) Maternal Mind-Mindedness as a predictor of child behavioural and cognitive outcomes in a socioeconomically-disadvantaged population. Unpublished thesis.
- Milligan, K, Khoury, J.E., Benoit, D. & Atkinson, L (2015) Maternal attachment and mind-mindedness: The role of emotional specificity *Attachment & Human Development*, 17, 302-318.
- Olsavsky, A. L., Berrigan, M. N., Schoppe-Sullivan, S. J., Brown, G. L., & Kamp Dush, C. M. (2020). Paternal stimulation and father-infant attachment. *Attachment & human development*, 22(1), 15-26.
- Risi, A., Pickard, J. A., & Bird, A. L. (2021). The implications of parent mental health and wellbeing for parent-child attachment: A systematic review. *PloS one*, 16(12), e0260891.
- Roisman, G.I., & Fraley, R.C. (2008). A behavior-genetic study of parenting quality, infant attachment security, and their covariation in a nationally representative sample. *Developmental psychology*, 44 3, 831-9.
- Roubinov, D. S., & Boyce, W. T. (2017). Parenting and SES: relative values or enduring principles? *Current opinion in psychology*, 15, 162–167.
<https://doi.org/10.1016/j.copsyc.2017.03.001>

- Saegert, S. C., Adler, N. E., Bullock, H. E., Cauce, A. M., Liu, W. M., & Wyche, K. F. (2006). APA Task Force on socioeconomic status (SES). Retrieved from the American Psychological Association website: www.apa.org/pi/ses/resources/publications/task-force-2006.pdf
- Schechter, I. (2013). A secure place: Attachment patterns and socioeconomic status.
- Schneider, B.H., Atkinson, L., & Tardif, C. (2001). Child–parent attachment and children’s peer relations: A quantitative review. *Developmental Psychology*, 37, 86–100.
- Schoppe-Sullivan, S. J., & Fagan, J. (2020). The evolution of fathering research in the 21st century: Persistent challenges, new directions. *Journal of Marriage and Family*, 82(1), 175-197.
- Shai, D., & Belsky, J. (2017). Parental embodied mentalizing: how the nonverbal dance between parents and infants predicts children's socio-emotional functioning. *Attachment & human development*, 19(2), 191–219.
- Shaw, D. S., Keenan, K., Vondra, J. I., Delliquadri, E., & Giovannelli, J. (1997). Antecedents of preschool children’s internalizing problems: A longitudinal study of low-income families. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1760–1767.
- Sheeder, J., Kabir, K., & Stafford, B. (2009). Screening for postpartum depression at well-child visits: is once enough during the first 6 months of life? *Pediatrics*, 123(6), e982–e988.
- Shonkoff, J. P., & Phillips, D. (2000). *From neurons to neighborhoods: The science of early child development*. Washington, DC: National Academies Press.
- Shonkoff, J.P., Slopen, N. & Williams, D.R. (2020) Early childhood adversity, toxic stress, and the impacts of racism on the foundations of health. *Annu Rev Public Health*. 42:115–34.

- Silverio, S. A., De Backer, K., Dasgupta, T., Torres, O., Easter, A., Khazaezadeh, N., Rajasingam, D., Wolfe, I., Sandall, J., & Magee, L. (2022). On race and ethnicity during a global pandemic: An ‘imperfect mosaic’ of maternal and child health services in ethnically diverse South London, United Kingdom. *EClinicalMedicine*.
- Śliwerski, A., Kossakowska, K., Jarecka, K., Świtalska, J., & Bielawska-Batorowicz, E. (2021). The Effect of Maternal Depression on Infant Attachment: A Systematic Review. *International journal of environmental research and public health*, 17(8), 2675.
- Sonuga-Barke, E., & Fearon, P. (2021). Do lockdowns scar? Three putative mechanisms through which COVID-19 mitigation policies could cause long-term harm to young people's mental health. *Journal of Child Psychology and Psychiatry*, 62(12), 1375-1378.
- de Souza Morais, R. L., de Castro Magalhães, L., Nobre, J. N. P., Pinto, P. F. A., da Rocha Neves, K., & Carvalho, A. M. (2021). Quality of the home, daycare and neighborhood environment and the cognitive development of economically disadvantaged children in early childhood: A mediation analysis. *Infant Behavior & Development*, 64, Article 101619.
- Spielberger, C. D. (1989). *State-Trait Anxiety Inventory: Bibliography* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.
- Sroufe, L. A. (2005). Attachment and development: A prospective, longitudinal study from birth to adulthood. *Attachment and Human Development*, 7, 349–367.
- Thompson, R. A. (2006). The development of the person: Social understanding, relationships, conscience, self. In N. Eisenberg (Ed.), *Handbook of child psychology*, Vol. 3 (6th ed., pp. 24–98). Hoboken, NJ: John Wiley & Sons.
- Thorup, A.A.E., Gantriis, D.L., Greve, A.N., Henriksen, M.T., Zahle, K.K., Stadsgaard, H., Ellersgaard, D., Burton, B.K., Christiani, C.J., Spang, K., Hemager, N., Jens Jepsen, J.R.M., Plessen, K.J., Nordentoft, N., Mors, O. & Bliksted, V. (2022) Exploring

- protective and risk factors in the home environment in high-risk families – results from the Danish High Risk and Resilience Study—VIA 7. *BMC Psychiatry* 22, 100
- Toth, S. L., Rogosch, F. A., Sturge-Apple, M., & Cicchetti, D. (2009). Maternal depression, children's attachment security, and representational development: an organizational perspective. *Child development*, 80(1), 192–208. <https://doi.org/10.1111/j.1467-8624.2008.01254.x>
- van Ijzendoorn, M. H., Carolus M. J. L. Vereijken, Bakermans-Kranenburg, M. J., & Riksen-Walraven, J. M. (2004). Assessing Attachment Security with the Attachment Q Sort: Meta-Analytic Evidence for the Validity of the Observer AQS. *Child Development*, 75(4), 1188–1213.
- Wang, X., Wu, Q., & Phelps, B. J. (2021). How Do Fathers Help? A Moderation Analysis of the Association between Adverse Childhood Experiences and Child Behavioral Health in Fragile Families. *Child psychiatry and human development*, 10.1007/s10578-021-01170-1. Advance online publication.
- Waters, E., & Deane, K. E. (1985). Defining and assessing individual differences in attachment relationships: Q-methodology and the organization of behavior in infancy and early childhood. *Monographs of the Society for Research in Child Development*, 50(1-2), 41–65.
- Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P (2013). The PTSD checklist for DSM-5 (PCL-5). Scale available from the National Center for PTSD at www.ptsd.va.gov
- Williams, R.C., Biscaro, A. & Clinton, J. (2019) Relationships matter: How clinicians can support positive parenting in the early years. *Paediatr Child Health*. 24:340–7
- Winnicott, D.W. (1971) *Playing and Reality*. London: Tavistock Publications Limited.

Part 3. Critical Appraisal

Introduction

This third and final section of my thesis explores my thoughts and reflections on the process of conducting empirical research as part of this thesis. First, I will explore the reasons for selecting this research topic. I will then describe and reflect upon some methodological issues that arose as part of this process, namely the challenges of data coding, the ‘tug of war’ between my clinical and research self, the difficulties of conducting research in a global pandemic, and the costs and benefits of using a secondary dataset. I will then reflect on the ethical considerations of conducting research with vulnerable groups such as those recruited to the original study. I will end with some conclusions of my thoughts of the overall research process.

Selecting this area of research

I was drawn to undertaking this research because of my keen interest in both attachment theory and early child development. My interest in attachment developed through undergraduate study, and then through my time working in psychodynamic teams, where the early parent-infant relationship is central to therapeutic work. My interest in early child development grew through my two years working on a longitudinal research study of infant development. The opportunity to return to this field was hugely appealing, and I was also keen to be involved in research that was part of a wider clinical intervention aimed at supporting multiply disadvantaged young mothers and their infants - especially considering the continuing austerity measures, the increasing use of food banks, and the impacts of the Covid-19 pandemic on socioeconomically-disadvantaged families.

Understanding how mothers and infants experiencing some of these challenges was of great interest to me, and I hoped it would inform the new role I would undertake once qualified, as a clinical psychologist supporting mothers and infants in an area of London with high levels of deprivation.

Methodological issues and reflections

Data coding

Coding of these mother-infant interactions proved a combination of interesting, frustrating, concerning, and humbling, often concurrently. One challenging aspect of the research was coding videos where an infant was distressed and, I felt, not being adequately soothed by its mother, or where the mother actively displayed behaviours towards their infant that I felt were somewhat cruel or mocking. Indeed, there were many instances where I wished I could step into the room and intervene. In moments where these feelings washed over me, I tried my best to reflect on what was happening. While I perhaps naively believed myself to have a reasonably broad and relatively unbiased opinion of what ‘good enough’ parenting looked like, it became clear that I held certain expectations or hopes for how mothers ‘should’ raise their child, likely informed by my own (highly educated, middle-class, British-born) family background, and by my time in infant research teams. Yet I am not a mother, less so one experiencing the multiple challenges and demands experienced by the young women in this study, and so cannot know what it feels like to parent a child in those conditions.

The experience of coding these videos broadened my understanding of different styles of parenting and encouraged me to reflect on my preconceived ideas of what ‘good enough’ parenting can look like. It has also affirmed my decision to work with mothers and infants. The women in the videos were brave enough to engage in research and, despite the range in parenting skills I witnessed, this was the message I took from it: that parents are simply trying to do their best by their children in the context of multiple stressors and thus should be supported to improve (where necessary), not judged for failing to parent a certain way. Bronfenbrenner’s (1979) ecological systems framework felt particularly relevant to understanding this group of mothers and infants, and it was striking to realise that, in this study, contextual factors accounted for more of the variance in caregiving behaviours than maternal mental health alone.

Viewing these interactions ‘second-hand’ also reinforced how little control I had to change things – and forced me to reflect on how this translates to the therapy room – we typically work with clients for 1 hour a week and hope that they can meaningfully incorporate what we do in the therapy room into their lives. Most of us enter into careers in clinical psychology to help people, and feel good when we do so, and it can be disappointing or surprising to acknowledge how little control or influence we may ultimately have over how participants use the information, or how they are treated by government policies and wider society. These are feelings that we as psychologists must manage, or channel into activism or policy work.

Overall, however, it felt like such a privilege to be let into these families’ homes and into their lives. During the brief (~30mins) videos, we witnessed mothers and infants in a far more ‘natural’ and vulnerable state than they would have been in a clinic or research setting; bleary eyed, barefoot and wearing pyjamas, with relatives and pets walking past the camera, and with the remains of the day scattered around the room. The experience of coding these videos also allowed me to reflect upon my own experience of conducting home visits for both research and clinical purposes. When you enter a participant or patient’s home, you learn so much about them. It is a much more personal experience than conducting research in a clinic or conducting a therapy session at home. The bravery and willingness of these women to partake in the research was heartening, and I am grateful to them for sharing their experiences.

Conducting research in a global pandemic

When the pandemic hit and we entered the first UK Covid-19 Lockdown, I felt reassured to be choosing a project with a secondary dataset. I felt grateful that my research was unlikely to be impacted by university closures and stalled research visits. However, over the process of the next two years I experienced many other setbacks associated with these ‘unprecedented’ times. This included having to change my research topic due to being unable to access the original

training; the challenges of liaising with fellow trainee researchers across multiple countries and time zones; and not being able to enjoy the support of friends and family during more stressful parts of the research process.

The pandemic quashed our original plan for training in an alternative coding framework, that of Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE, Bronfman et al. 1999), and so we shifted to using a new framework (Mind-Mindedness, Meins et al., 2001) that perhaps lent itself less well to the mother-infant interaction videos we had access to.

In addition, instead of an intensive in-person training programme delivered by an expert which we imagine would have felt containing and grounding, the pandemic meant that our training consisted of my fellow trainees and I poring over an electronic copy of the training manual, teaching ourselves. The pandemic caused huge upheaval in everyone's lives. For the 3 of us working on this project, excited to code videos together at the Anna Freud Centre, which was something we felt would have given us a richer, 'truer' feeling of being involved in this research, we were instead "jointly" working on a research project from different corners of the globe, transcribing videos from home.

Costs and benefits of secondary datasets

Though I had enjoyed being involved in several large-scale research projects prior to training and was interested to return to 'active' research, I initially felt incredibly relieved to be using a secondary dataset – especially during a pandemic; no missed research appointments, no long days of research testing, no wrangling with university or NHS ethics, no delays in research due to lockdowns. Though I was sad not to be interacting with research participants in person, especially given my strong interest in the research topic and participant group, I felt grateful to be using a secondary dataset. However, as the process of data coding and analysis began, the limitations to this approach soon became clear.

The thing I found most challenging about using a secondary dataset was the lack of control over measures and research set-up, and how this impacted what could be determined about the subject matter.

During the home visits, the experimenters were always present and often highly involved in interactions. This was problematic for the research in general, as the researchers across different study sites delivered instructions somewhat differently to one another, it was also challenging because it meant much of the data was unusable, because many of the mothers spent considerable time talking to the experimenters about their baby in detail; often discussing their personalities, their emotions, their desires, and their interests. This meant that many mothers therefore spent less time directing their speech towards their baby – the only form of maternal communication assessed by the Mind-Mindedness framework. Anecdotally, it appeared that the more anxious mothers spoke more to the experimenters than the less anxious mothers. Although the study found that Mind-Mindedness did not differ significantly according to maternal anxiety, I felt that by having the experimenter present, and then excluding highly Mind-Minded but not infant-directed maternal comments worked against anxious mothers, by reducing the amount of speech they directed to their infant. Had we been responsible for designing the study ourselves, rather than relying upon a videos from an existing research project, we would have ensured that the experimenters left the mothers and babies alone for these interactions.

An additional challenge of using a secondary dataset, and of not conducting the research ourselves, is that much of the set-up was not entirely suitable. For example, the camera recording the mother-infant interactions was often ill-suited to capturing things – instances where the mother or baby were out of shot had to be excluded because we couldn't ascertain whether the comments were appropriately mind-related or non-attuned.

The push and pull of my clinical and researcher selves when coding videos

Despite the challenges of learning a new coding framework, it was a very interesting process that taught me a lot and caused me to reflect on my role as a reflective-scientist practitioner. There were many times when I noticed my tendency to approach the videos through a clinical lens, rather than a more objective research lens, likely influenced by my predominantly clinical role while on training. It also led me to reflect on why I sometimes found the objective research focus so appealing, as when I focused on the specific units of maternal speech, I could pay less attention to my often painful or frustrated feelings about the interactions I was witnessing.

The framework's focus on language, and strict rating protocol, while understandable and necessary from a research perspective, sometimes left me feeling that we were letting some of the mothers down or doing a disservice to their caregiving efforts. It is understood that language level affects how people can make sense of their difficulties, but within this coding framework there were times that we (SM, YA and I) wondered if it was fair to code 'against' a mother simply because of her choice of words. The framework was strict in the way it coded language, and we couldn't help but wonder how much language skill came into this, and whether this caused mothers with 'worse' language skills to be rated as providing less high-quality caregiving than their more eloquent peers, even if they were very well able to make sense of their infant's mind. For example, while some mothers might notice their tearful baby and say, 'come here' whilst holding their arms outstretched, others may opt to say, 'want cuddle'. My clinical understanding, is that these are tapping into the same thing, conveying the mother's understanding that the baby needs soothing yet, within a strict research framework, only the latter is coded as Mind-Minded.

The framework's focus on language ironically led me to reflect on the importance of things that were not language based, such as touch, and overall level of maternal warmth. While I would take these in naturally when working with mothers and infants in a clinical setting, the fact I could not use them to inform my rating of the mother's caregiving in this project highlighted to

me how helpful they are. Other frameworks are designed to tap into these (e.g., Shai & Belsky's [2011] 'Embodied Mentalizing'), and in my future work I will pay more attention to these. It highlights to me how helpful research can be at encouraging u to focus on and operationalize niche details, something that we don't explicitly do in clinical practice.

Ethical considerations of conducting research with vulnerable groups

During the many hours, over many months, that I spent transcribing and coding these videos, I frequently wondered what the mothers in the videos would make of my research, and whether they would be happy that their data was being used, years later. While they consented to the original study, and although the present research can be considered as working for the greater benefit of mothers and infants more widely (if published, but also through its influence upon my clinical work), I couldn't help but wonder if it was appropriate, and how these mothers would feel about their caregiving being rated many years later by an unknown researcher.

Conclusions

I have learned a lot over the course of conducting this research and writing this thesis. The experience has highlighted to me the importance of the 'scientist reflective practitioner' approach that we all aspired to achieve when entering training. Although the research process has been stressful, it has emphasised to me what I enjoy about clinical practice, and what I value about research, and how I can use these different things in my career to positively influence one another. I look forward to taking the learnings from this research into my new role and hope I can do justice to the mothers and babies that participated.

References

- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard university press.
- Bronfman, E. T., Parsons, E., & Lyons–Ruth, K. (1999). *Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE)*, Version 2. Unpublished manual, Harvard Medical School, Cambridge, MA
- Meins, E., & Fernyhough, C. (2006). *Mind-mindedness coding manual*. Unpublished manuscript. Durham University, Durham, UK, 82.
- Shai, D., & Belsky, J. (2011). When words just won't do: Introducing parental embodied mentalizing. *Child Development Perspectives*, 5(3), 173-180.

Appendix: Joint project statement (outline of contributions)

Both the systematic review and empirical study included in this thesis were undertaken as joint research projects in collaboration with my research colleagues, Yaman Alqadri and Samara Melwani, who are currently completing their DCLinPsy training.

For the systematic review and meta-analysis, the screening and coding procedures were divided equally between us, with support from Professor Pasco Fearon (our primary thesis supervisor), Professor Peter Fonagy, and two researchers from Leiden University (Dr Sabine van der Asdonk and Professor Lenneke Alink). Yaman, Samara and I met jointly with our primary supervisor, Professor Pasco Fearon, throughout the course of our research, and had occasional meetings with the broader team to refine procedures and ensure adherence. All three projects were analysed and written independently. My systematic review and meta-analysis focused on childhood abuse and adolescent mentalizing, Yaman's focused upon childhood neglect and adult mentalizing, and Samara's focused on childhood abuse and adult mentalizing.

Our empirical work was also collaborative, in that we worked together to achieve inter-rater reliability on Meins et al's (2006) Mind-Mindedness construct, consulting with Professor Elizabeth Meins when necessary. We also met with our primary supervisor, Professor Pasco Fearon periodically over the course of the research. Yaman, Samara and I each transcribed and coded 1/3 of the videos used for this study. All three projects were analysed and written independently. My study investigated associations between maternal mental health, maternal Mind-Mindedness and infant attachment security, Yaman's study investigated changes in Mind-Mindedness as a consequence of the Minding the baby home-visiting programme, and Samara's study investigated maternal Mind-Mindedness as a predictor of child behavioural and cognitive outcomes.