Maternal mind-mindedness as a predictor of child behavioural and cognitive outcomes in a socio-economically disadvantaged population

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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.

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Date: 25th July, 2022

OVERVIEW

Part 1: Literature review

The first section is a meta-analysis examining the relationship between childhood abuse and mentalization in the general adult population. Systematic electronic searches were conducted across 5 databases, and 57 outcomes across a total of 27 studies were included. An additional meta-analysis including 18 studies was also included examining the relationship between general childhood maltreatment and mentalization in adulthood. Results indicated a modest but significant effect size in both instances, concluding that both childhood abuse and childhood maltreatment are associated with poorer mentalization in adulthood. Results highlight the importance of considering the nuances of early childhood maltreatment experiences and corresponding effects, and of considering mentalization as a transdiagnostic construct.

Part 2 : Empirical Paper

The second section reports on a longitudinal study that investigates the role of maternal mind-mindedness on child cognitive and behavioral development in a socio-economically disadvantaged population. The study uses secondary data from a multi-site randomized controlled trial. Video-recorded interactions of 80 mother-infant dyads were coded for maternal mind-mindedness. No significant associations between maternal mind-mindedness at one year and infant outcomes at two years were found. Further research is warranted.

Both Part 1 and Part 2 were conducted as joint research (see Appendix for a breakdown of contributions).

Part 3: Critical Appraisal

The critical appraisal begins with reasons for choosing this research topic, then provides further reflections on the methodological choices taken in Part 2 of the thesis, and finally elaborates on the clinical implications and future directions of both sections. Personal reflections are integrated throughout.

IMPACT STATEMENT

In England and Wales, one in five adults aged 18 to 74 years (8.5 million people) have reported experiencing at least one form of child abuse before the age of 16. Furthermore, recent statistics published by the NSPCC show that conditions caused by the coronavirus pandemic have increased the vulnerability of children to abuse in the home. The current study is the first to conduct a meta-analytic review of the growing body of literature on the effects of childhood abuse on mentalization in a general adult population. Findings show a modest but significant effect size. This meta-analysis constitutes part of a larger research project, which, in light of recent developments in neuropsychology, studies distinct subtypes of maltreatment and their effects on mentalization in adulthood. Findings indicate that younger participants, members of minority groups, and female participants reported poorer mentalization in adulthood after childhood abuse. A wealth of literature has established the role of a disrupted mentalization capacity in the development of various clinical presentations and adverse interpersonal and intergenerational patterns, and implications of this study help to better understand risk and resilience factors that lay the groundwork for early clinical prevention and intervention. The study underscores the importance of considering mentalization as a transdiagnostic construct. Future research may seek to compare the effects of early neglect and abuse on mentalization in adulthood, and extend this meta-analysis to a clinical population using similar methods.

The empirical study contributes to an ongoing conversation about the protective effects of early parenting on child outcomes in a high risk population. More specifically, the study seeks to build on previous findings investigating the role of maternal mind-mindedness on child cognitive and behavioral development, in a sample of socio-economically deprived young mothers. This research is particularly relevant in today's social and political landscape where the coronavirus pandemic and cost of living crises have contributed to an increase in poverty, with extraordinary effects on family systems and likely effects on child development. Contrary to previous research, the study found that maternal mind-mindedness at one year was not associated with child cognitive development or behavioral problems at two years, and results

remained non-significant after controlling for household income, maternal education level, parental co-habitation, and sex of the child. The non-significant results reiterate the complexities of the pathways that link early parenting and child cognitive and behavioral development and contribute to a broader conversation around the age at which observed developmental impacts come to fruition. Future research may look to build on these findings to be able to inform clinical intervention and windows of preventative action.

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Part 1: Literature Review

Childhood abuse and mentalization in adulthood: a meta-analysis

Abstract

Aims: Childhood abuse has been shown to be associated with a range of aspects of social cognition in adulthood. Among them, mentalization – the ability to attend to and interpret one's own behavior and the behavior of others in terms of mental states – has been a popular topic of research. However, the literature remains limited to single dimensions of mentalization, as opposed to the broader multi-dimensional concept, and there has been no systematic review or meta-analysis on this topic.

Methods: This multilevel meta-analysis provides a synthesis of all empirical literature examining the relationship between childhood abuse and mentalization abilities in the general adult population. Mentalization was operationalized using 8 distinct constructs: reflective functioning, mentalization, mind-mindedness, insightfulness, social cognition, theory of mind, alexithymia, and emotion recognition. Systematic electronic searches were conducted across 5 databases, and 57 outcomes across a total of 27 studies were included. An additional meta-analysis was also conducted examining the relationship between general childhood maltreatment, as distinct childhood from abuse, and mentalization in adulthood.

Results: A significant weighted average correlation of r=.14, 95%CI [.09, .19] was found for the relationship between childhood abuse and adult mentalization, representing a small effect size. Moderation analyses revealed that younger participants, members of minority groups, and female participants reported poorer mentalization in adulthood after childhood abuse. An additional meta-analysis examining the relationships between general childhood maltreatment and mentalization in adulthood reviewed 18 studies and yielded a significant weighted average correlation of r=0.17, 95%CI [.07, .27].

Conclusions: The current meta-analysis confirms that childhood abuse and childhood maltreatment are both associated with poorer mentalization in adulthood. The results contribute clinically to the shape and form of early interventions and treatments. Future

research may seek to compare the effects of abuse and neglect, and account for a clinical population.

Introduction

The field of developmental psychology has witnessed a proliferation of research on adverse childhood experiences and their developmental outcomes. Specifically, growing literature reports impairments in social and cognitive abilities in maltreated children compared with non-maltreated children, in which various aspects of social cognitive functioning have been studied. Specific subtypes of maltreatment have also been explored, to understand how distinct experiences, such as abuse and neglect, affect development (Luke, 2013).

One particular recent and growing area of interest includes mentalization – the ability to attend to and interpret one's own behaviour as well as the behaviour of others, in terms of internal mental states, such as thoughts, feelings, and beliefs (Allen & Fonagy, 2006). The ability to mentalize is thought to be vital to the development of skills associated with self-organization and affect regulation (Midgley & Vrouva, 2012). Growing evidence shows that compared with children without a history of maltreatment, maltreated children may experience impaired or disrupted mentalizing abilities in adulthood, as they are more likely to apprehend or interpret interpersonal encounters, and the associated emotions or mental states, differently (Luke 2013).

Where a host of literature points to the disruption of mentalization abilities as a single and profound developmental outcome (Bateman & Fonagy, 2010), the evidence underpinning the relationship between mentalization and childhood maltreatment remains largely limited to single or specific dimensions, as opposed to mentalization as an integrative and multidimensional concept. For example, previous literature has examined, and in instances reviewed, single constructs that fall under the larger theoretical umbrella of mentalization, such as emotion recognition (Berube, 2021), theory of mind (Benarous, 2015), social understanding (Luke 2013), alexithymia (Khan & Jaffee, 2022) and their relationships to childhood maltreatment. Similar literature reviewing maltreatment and mentalization as an integrated umbrella concept, containing each of these constructs, however, does not yet exist.

Our aim in this paper is therefore to conduct a critical review and meta-analysis of existing literature in order to understand the relationship between childhood abuse and mentalization

in the general (non-clinical) adult population. While this paper will broaden mentalization into a multidimensional concept, it will also narrow down adverse childhood experiences into the single and specific dimension of abuse, defined in accordance with the NSPCC as when a child is intentionally harmed by an adult or another child, either online or in person, physically, sexually or emotionally (Romanou & Belton, 2020). This is to address recent research that distinguishes distinct outcomes of childhood abuse and neglect, and to bypass a common limitation of previous research, which typically oversimplifies boundaries between these two experientially distinct types of environmental experience (Sheridan & McLaughlin, 2014). This meta-analysis therefore evaluates the hypothesis that abused children under-perform relative to their non-abused counterparts in measures of mentalization during adulthood. A separate analysis conducted in tandem will address the topic of neglect in this context (Alqadri, 2022), and another on how general childhood maltreatment affects mentalization during adolescence (Maris, 2022). Future research may seek to compare the effects of childhood abuse and neglect on adult mentalization, and the effects of adolescent versus adult mentalization abilities, to give way to specific theory-practice links around the types and timings of intervention.

In England and Wales, one in five adults (8.5 million people) aged 18 to 74 years have reported experiencing at least one form of child abuse before the age of 16 (Office For National Statistics, 2020). This includes physical, emotional, or sexual abuse, or witnessing domestic violence or abuse. Implications of this review may further expand an understanding of underlying social-emotional vulnerabilities and outcomes, to better understand risk and resilience factors of this population. A fragile or fractured mentalization capacity has been shown to correlate with higher rates of clinical presentations such as PTSD (Allen 2001), eating disorders (Skarderud, 2007), depression (Allen, 2003), anxiety (Nolte et al., 2011), attachment-related problems (Fonagy & Target, 1997), borderline personality disorder (Bateman, 2010), and relatedly higher rates of antisocial and socially offending behaviour (Fonagy et al., 2020). Exploring the pathways involved in disrupted mentalization abilities may also be relevant to understanding the underlying mechanisms of intergenerational cycles of

maltreatment and trauma. For instance, an umbrella review of meta-analyses conducted by van IJzendoorn et al (2020) showed that the strongest predictor of child maltreatment is if a child has parents with a history of maltreatment (van IJzendoorn et al., 2020). Relatedly, Buisman et al (2020) showed that the intergenerational transmission of maltreatment appears to be more systematic for abuse than for neglect (Buisman et al., 2020), reinforcing the need to tease out specific types of maltreatment in ongoing research. Successfully identifying the underlying risks and latent vulnerabilities that can impact mentalization abilities may continue lay the groundwork for early intervention and prevention.

Mentalization as a developmental process

Mentalizing, as conceptualized by Fonagy, Gegely, Jurist and Target (2002), refers to a process of imaginative mental activity that enables us to perceive and interpret human behavior, with respect to both ourselves and others, in terms of intentional mental states. This process is crucial to a child's developing understanding of his/her own emotional reactions, the emotional reactions of others, why others behave the way they do, and the impact of his/her mental state on others (Bateman & Fonagy, 2019; Duval, 2018). Fonagy and colleagues consider mentalization as a social and developmental process - every individual is born with the ability to mentalize, but the strength of the capacity is scaffolded, or in the face of adversity, disrupted, by the early social environment (Bateman & Fonagy, 2019).

More specifically, when a caregiver has the capacity to accurately interpret the internal state of a child and communicate it back to them, or interpret the internal state of another person and communicate it accurately to the child, this helps the child to learn about their own mind and the minds of others (Fonagy et al., 2002). A child naturally observes, mirrors, and then internalizes this capacity (Bateman & Fonagy, 2019). This, in turn, develops positive abilities in affect regulation and self control, and has further implications on the child's sense of self, emotional agency, and social functioning (Bateman & Fonagy, 2019).

A child who benefits from a safe and secure early attachment relationship will not only acquire a more robust ability to process and regulate their own internal states, but also a better

ability to understand the internal states and reactions of others, and thus a higher ability to function interpersonally than a child who does not (Duval, 2018). In this case, secure attachment will constitute a caregiver who is (1) nonthreatening, (2) can be trusted to have an interest in the child's mind, (3) is accurately attuned to the child's underlying psychological states and feeling, and (4) is expressive when communicating these states back to the child (Fonagy et al., 2002). Each of these caregiver characteristic will form the building blocks of an internal working model of attachment that will inform a safe and secure representation of the self, others, and the world around the child. From a Vygotskian lens, a secure attachment figure may also excel in providing alternative versions of reality through dialogue that may scaffold and motivate a child's acknowledgement, interest, and appreciation of multiple perspectives, whereas a threatening attachment figure may fail to provide this (Fernyhough, 2008). Consistent with the above, research has shown that children who experience maltreatment, and therefore limited access to trusting and secure attachment relationships, are likely to experience deficits in social cognitive functioning, including emotion recognition (Koizumi & Takagishi, 2014; Pears & Fisher, 2005; Pollak, 2008) and theory of mind (Cicchetti et al., 2003; Pears & Fisher, 2005).

Operationalizing mentalization

Mentalization has been operationalized in previous research using a wide range of constructs and measures. In The Handbook of Mentalizing in Mental Health Practice, Fonagy and colleagues contend that mentalization is a multidimensional construct that involves both self-reflective and interpersonal components (Luyten et al., 2019). Research into the mechanisms of mentalization supports a theory of distinct neural systems (Lieberman, 2007) that reflect four different axes, or eight different dimensions, of mentalization. These include (1) automatic versus controlled mentalizing, (2) self versus other mentalizing, (3) internal versus external mentalizing, and (4) cognitive versus affective mentalizing (Luyten et al., 2019). Any one measure or assessment of mentalization may represent one or more of these dimensions.

This meta-analysis uses a multidimensional definition, specifically including eight distinct operationalizations of mentalization, in an attempt to represent the full scale of mentalizing across each dimension of all four axis described above. The full set of terms included in this analysis are (1) Reflective functioning; (2) Mentalizing; (3) Mind-mindedness; (4) Insightfulness; (5) Social Cognition; (6) Theory of Mind; (7) Alexithymia; (8) Emotion Recognition. This set of terms has been established and used in previous research, where conceptual overlaps have been noted between each of the constructs (Choi-Kain et al., 2008).

When considering each of these constructs, differences can be noted in the dimensions of mentalization represented, and therefore the neural circuitry that is engaged. For example, alexithymia typically taps into an internal and controlled self-mentalizing ability that engages both cognitive and affective awareness, where reflective functioning may tap into a controlled mentalizing ability that is both internal and external, both self and other, and both cognitive and affective (Luyten et al., 2019). Moreover, the characteristics of specific assessment tools used within-constructs also determine which dimensions are being measured.

Abuse versus neglect : a framework of distinction

The bulk of developmental research has focused on the relationship between adverse childhood experiences (ACES) and developmental outcomes. Within this, evidence suggests that general childhood maltreatment disorganizes the attachment system and, as a result, undermines the development of regulatory systems and processes. The neurobiological legacy of early maltreatment remains extraordinarily complex and nuanced, however there is a general consensus that childhood maltreatment can leave long term scars on physiological processes associated with stress, and emotional regulation and recognition (Cross et al., 2017). More recent research reveals that while both abuse and neglect have been shown to affect emotional learning and regulation, the specific neural circuitry remains distinct (Sheridan & McLaughlin, 2014).

Neglect is defined as the deprivation of age-expected cognitive and social inputs, and abuse as the presence of a threat to one's physical or psychological integrity (Sheridan & McLaughlin, 2014). In an examination of a series of human and animal studies on early childhood neglect, Sheridan & McLaughlin show that individuals who experience early neglect are likely to show reductions in cortical thickness, most pronounced in the association cortex. The effects of deprivation on neural development can therefore be recognized in deficits to aspects of cognitive and social functioning that are reliant on these regions, most notably language, executive function, spatial navigation, and social cognition (Sheridan & McLaughlin, 2014). On the other hand, early exposure to threat or abuse is associated with impacted development in neural circuitry underlying learning, memory, and perception, most notably including fear learning and emotional learning. This includes lasting changes in the hippocampus, amygdala, and ventromedial PFC (vmPFC) (Sheridan & McLaughlin, 2014). Subsequent literature surrounding the impacts of childhood maltreatment on mentalization generally supports this distinction in outcomes (Rnic et al., 2018; Simon et al., 2019). By distinguishing childhood maltreatment into categories of abuse and neglect, a more nuanced understanding of the impacts on mentalization can be reached.

(Subtypes of) Abuse and mentalization

Research looking at the relationship between early maltreatment and emotion recognition has been led by a pioneering series of studies conducted by Pollak and colleagues in the early 2000s (Pollak & Kistler, 2002; Pollak & Sinha, 2002: Pollak & Tolley-Schell, 2003). Since then, numerous studies have shown evidence that maltreated children are often quicker at identifying expressions of anger (Curtis & Cicchetti, 2011; Curtis & Cicchetti, 2013; Leist & Dadds, 2009) and fear (Masten et al., 2008) compared with non-maltreated peers. Other studies have found that maltreated children show less accuracy in processing happy faces, and require more information to distinguish expressions of sadness, compared to controls (Pollak & Sinha, 2002: Pollak & Tolley-Schell, 2003). Overall, the research on the effects of

maltreatment has been oriented towards the external, automatic, and other-focused dimensions of mentalization.

Numerous studies have revealed the effects of abusive parenting in producing inconsistent or frightening emotional signals which do not mirror or accurately represent the child's own expressed emotion or state of mind (Pollak & Sinha, 2002). This in turn can lead to difficulties with the child's development of emotional perception, processing, and understanding (Fonagy, 2002). Where the majority of studies combine different forms of abuse, studies that distinguish between subtypes of abuse, namely physical, emotional and sexual abuse show different outcomes in the perception of emotions (Berube, 2021).

It has been demonstrated that children who experience physical abuse, for example, tend to consistently show hypersensitivity to anger and fear (Pollak & Tolley-Schell, 2003; Pollak, 2008), and therefore require less sensory information than non-abused counterparts to identify these emotions in others (Berube, 2021). A facilitated access to representations of anger and potential threat may be adaptive in allowing for quick detection of potential danger in the environment (Pollak, 2008), and therefore avoiding future abuse, but at the same time can undermine the development of slower reflective processing skills (Fonagy, 1999). Additionally, in a study conducted by Turgeon et al (2020) it was found that adults with a history of childhood physical abuse were less able to recognise fear and sadness when emotionally displayed on children's faces, compared with non-abused counterparts (Turgeon et al., 2020). In this same study, it was found that adults with a history of emotional and sexual abuse were less able to recognise anger on children's faces. In a study by Shipman & Champion (2000), sexual abuse is also shown to be associated with lower emotional management skills, including lower emotional understanding and increased deficits in emotion regulation (Shipman & Champion, 2000). All in all, previous research, albeit inconclusively, indicates that different subtypes of abuse do produce different outcomes on mentalization, and justifies the distinct study of each subtype of abuse.

The Current Review

The broad aim of this study is to conduct a meta-analytic review of the literature surrounding the relationship between childhood abuse and mentalization in the general adult population (aged 18 and over). In doing so, the study seeks to operationalize a multidimensional definition of mentalization. Moderator analyses will be conducted to distinguish and compare the effects of different types of abuse on adult mentalization, and to understand the moderating effects of specific sample characteristics such as participant gender, age, and ethnicity. A further objective is to compare a meta-analytic review of the literature surrounding *general childhood maltreatment* and adult mentalization, with that of *childhood abuse*, to understand how outcomes may differ when research is narrowed into specific types of maltreatment. A final moderator analysis will be conducted in the context of general childhood maltreatment and adult mentalization to understand the moderating role of the measure of mentalization in the relationship.

A number of hypotheses are made: (1) greater childhood abuse will be significantly associated with poorer mentalization abilities in adulthood, (2) type of abuse will not significantly moderate the relationship between abuse and mentalization, and (3) age and gender will significantly moderate the effect of abuse on mentalization, however the effect of ethnicity as a moderator between abuse and mentalization is an open research question, as the current literature is inconclusive. The theory and research expressed above also lead us to advance the hypothesis that (4) there will be a significant difference in adult mentalization when comparing the effects of general childhood maltreatment with childhood abuse. Finally, we explore the extent to which the measure, or dimension(s), of mentalization moderates the relationship between general childhood maltreatment and adult mentalization, which currently remains an open research question.

Methods

Literature search

A systematic review of the literature was conducted following recommendations outlined in the PRISMA guidelines (Page et al., 2021). Five electronic databases, including PsycInfo, Medline, Pubmed, Web of Science, and Cochrane Library, were used to identify relevant published articles. No date cutoff was employed. The literature search included peer-reviewed journal articles in English, German and Dutch. The search terms included: "abus*" or "neglect*" or "negligence" or "exploit*" or "maltreat*" or "mistreat*" or "ill-treat*" or "rape*" or "incest", "childhood" or "history or surviv*", AND "reflective functioning" or "mental*" or "mind-mind*" or "mind-related" or "mentalization" or "insightfulness" or "social cogniti*" or "alexithymia" or "mindedness" or "emotion recognition" or "theory of mind". A subset of attachment-related terms were also included in the initial search to yield results for a separate ongoing meta-analysis, however this sample of articles was filtered out of this study in the first stage of screening. The attachment-related terms included "unresolved state of mind" or "unresolved trauma" or "unresolved loss" or "attachment representation" or "adult attachment".

The initial search returned 5 partially overlapping sets of studies (*n*=1446) which contained 789 unique articles when combined *(See Figure 1.1)*. In the first instance, the abstracts of the articles were screened to identify studies with the following inclusion criteria: 1) general adult population, 2) quantitative empirical research, and 3) explicit measure of mentalization and childhood maltreatment. At this stage, in line with the inclusion criteria, all articles that looked exclusively at attachment and mentalization with no reference to childhood maltreatment were excluded. Reviews and meta-analyses of existing literature were excluded. In this phase the construct of 'mentalization' was considered in its broadest sense, including the 8 operationalizations listed above. 550 studies were discarded because they did not meet the inclusion criteria.

The remaining 234 articles were then classified by sample, yielding 87 studies from the general adult population, 125 from the clinical adult population, and 22 from the adolescent population. As this review focuses specifically on the general adult population, all studies from

the latter two categories were excluded during this phase. Although some 'clinical' papers included control samples taken from the general population, the samples were not always possible to distinguish in the effect sizes and therefore these papers were excluded from the review.

The 87 general adult population articles were then reviewed individually as full texts, for eligibility using the following inclusion criteria: 1) the paper reports on the relationship between childhood maltreatment and mentalizing, 2) relevant statistics were reported and the paper is an empirical study, 3) the study constructs meet the required definitions. Childhood maltreatment was screened according to the World Health Organization (WHO) definition, as "the abuse and neglect that occurs to children under 18 years of age, that 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" (World Health Organization, 2020). Mentalization was defined according to the 8 operationalisations listed above. Where the full text was not available online, authors were contacted by email to request a copy. Papers that used a neurological operationalization or measure of mentalization were excluded at this stage; for example, papers that study the neural mechanisms and alterations of mentalization processing with no behavioral component. Finally, papers that did not present an effect size on the relevant association were excluded.

Of the 87 studies, 34 were excluded in the full text screening stage; 7 papers did not meet the definition of mentalizing, 10 papers presented no relevant associations, 8 papers used a neurological measure of mentalization, 4 papers were unlocatable in a full text or English version, 2 papers did not meet the definition of maltreatment, and 2 papers did not present an empirical study. To confirm that participants were only included once in each meta-analysis, the method and results sections of studies were reviewed to identify any overlapping samples. One pair of studies were identified with overlapping samples and, as the effect sizes presented were identical, one of the studies was excluded. The final number of publications was therefore 52, of which 27 studies were included in the primary meta-analysis examining

childhood abuse, and 18 studies were included in the additional meta-analysis, referred to from this point as the secondary meta-analysis, examining general childhood maltreatment. Studies that included both general childhood maltreatment and abuse as a subtype of maltreatment (*n*=6) were included in the primary meta-analysis and excluded from the secondary meta-analysis.

Search and screening procedures

Identification

Records identified through database searching
(*n* = 1446)

Records removed *before screening*:
Duplicate records removed (*n* =657)

Screening

Abstracts screened
(*n* = 789)

Records excluded
(*n* = 550)

Full text articles assessed for eligibility (*n*=234)

Full text articles excluded (*n*=34)
Neurological article (*n* = 8)
No relevant association (*n* = 10)
Definition of mentalizing not met (*n* = 7)
Couldn't find text / English version (*n* = 4)
Definition of maltreatment not met (*n* = 2)
Study is not empirical (*n* = 2)
Replicated sample (*n* = 1)

Included

Studies included in main review, childhood abuse and adult mentalization (*n* = 27)
Outcomes included in main review (*n* = 57)

Studies included in secondary review, general childhood maltreatment and adult mentalization (*n* = 18)
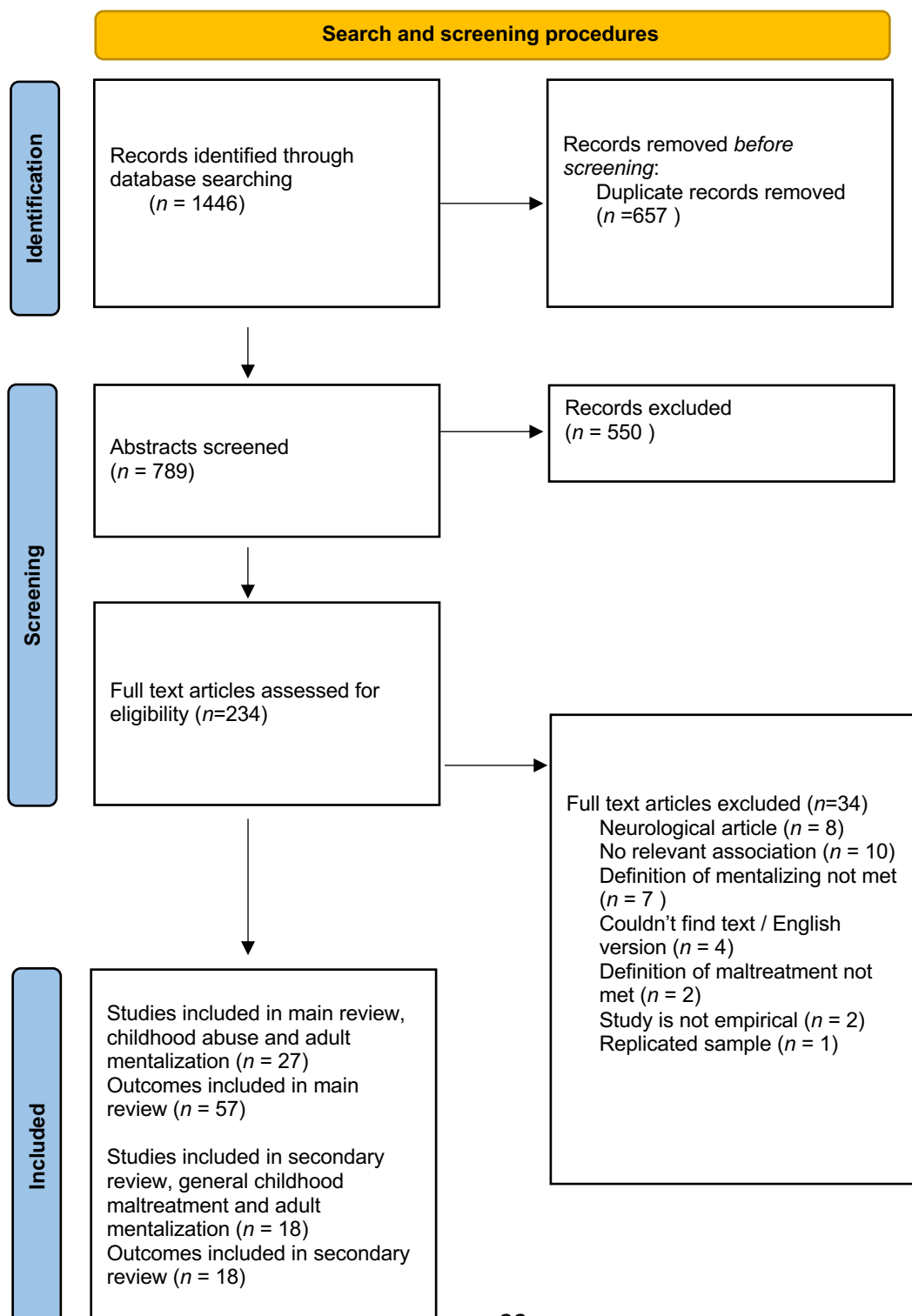Outcomes included in secondary review (*n* = 18)

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Figure 1. *This flow diagram details the search and screening procedures used to select included studies.*

Coding of study characteristics and moderators

Study characteristics, measurement characteristics, and effect size characteristics were coded from each study. The following information was coded with regards to study characteristics: publication details, study design, sample characteristics (i.e. age, gender, ethnicity). The following information was coded with regards to measurement characteristics: instruments and subscale instruments used to measure maltreatment, mentalizing, and related subtypes, reliability statistics, information around the constructs (i.e. level and direction), means and standard deviations, how maltreatment and mentalizing were operationalized in the study, the subtypes of maltreatment or mentalization included in the study, who provided the information about the maltreatment, when it was experienced, the severity of maltreatment, and specifics on the perpetrator where available. With regards to effect size characteristics, all relevant statistics and interpretations of statistics were coded, in addition to associated sample sizes.

Study Quality

Information from the Cambridge Quality Checklist (Murray et al., 2009) was also coded here including sampling method, response rate, sample size, and whether the measures of maltreatment and mentalization can be considered reliable measurements (i.e. reliability coefficient ≥.75 *and* reasonable face validity *or* criterion or convergent validity coefficient ≥.3, *or* more than one instrument or information source used, *or* official records were used) (Murray et al., 2009).

Meta-analytic strategy

The current meta-analysis used a random-effects, multi-level approach. Most studies (*n* = 27) eligible for review evaluate the effects of specific subtypes of childhood abuse on

mentalization, therefore presenting multiple outcomes within each study. As a result, the number of effect sizes in the meta-analysis are related to the number of outcomes, not the number of eligible studies (Van den Noortgate et al., 2015).

Where meta-analyses typically rely on the assumption that effect sizes are independent of each other, the current review includes multiple outcomes per study (Hox 2002; Lipsey & Wilson, 2001). To account for this, a robust variance estimation (RVE) approach was used. RVE allows for dependent effect sizes, and allows effect sizes to be nested within studies (Fisher & Tipton, 2015; Van den Noortgate & Onghena, 2003). RVE also allows for analyses of both within-cluster and between-cluster heterogeneity (Fisher et al., 2017).

If eligible studies reported correlation coefficients, this information was extracted. When studies did not include a correlation coefficient, all alternative statistics, including t-tests and betas, were converted into correlations using the Comprehensive Meta-Analysis program (CMA) (Borenstein et al., 2014) and the DeCoster's (2012) conversion spreadsheet (DeCoster, 2012). If studies provided effect sizes on specific subtypes of mentalization, effect sizes were either extracted or averaged together depending on which was most appropriate for that study (P. Fonagy, personal communication, March 10, 2022). For example, the most recent version of the Reflective Functioning Questionnaire (RFQ) comprises two subscales assessing certainty (RFQc) and uncertainty (RFQu). In the absence of an effect size representing total reflective functioning, the effect sizes representing the subscales were averaged for a total score and included in the review.

All correlation coefficients (*r*) were transformed into Fisher's *Z* statistics with respective standard errors using CMA (Borenstein et al., 2014), and then back into *r*'s for interpretation. Treating the correlation coefficient through the Fisher's *r* to *Z* conversion is the recommended practice as it corrects for problems with standard error and the distribution of the statistic at extremes (Lipsey and Wilson, 2001; van IJzendoorn et al., 2004). A positive effect size was recorded when childhood abuse was associated with lower levels of mentalization in

adulthood. Due to statistical power and risk of bias, moderator analyses required at least four studies per category for inclusion (Fisher & Tipton, 2015).

Statistical analyses were run on the statistical computing software R. The Robumeta R package was used to compute the overall multi-level effect size (Fisher & Tipton, 2015). The Metafor R package was used to assess for publication bias based on a random-effects model. The random-effects model allows for variation in effect sizes across studies and assumes that variation is a combination of subject-level sampling error and other random variability between studies (Borenstein et al., 2010; Rosenthal, 1995). The Metafor R package was also used for the moderator analyses, and to compute the general maltreatment-mentalization effect size (Viechtbauer, 2010).

Study number / Outcomes	Author, Year	N	Mean Age	Gender	Ethnicity	Abuse Measure	ME Measure	Effect size
4								
Sexual Abuse	Bermond et al. (2008)	273	*NA*	1	*NA*	Questionnaire on Sexual Abuse Characteristics	Bermond Vorst Alexithymia (BVAQ)	0.27
12								
Physical Abuse	Bottos & Nilsen (2014)	33	38.84	1	0.1	Childhood Experience of Care and Abuse Questionnaire (CECA.Q)	Reading The Mind in the Eyes Task (RMET)	0.01
Sexual Abuse	Bottos & Nilsen (2014)	19	38.84	1	0.1	Childhood Experience of Care and Abuse Questionnaire (CECA.Q)	Reading The Mind in the Eyes Task (RMET)	0.11
13								
Emotional Abuse	Brown et al. (2016)	339	19	0.46	0.28	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.12
Physical Abuse	Brown et al. (2016)	339	19	0.46	0.28	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.04
Sexual Abuse	Brown et al. (2016)	339	19	0.46	0.28	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.08
14								
Emotional Abuse	Brown et al. (2018)	500	19	0.5	0.28	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.13
Physical Abuse	Brown et al. (2018)	500	19	0.5	0.28	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.03
Sexual Abuse	Brown et al. (2018)	500	19	0.5	0.28	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.02
35								
Sexual Abuse	Gaher et al. (2015)	407	20.33	0.65	0.07	Child Abuse and Trauma Scale (CATS)	Toronto Alexithymia Scale (TAS-20)	0.23
52								
Emotional Abuse	Kapeleris & Paivio (2011)	187	22	0.74	0.33	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.39
Physical Abuse	Kapeleris & Paivio (2011)	187	22	0.74	0.33	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.34
Sexual Abuse	Kapeleris & Paivio (2011)	187	22	0.74	0.33	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.24
53								
Emotional Abuse	Kaur & Mearns (2021)	646	23.14	0.97	0.65	Computer Assisted Maltreatment Inventory (CAMI)	Toronto Alexithymia Scale (TAS-20)	0.46
Physical Abuse	Kaur & Mearns (2021)	646	23.14	0.97	0.65	Computer Assisted Maltreatment Inventory (CAMI)	Toronto Alexithymia Scale (TAS-20)	0.12
Sexual Abuse	Kaur & Mearns (2021)	646	23.14	0.97	0.65	Computer Assisted Maltreatment Inventory (CAMI)	Toronto Alexithymia Scale (TAS-20)	0.35
55								

Sexual Abuse	Koren-Karie & Getzler-Yosef (2019)	60	43.47	1	*NA*	Interview	Insightfulness Assessment (IA)	0.34
56								
Sexual Abuse	Liu et al. (2021)	1404	21	0.57	*NA*	The Childhood Sexual Abuse Questionnaire, a subscale of the Childhood Trauma Questionnaire – Short Form (CTQS-SF)	Toronto Alexithymia Scale (TAS-20)	0.23
57								
Emotional Abuse	Lloyd et al. (2021)	98	38.38	0.6	0.28	Childhood Trauma Questionnaire (CTQ-28)	Toronto Alexithymia Scale (TAS-20)	0.10
Physical Abuse	Lloyd et al. (2021)	98	38.38	0.6	0.28	Childhood Trauma Questionnaire (CTQ-28)	Toronto Alexithymia Scale (TAS-20)	0.03
Sexual Abuse	Lloyd et al. (2021)	98	38.38	0.6	0.28	Childhood Trauma Questionnaire (CTQ-28)	Toronto Alexithymia Scale (TAS-20)	0.27
58								
Sexual Abuse	Lutz-Zois et al. (2011)	1117	19	1	0.07	Childhood Sexual Experiences Scale	Toronto Alexithymia Scale (TAS-20)	0.11
63								
Emotional Abuse	Mazzeo & Espelage (2002)	406	19.1	1	0.18	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.19
Physical Abuse	Mazzeo & Espelage (2002)	406	19.1	1	0.18	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.11
64								
Emotional Abuse	Mazzeo et al. (2008)	412	19.59	1	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.13
Sexual Abuse	Mazzeo et al. (2008)	412	19.59	1	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	-0.01
64*								
Emotional Abuse	Mazzeo et al. (2008)	192	20.15	1	1	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.20
Physical Abuse	Mazzeo et al. (2008)	192	20.15	1	1	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.10
Sexual Abuse	Mazzeo et al. (2008)	192	20.15	1	1	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.05
69								
Emotional Abuse	Mohaupt & Duckert (2016)	36	36.2	0	0	Traumatic Events Checklist (TEC)	Linguistic Inquiry and Word Count (LIWC)	0.09
Physical Abuse	Mohaupt & Duckert (2016)	36	36.2	0	0	Traumatic Events Checklist (TEC)	Linguistic Inquiry and Word Count (LIWC)	0.35
Sexual Abuse	Mohaupt & Duckert (2016)	36	36.2	0	0	Traumatic Events Checklist (TEC)	Linguistic Inquiry and Word Count (LIWC)	0.05
70								

Emotional Abuse	Morie et al. (2020)	57	22.85	0.46	0.8	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.27
Physical Abuse	Morie et al. (2020)	57	22.85	0.46	0.8	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.19
Sexual Abuse	Morie et al. (2020)	57	22.85	0.46	0.8	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.25
72								
Abuse	Mullet et al. (2021)	1178	19.76	1	0.19	Early Trauma Inventory Self-report Short Form (ETISR-SF)	Toronto Alexithymia Scale (TAS)	0.19
78								
Emotional Abuse	Paivio & McCulloch (2004)	100	21	1	NA	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.47
Physical Abuse	Paivio & McCulloch (2004)	100	21	1	NA	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.40
Sexual Abuse	Paivio & McCulloch (2004)	100	21	1	NA	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.16
80								
Emotional Abuse	San Cristobal et al. (2017)	124	29.69	1	NA	Childhood Trauma Questionnaire (CTQ)	The Parental Reflective Functioning Questionnaire (PRFQ)	0.04
Physical Abuse	San Cristobal et al. (2017)	124	29.69	1	NA	Childhood Trauma Questionnaire (CTQ)	The Parental Reflective Functioning Questionnaire (PRFQ)	0.05
83								
Emotional Abuse	Schwarzer et al. (2021)	214	23.01	0.79	NA	Childhood Trauma Questionnaire (CTQ)	The Reflective Functioning Questionnaire (RFQ) – Short Version	0.18
86								
Physical Abuse	Swannell et al. (2012)	4320	52.11	0	NA	Childhood Trauma Questionnaire (CTQ)	One item from the Toronto Alexithymia Scale (TAS)	0.03
86*								
Physical Abuse	Swannell et al. (2012)	7103	52.11	1	NA	Childhood Trauma Questionnaire (CTQ)	One item from the Toronto Alexithymia Scale (TAS)	0.07
87								
Abuse	Terock et al. (2018)	5283	53.5	0.52	0	The Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) - German Version	0.15
88								
Abuse	Terock et al. (2020)	1916	55	0.53	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.06
Emotional Abuse	Terock et al. (2020)	1916	55	0.53	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.06
Physical Abuse	Terock et al. (2020)	1916	55	0.53	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.04

Sexual Abuse	Terock et al. (2020)	1916	55	0.53	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.03
88*								
Abuse	Terock et al. (2020)	3658	51	0.51	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.10
Emotional Abuse	Terock et al. (2020)	3658	51	0.51	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.11
Physical Abuse	Terock et al. (2020)	3658	51	0.51	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.06
Sexual Abuse	Terock et al. (2020)	3658	51	0.51	0	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20) German Version	0.05
91								
Emotional Abuse	Turgeon (2020)	63	32	1	0.2	The French brief screening version of the Childhood Trauma Questionnaire (CTQ)	Computerized task resembling the Facial Expression Megamix Task	0.17
Physical Abuse	Turgeon (2020)	63	32	1	0.2	The French brief screening version of the Childhood Trauma Questionnaire (CTQ)	Computerized task resembling the Facial Expression Megamix Task	0.19
Sexual Abuse	Turgeon (2020)	63	32	1	0.2	The French brief screening version of the Childhood Trauma Questionnaire (CTQ)	Computerized task resembling the Facial Expression Megamix Task	0.17
93								
Sexual Abuse	Watson et al. (2013)	556	20.22	1	*NA*	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.09

Table 1. *Characteristics of studies identified for primary meta-analysis studying childhood abuse and adult mentalization. 57 outcomes reviewed across 27 studies are included.*

* = Studies that have been included twice due to two separate samples with separate effect sizes, N = Sample Size, Mean Age = Age of participant during reporting in years, Gender = Proportion of sample female, Ethnicity = Proportion of sample from minority group, Abuse Measure = Measure of Abuse, ME Measure = Measure of Mentalization, Effect Size = Reported as Fishers Z Correlations, NA = Data is not published in the study.

Results

The first research question addressed whether childhood abuse was systematically related to mentalization in a general adult population, using a multilevel analysis. The literature search yielded 57 outcomes across 27 studies, summarized in Table 1, and included a total of 52,801 independent observations (n=52,801). It should be noted that, as this was conducted as a multilevel analysis, participants were frequently observed more than once, in multiple outcomes. For example, a single participant may have simultaneously experienced both physical and emotional abuse, and will therefore be counted as two observations. This relatively large sample size therefore does not reflect the number of independent participants but rather the number of independent observations. The dependency this creates in the data is accounted for in the multilevel meta-analytic model. Moreover, three studies were counted twice in the analysis as they each included two separate samples.

The second research question evaluated subtypes of abuse as moderators of the relationship between childhood abuse and adult mentalization. Following this, a series of moderator variables were analyzed to explore whether key sample characteristics were associated with variation in the abuse-to-mentalization association. These included participant ethnicity, participant age, and participant gender.

The third research question evaluated whether general childhood maltreatment was related to mentalization in a general adult population. This literature search yielded a total of 24 studies which are summarized in Table 2, and included a total of 7,982 participants (n=7,982). Here, the n represents a total number of distinct participants, as opposed to a total number of distinct observations, where no single participant was counted more than once. The meta-analytic effect sizes concerning childhood abuse and general childhood maltreatment on future mentalizing abilities were then compared. A final moderator analysis, looking at measures of mentalization, is considered in the context of general childhood maltreatment and adult mentalization.

Overall Multilevel Effect Size

Aggregation of the 57 outcomes across 27 studies (*n*=52,801) yielded a weighted average correlation of r =.14, *t*(26) = 6.12, *p* < *.0*, 95% CI[.09, .19] (see *Figure 1.2* for forest plot). This weighted average correlation converts to a small effect size (Cohen, 1992).

Homogeneity analyses were also conducted to ascertain whether the 57 effect sizes included in the weighted average effect size all estimate the same population effect size. The homogeneity estimate (*Q*-within) follows a chi-square distribution and examined the variation in effect sizes expected as a result of sampling error. The Cochran's (*Q*-between) test for the effect sizes indicated between-outcome heterogeneity, comparing abused and non-abused groups, for mentalization was Q (56) = 376.48, *p* <.0001. The I^2 statistic, which represents the proportion of the variation in the observed effects that reflect variation in true effects rather than sampling error, indicated high heterogeneity across studies, I^2 = 85.1% (Higgins & Thompson, 2002; Higgins et al., 2003). A planned moderator analysis was therefore conducted to further understand possible reasons behind the high heterogeneity and the variation in effect sizes.
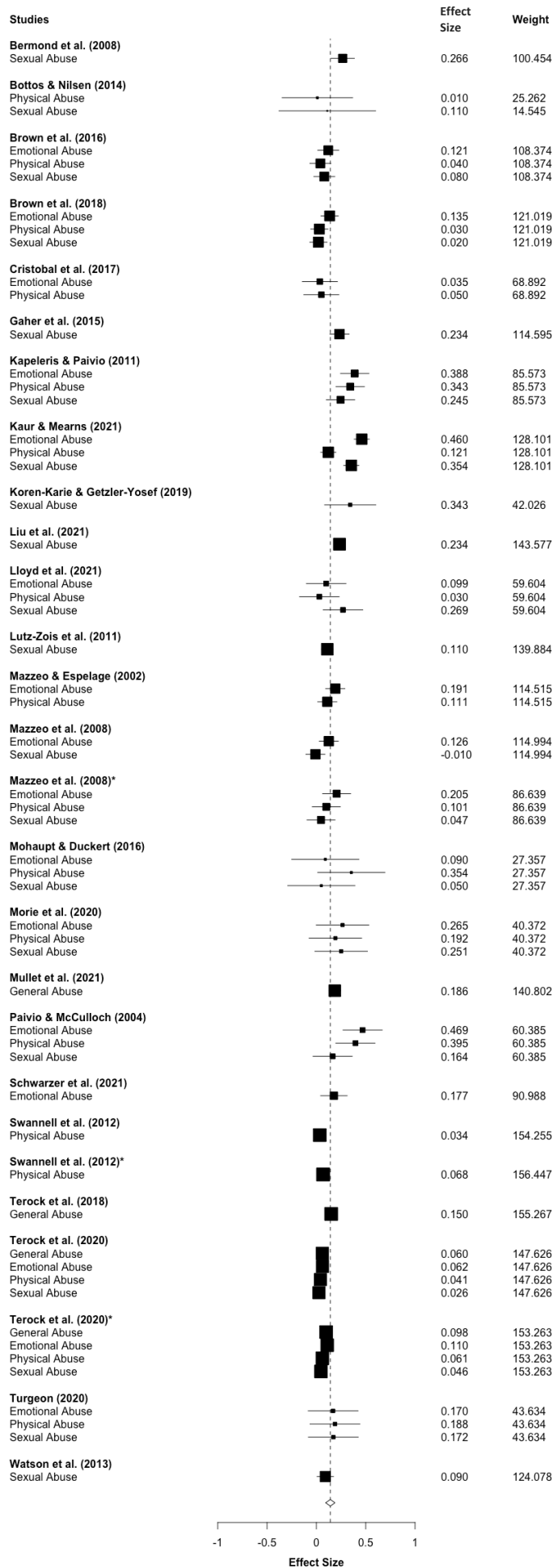
Forest Plot

Studies	Effect Size	Weight
Bermond et al. (2008)		
Sexual Abuse	0.266	100.454
Bottos & Nilsen (2014)		
Physical Abuse	0.010	25.262
Sexual Abuse	0.110	14.545
Brown et al. (2016)		
Emotional Abuse	0.121	108.374
Physical Abuse	0.040	108.374
Sexual Abuse	0.080	108.374
Brown et al. (2018)		
Emotional Abuse	0.135	121.019
Physical Abuse	0.030	121.019
Sexual Abuse	0.020	121.019
Cristobal et al. (2017)		
Emotional Abuse	0.035	68.892
Physical Abuse	0.050	68.892
Gaher et al. (2015)		
Sexual Abuse	0.234	114.595
Kapeleris & Paivio (2011)		
Emotional Abuse	0.388	85.573
Physical Abuse	0.343	85.573
Sexual Abuse	0.245	85.573
Kaur & Mearns (2021)		
Emotional Abuse	0.460	128.101
Physical Abuse	0.121	128.101
Sexual Abuse	0.354	128.101
Koren-Karie & Getzler-Yosef (2019)		
Sexual Abuse	0.343	42.026
Liu et al. (2021)		
Sexual Abuse	0.234	143.577
Lloyd et al. (2021)		
Emotional Abuse	0.099	59.604
Physical Abuse	0.030	59.604
Sexual Abuse	0.269	59.604
Lutz-Zois et al. (2011)		
Sexual Abuse	0.110	139.884
Mazzeo & Espelage (2002)		
Emotional Abuse	0.191	114.515
Physical Abuse	0.111	114.515
Mazzeo et al. (2008)		
Emotional Abuse	0.126	114.994
Sexual Abuse	-0.010	114.994
Mazzeo et al. (2008)*		
Emotional Abuse	0.205	86.639
Physical Abuse	0.101	86.639
Sexual Abuse	0.047	86.639
Mohaupt & Duckert (2016)		
Emotional Abuse	0.090	27.357
Physical Abuse	0.354	27.357
Sexual Abuse	0.050	27.357
Morie et al. (2020)		
Emotional Abuse	0.265	40.372
Physical Abuse	0.192	40.372
Sexual Abuse	0.251	40.372
Mullet et al. (2021)		
General Abuse	0.186	140.802
Paivio & McCulloch (2004)		
Emotional Abuse	0.469	60.385
Physical Abuse	0.395	60.385
Sexual Abuse	0.164	60.385
Schwarzer et al. (2021)		
Emotional Abuse	0.177	90.988
Swannell et al. (2012)		
Physical Abuse	0.034	154.255
Swannell et al. (2012)*		
Physical Abuse	0.068	156.447
Terock et al. (2018)		
General Abuse	0.150	155.267
Terock et al. (2020)		
General Abuse	0.060	147.626
Emotional Abuse	0.062	147.626
Physical Abuse	0.041	147.626
Sexual Abuse	0.026	147.626
Terock et al. (2020)*		
General Abuse	0.098	153.263
Emotional Abuse	0.110	153.263
Physical Abuse	0.061	153.263
Sexual Abuse	0.046	153.263
Turgeon (2020)		
Emotional Abuse	0.170	43.634
Physical Abuse	0.188	43.634
Sexual Abuse	0.172	43.634
Watson et al. (2013)		
Sexual Abuse	0.090	124.078

Effect Size

-1   -0.5   0   0.5   1

Figure 2. *A forest plot of effect sizes and confidence intervals for each outcome across all studies included in the primary meta-analysis, examining childhood abuse and mentalization in adulthood. * = studies that have been included twice due to two separate samples with separate effect sizes.*

Bias of Effect Size

Egger's regression test (Egger et al., 1998) was conducted using a random-effects model to examine whether the effect sizes included in the meta-analysis displayed a "small sample" bias. Effect sizes are plotted against a measure of precision (i.e. standard error) to determine if studies with small effect sizes are systematically underrepresented (i.e. in the case of an asymmetric funnel plot). Results indicated that among the studies eligible for review, smaller studies reported larger effect sizes than larger studies, $t(55) = 2.97$, $p = .004$ (see *Figure 1.3*). This is indicative of publication bias.

In addition, Duval and Tweedie's (2000) trim and fill procedure, a nonparametric approach, was conducted to examine how many hypothetical, non-published effect sizes were missing from the meta-analysis. Results indicated that 16 negative effect sizes were missing. This is an indication of publication bias. However, a fail-safe *N* analysis (Rosenthal, 1979) indicated that 10,328 additional effect sizes would be required to attribute the entirety of the effect size to publication bias. Thus, despite the clear evidence of publication bias, it is unlikely that the observed significant effects of the meta-analysis are solely a consequence of publication bias. Yet caution should be taken when interpreting the magnitude of the effect sizes. An adjusted average effect size accounting for the 16 missing outcomes was obtained, r =.09, *t* = 4.16, *p < .0001*, 95% CI[.05, .13].
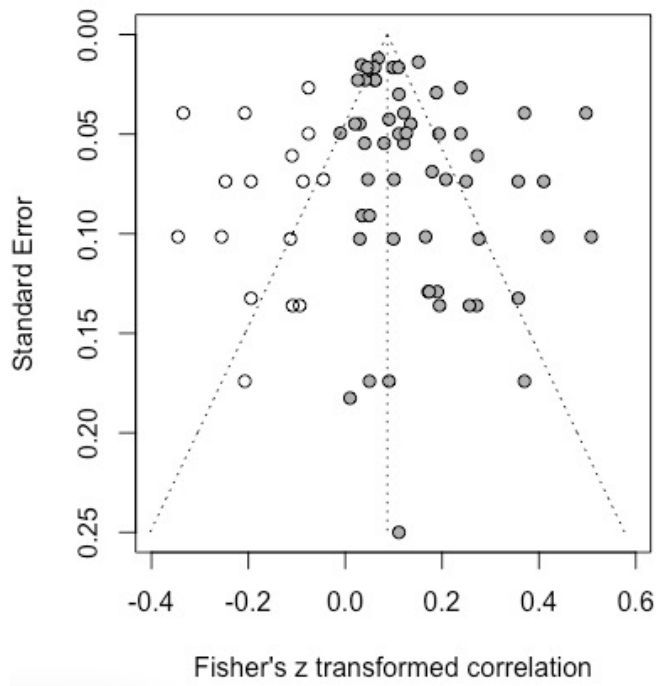
Figure 3. *A funnel plot to explore publication bias, with "filled" studies (in white) to show theoretically missing studies.*

Multivariate Moderator Analysis : Types of Abuse

To address hypothesis two, a multilevel analysis was conducted to examine whether specific types of childhood abuse were more detrimental than others to mentalization in adulthood. A hierarchal nested model was used. When the intercept was introduced into the model, there was no significant correlation between each type of abuse and mentalization. However, when the intercept was removed from the model, each subtype of abuse was significantly correlated with mentalization. When general abuse was tested as a moderator, it significantly moderated the relationship between childhood abuse and mentalization, r = .12, *t*(53)=2.50, *p* =.02, 95% CI[.02, .22]. Emotional abuse significantly moderated the relationship between childhood abuse and mentalization, r = .19, *t*(53)=6.36, *p* <.0001, 95% CI[.13, .25]. Physical abuse significantly moderated the relationship between childhood abuse and mentalization, r = .11, *t*(53)=3.66, *p*=.0006, 95% CI[.05, .17]. Sexual abuse significantly moderated the relationship between childhood abuse and mentalization, r = .15, *t*(53)=5.45, *p*<.0001, 95% CI[.09, .20]. Overall, results indicate that emotional abuse is the strongest predictor of worse mentalization in adulthood, followed by sexual abuse, and then physical abuse.

Abuse and Mentalization: Moderator Analysis

To address hypothesis 3, and explain the heterogeneity in correlations, a random-effects model was used to identify possible moderators of the correlation between childhood abuse and adult mentalization. Analyses examined the effects of three continuous moderators, including participant ethnicity, mean age, and gender, on the association between childhood abuse and mentalization using meta-regression. All continuous variables were centred around their mean.

Ethnicity.

The moderating effect of ethnicity on the association between childhood abuse and mentalization was assessed. Ethnicity was defined as the proportion of minority participants

in the sample. The results showed that ethnicity was a significant moderator of the association between abuse and mentalizing (F = 6.89, p = .011). The meta-analytic regression coefficient of ethnicity was .15 (95%CI .04, .26), indicating that effect sizes were smaller in groups with lower proportions of ethnic minority participants.

Age.

The moderating effect of age on the association between childhood abuse and mentalization was assessed. The results showed that age was a significant moderator of the association between abuse and mentalizing (F = 7.73, p = .007). The meta-analytic regression coefficient of age was -.003 (95%CI -.005, -.008), indicating that effect sizes were smaller in groups with older average age.

Gender.

The moderating effect of gender on the association between childhood abuse and mentalization was assessed. Gender was defined as the proportion of female participants in the sample. The results showed that gender was a significant moderator of the association between abuse and mentalizing (F = 5.49, p = .023). The meta-analytic regression coefficient of gender was .13 (95%CI .020, .24), indicating that effect sizes were smaller in groups with lower proportions of female participants.

Overall Average Study Level Effect Size for General Maltreatment

Aggregation of the 18 studies that examined general maltreatment (n = 7,982) yielded a weighted average correlation of r=.17, t=3.57, p=.002, 95%CI[.07, .27]. This weighted average correlation converts to a small effect size (Cohen, 1988).

Although the effect sizes indicate a stronger observed relationship between general childhood maltreatment and mentalization than that of childhood abuse and mentalization, the confidence intervals do not indicate a reliable difference.
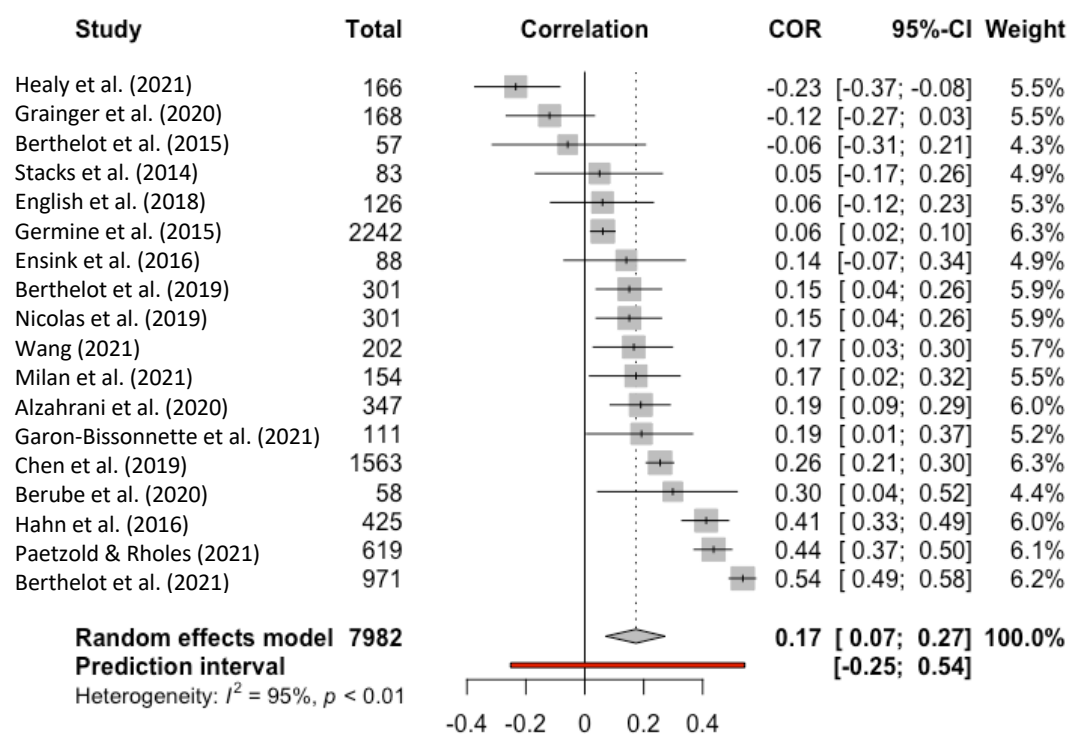
Figure 4. *A forest plot of effect sizes and confidence intervals for each study included in the secondary meta-analysis, studying general childhood maltreatment and mentalization in adulthood.*

Study number	Author, Year	N	CM Measure	ME Measure	Effect Size
1	Alzahrani et al. (2020)	347	Interview	Toronto Alexithymia Scale (TAS-20)	0.19
5	Berthelot et al. (2015)	57	Childhood Experience of Care and Abuse (CECA)	Reflective-Functioning Manual for Application to Adult Attachment Interviews	-5.81E-02
6	Berthelot et al. (2019)	301	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ)	0.15
7	Berthelot et al. (2022)	971	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ-8) – Short Form	0.54
8	Berube et al. (2020)	58	Childhood Trauma Questionnaire (CTQ)	A method similar to the Facial Expression Megamix Task	0.30
15	Chen et al. (2020)	1563	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)	0.26
24	English et al. (2018)	126	Childhood Trauma Questionnaire (CTQ)	Emotional Faces Task	0.06
26	Ensink et al. (2016)	88	Telephone interview and Adult Attachment Interview (AAI)	Reflective-Functioning Manual for Application to Adult Attachment Interviews	0.14
37	Garon-Bissonnette et al. (2022)	111	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ)	0.01
38	Germine et al. (2015)	2242	TestMyBrain Childhood Experiences Questionnaire	Reading the Mind in the Eye Task (RMET)	0.06

37

39	Grainger et al. (2020)	168	Childhood Trauma Questionnaire (CTQ)	Reading the Mind in the Eye Task (RMET)	-0.12
41	Hahn et al. (2016)	425	The Child Abuse and Trauma Scale (CATS)	Toronto Alexithymia Scale (TAS-20)	0.41
43	Healy et al. (2021)	166	Childhood Trauma Questionnaire (CTQ)	Reading the mind in the Eye (RMET)	-0.23
66	Milan et al. (2021)	154	Childhood Trauma Questionnaire (CTQ)	Linguistic Inquiry and Word Count (LIWC)	0.17
76	Nicolas et al. (2019)	301	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ)	0.15
77	Paetzold & Rholes (2021)	619	The Child Trauma Screening Questionnaire (CTSQ)	Reflective Functioning Questionnaire (RFQ)	0.444
84	Stacks et al. (2014)	83	Childhood Trauma Questionnaire (CTQ)	Parent Development Interview-Revised Short Form (PDI-R2-S)	0.05
92	Wang (2021)	202	Adverse Childhood Experiences Questionnaire (ACEs)	Parental Reflective Functioning Questionnaire (PRFQ)	0.17

Table 2. *Characteristics of studies included in the secondary meta-analysis studying general childhood maltreatment and adult mentalization. All outcomes measure general childhood maltreatment. 18 studies were included. N = Sample Size. CM Measure = Measure of Childhood Maltreatment. ME Measure = Measure of Mentalization. Effect Size = Reported as Fisher's Z Correlations.*

General Maltreatment and Mentalization: Moderator analysis

In order to explore whether specific dimensions of mentalization were more impacted by childhood maltreatment, a separate random-effects analysis was conducted using dimensions of mentalization (i.e., alexithymia and reflective functioning), operationalized as measures of mentalization, as categorical moderators. 12 studies were included in this analysis. Results indicated that the measure of mentalization did not moderate the effect of general maltreatment on mentalization $F(1,10)=0.35$, $p = 0.57$.

Discussion

So far, there has been no published meta-analytic review that considers mentalization as a multi-dimensional construct in its relationship to childhood maltreatment. There has also been no published meta-analytic research distinguishing subtypes of maltreatment and effects on mentalization. The current analysis seeks to fill that gap.

The findings from our meta-analysis clearly corroborate the main hypothesis that childhood abuse does lead to significant deficits in overall mentalization abilities in adulthood. The average multilevel effect size, aggregating 57 outcomes across 27 studies, revealed an overall r value of .14. In a recent meta-analysis conducted by Khan and Jaffee on alexithymia in individuals maltreated as children and adolescents (Khan & Jaffee, 2022), an effect size of r=.22 was found and interpreted as small and statistically significant, and the authors indicate that, clinically, the results warrant a need to assess whether individuals with maltreatment present with elevated levels of alexithymia. Considering this a domain-specific benchmark, a similar argument can be made in the context of this analysis. Clinical implications extend to methods of assessment and formulation for individuals with a history of childhood abuse, and warrant a need to consider mentalization as a multidimensional and transdiagnostic construct. Future research may further explore clinically meaningful interpretations in this context.

The significance of these findings can add to a growing body of work studying risk and resilience for this vulnerable population. For example, mentalization difficulties appear to play an important role in interpersonal relationships and attachment-related problems (Fonagy & Target, 1997), in intergenerational cycles of abuse (Busman et al., 2020; van IJzendoorn et al., 2020), and in the development of psychopathologies such as borderline personality disorder (Bateman, 2010), depression (Allen, 2003), anxiety (Nolte et al., 2011), and antisocial and socially offending behaviour (Fonagy et al., 2020). It has been broadly noted in previous research that most mental health difficulties will involve some difficulties in mentalization (Bateman and Fonagy, 2010). Although neglect and abuse often co-occur (Trickett & McBride-Chang, 1995), it is suggested that the distinct experiences and related neural outcomes may

differ (Sheridan & McLaughlin, 2014), and this research intends to highlight these complexities in the broader conversation.

Although we can conclude from this meta-analysis that childhood abuse is a robust predictor of worse mentalization in adulthood, the strong heterogeneity in effect sizes across studies prompted a moderator analysis to provide a fuller picture. Firstly, subtypes of abuse were explored. Results indicated that the type of abuse did significantly moderate the relationship, where emotional abuse was the most detrimental to mentalization, followed by sexual abuse and then physical abuse. This finding supports previous research which shows differences in types of abuse and outcomes in the perception of emotions in others (Berube, 2021; Pollak, 2008; Turgeon, 2020). However, caution must be taken when interpreting these results. Although a multilevel approach was taken to account for and distinguish the outcomes of specific types of abuse, this meant that participants were considered concurrently across multiple outcomes. For example, a single participant may have simultaneously experienced physical and emotional abuse and would have therefore been considered as part of both groups. Previous research shows that subtypes of abuse routinely co-occur with each other, and with other early traumas in unique ways for different children (Trickett & McBride-Chang, 1995). It is therefore unlikely or impossible to isolate independent subtypes. This not only confuses the process of determining which subtype is driving the effect, but also suggests that a compounding effect may be taking place, where the number of types of abuse experienced by any single participant may be a stronger predictor than the subtype itself. Future research may also seek to control for other early traumas that routinely occur alongside the subtypes of abuse included in this study, for example children who witness violence in the home, as evidence shows this can have profound effects on children's emotional capabilities (DeJonghe et al., 2011). It should also be noted that, although standardized definitions and gold standard measures of subtypes of abuse have developed with substantial validity in the field, emotional abuse can be experienced as less explicit than other types of abuse and therefore remains more difficult to evaluate (Benarous et al., 2015).

Ethnicity was also evaluated as a moderator of the relationship, looking specifically at the percentage of minority participants in the sample. Results indicated that the association between childhood abuse and mentalizing was larger in ethnic minority samples than majority samples. However, many other factors have been shown to correlate with ethnic minority status, particularly socioeconomic status and relative disadvantage, which may independently impact how people process and navigate their social worlds and related abilities in mentalization (Muscatell et al., 2012). Future research may look to further explore the pathways that drive this effect.

Moreover, results from a previous meta-analysis conducted by Elfenbein and Ambady (2002) studying the effects of culture on emotional recognition show an in-group advantage, where emotional recognition accuracy is higher when emotions are both expressed and perceived by members of the same ethnic group (Elfenbein & Ambady, 2002). Where the measure allows, further details on the ethnicities of all participants included in tasks may be coded and incorporated into the analysis to either support or rebuff this hypothesis as an explanation of the effect.

Additionally, participant age at the time of reporting was evaluated as a moderator of the relationship between childhood abuse and adult mentalization. Results indicated that younger participants show greater effects of childhood abuse on mentalizing abilities. Although the effect is small and explains a negligible degree of variability in the outcome, previous research on the fluidity of attachment systems over time corroborates these results. A relevant hypothesis is that while early attachment relationships may give way to deficits in mentalization, attachment does not necessarily remain static over time (Fearon & Roisman, 2017). As mentalization abilities are born out of the social matrix of attachment relationships (Jewell et al., 2016), the development of secure attachment patterns in adulthood may heal or improve what may begin as a fractured mentalization capability. Furthermore, existing research on mentalization-based interventions can also support the notion that the introduction of secure attachment systems later in life may hold the ability to correct or rebuild

deficits in mentalization, that may have once been rooted in early maltreatment (Vogt & Norman, 2019).

Finally, gender was evaluated as a moderator of the relationship, looking specifically at the percentage of female participants in the sample. Results indicated the association between childhood abuse and mentalizing was larger in samples with a higher proportion female. Previous research supports this finding; most recently, Khan and Jaffee's meta-analysis (2022) similarly shows bigger effect sizes in samples with a higher female proportion when looking at the relationship between childhood maltreatment and alexithymia (Khan & Jaffee, 2022).

The secondary meta-analysis reveals that general maltreatment had also had a small yet significant effect on mentalization. When comparing the two, the effect sizes suggest that general childhood maltreatment is a stronger predictor of worse mentalization in adulthood then the subtype of childhood abuse, however, the confidence intervals indicate that no reliable difference can be interpreted. A bulk of previous research in the field has focused on the term 'adverse childhood experiences' (ACES), and their effects on development outcomes. Within this, a wide range of negative childhood experiences have been explored in relation to impacts on later cognitive, educational, and mental health outcomes. In the seminal ACES study conducted by Felitti et al between 1995 and 1997 (Felitti et al., 1998), a compounding effect of ACES on physical and mental health outcomes was shown. This is to say that the more ACES that were reported, the worse the physical and mental health outcomes. This framework therefore supports the hypothesis that general maltreatment is more likely to involve the compounding effect of multiple subtypes of maltreatment, and therefore produce a larger effect than the singular effect of childhood abuse. However, in light of the confidence intervals indicated, further research is required to compare and establish any differences in these effects.

Finally, the moderator analysis conducted on the secondary meta-analysis looked to explore whether the measures of mentalization, and by proxy, distinct dimensions of mentalization referenced in the introduction above, are impacted differently by general

childhood maltreatment. This analysis specifically compared the effects of childhood maltreatment on alexithymia versus reflective functioning. Results indicated that while both alexithymia and reflective functioning were significantly impacted by childhood maltreatment, neither construct was significantly more impacted than the other. We can therefore conclude that, at the very least, general childhood maltreatment concurrently impacts neural mechanisms that tap into an internal and controlled self-mentalizing ability (Alexithymia), *and* a controlled mentalizing ability that is both internal and external, both self and other, and both cognitive and affective (Reflective Functioning) (Luyten et al., 2019). Further meta-analytic research may seek to include other operationalizations of mentalization in this analysis to obtain a fuller picture, in addition to examining the measure of mentalization as a moderating variable in the relationships between childhood abuse, childhood neglect, and mentalization.

Key limitations of research

While this meta-analysis contributes to understanding the relationship between childhood abuse and mentalization in adulthood, results should be interpreted in light of the following limitations.

Firstly, this study presents a bias towards one specific measure of mentalization across studies. Where a wide net was cast with the intention of using a multimethod assessment approach that taps into all eight neural dimensions of mentalization (Luyten et al., 2019), a high proportion of papers eligible for review used alexithymia as a measure of mentalization, and within this sample, the majority used the Toronto Alexithymia Scale (TAS) as an assessment tool. Therefore, the results of this study speak mainly to a representation of mentalization that is polarized towards the internal, the self, and the controlled (Luyten et al., 2019). Future research may address this bias by expanding the search to include more narrative based measures that may enable a more comprehensive and diverse analysis of distinct dimensions of mentalization.

Secondly, the Duval and Tweedie trim and fill procedure provided evidence of publication bias, indicating that there were 16 missing effect sizes from the meta-analysis.

This is a potential source of Type 1 error and may be a result of only having included published literature in the search. Future research may therefore consider the inclusion of unpublished literature by expanding the search to include theses and dissertations, and by contacting researchers to retrieve unpublished data (Joober et al., 2012). Nevertheless, the fail-safe N analysis indicated that an additional 10,328 additional studies would be required to attribute the entirety of the effect size to publication bias, and to render the results of this analysis non-significant. It is therefore possible to conclude that while the effect size may be more modest in reality than what is presented, it is still indicative of a significant relationship.

A high level of heterogeneity was also indicated in the current meta-analysis, likely due to the wide variation in characteristics, methods, and measures used across studies. A nested model and random-effects were used to increase generalisability to the population. Compared with a fixed-effects model, which only allows for inferences pertaining to the sample of effect sizes used, a random-effects model allows for unconditional inferences about the population studied, and is therefore more appropriate when there is a high level of heterogeneity in the sample of effect sizes (Hedges & Vevea, 1998). A planned moderator analysis was also used to explore and make sense of the high variability in effect sizes.

Another key limitation is that this study is largely made up of cross-sectional studies and therefore retrospective reports of abuse. This means that extraneous variables, such as trauma following a history of abuse for example, may have not been measured and may bias the results. This is particularly true as children who experience early maltreatment are more vulnerable to adversity in the developmental trajectory. For example, children who experience early abuse are more likely to become victims of bullying in early adolescence (Shakoor et al., 2012), and children with weaker cognitive theory of mind abilities may be more likely to be involved in intra-familial abuse (Shakoor et al., 2012). The retrospective nature of the self-reports may also lead people to overestimate or underestimate the details of their experiences. Due to the vast range of possible confounds, direct causation between childhood abuse and mentalization in adulthood cannot be inferred, and more longitudinal studies would be useful to infer a more meaningful conclusion.

In addition, while we were able to explore the complexities of the relationship between childhood abuse and adult mentalization through several continuous moderators, due to inconclusive data across studies we were not able to look at other highly relevant factors which may contribute to a more definitive picture of the relationship. For example, a child's experience of abuse can vary in several ways, including the severity of abuse, chronicity of abuse, type of perpetrator, frequency of abuse, or age of onset, all of which can impact the development of social understanding (Manly et al., 2001). Future research may seek to examine these factors to better understand the complexities of this relationship. It also should be reiterated that while a multilevel approach was adopted to account for the multiple subtypes of abuse as distinct outcomes in each study, many participants were counted across multiple groups, thus confounding the results.

A final key limitation of this research is the exclusion of a clinical population. Previous research has shown that childhood abuse tends to increase vulnerability to psychiatric comorbidities (Benarous et al., 2015; Blair et al., 2006; Dvir, 2014) and that psychiatric disorders are correlated with altered social cognition (Cusi, 2012) and biases in emotion processing (Suzuki et al., 2015; Veague & Hooley, 2014). Therefore, to consider the effects of childhood abuse on adult mentalization in the absence of a clinical sample is to only consider part of the puzzle, and caution should be taken when considering the results in the absence of psychopathology. However, as a counter to this limitation, a study on childhood physical abuse and attentional biases to angry faces conducted by Johnson et al (2010) found that biases in emotional processing were significant even after controlling for participants previous and current mental illness (Johnson et al., 2010).

Closing Remarks and Future Directions

The current meta-analysis provides evidence that difficulties in adult mentalization are at least partly rooted in early childhood abuse and / or general childhood maltreatment, and therefore limited access to attachment relationships that foster an ability to learn about one's own mind or the mind of another (Midgley & Vrouva, 2012). In England and Wales, one in five

adults (8.5 million people) aged 18 to 74 years have reported experiencing at least one form of child abuse before the age of 16 (Office For National Statistics, 2020). Furthermore, recent statistics published by the NSPCC show that conditions caused by the coronavirus pandemic have increased the vulnerability of children to abuse in the home (Romanou & Belton, 2020). These effects are not limited to the UK, but are global (Katz et al., 2021). The findings of this study infer a growing and imperative need for early intervention and treatment, with a focus on rebuilding capacities for mentalization. The current research indicates a need to consider mentalization as a transdiagnostic concept, that is relevant in the development of various psychopathologies, but also general self-esteem, resiliency and well-being (Ballespi, 2018).

Furthermore, there is no "one size fits all" model of intervention, and a continued effort must be made to understand the diversity in the legacies left by subtypes of early abuse on mentalization abilities. Future research may look to compare the meta-analytic effects of childhood abuse and neglect on specific dimensions of mentalization to pave way for nuances in treatment recommendations. Future research may also consider expanding this analysis to include literature on a clinical population. A more holistic understanding of underlying risks and latent vulnerabilities to disrupted mentalizing will continue to lay the groundwork for a transdiagnostic approach in assessment, formulation and intervention.

References

References marked with an asterisk (*) indicate studies included in the primary meta-analysis (childhood abuse and mentalization in adulthood). References marked with two asterisks (**) indicate studies included in the secondary meta-analysis (general childhood maltreatment and mentalization).

Alqadri, Y. (2022). Unpublished thesis.

Allen, J. G. (2001). *Traumatic relationships and serious mental disorders*. John Wiley & Sons Ltd.

Allen, J. G., Bleiberg, E., & Haslam-Hopwood, T. (2003). Mentalizing as a compass for treatment. *Bulletin of the Menninger Clinic*, *67*(1), 1-4.

Allen, J. G., & Fonagy, P. (Eds.). (2006). *The handbook of mentalization-based treatment.* John Wiley & Sons Inc.

**Alzahrani, S. H., Coumaravelou, S., Mahmoud, I., Beshawri, J., & Algethami, M. (2020). Prevalence of alexithymia and associated factors among medical students at King Abdulaziz University: a cross-sectional study. Annals of Saudi Medicine, 40(1), 55-62.

Ballespí, S., Vives, J., Debbané, M., Sharp, C., & Barrantes-Vidal, N. (2018). Beyond diagnosis: Mentalization and mental health from a transdiagnostic point of view in adolescents from non-clinical population. *Psychiatry research*, *270*, 755–763.

Bateman, A., & Fonagy, P. (2010). Mentalization based treatment for borderline personality disorder. *World psychiatry : official journal of the World Psychiatric Association (WPA)*, *9*(1), 11–15.

Bateman, A. W., & Fonagy, P. (Eds.). (2019). Handbook of Mentalizing in Mental Health Practice (2nd ed.). American Psychiatric Publishing, Inc.

Benarous, X., Guilé, 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.

*Bermond, B., Moormann, P. P., Albach, F., & van Dijke, A. (2008). Impact of severe childhood sexual abuse on the development of alexithymia in adulthood. Psychotherapy and psychosomatics, 77(4), 260–262.

**Berthelot, N., Ensink, K., Bernazzani, O., Normandin, L., Luyten, P., & Fonagy, P. (2015). Intergenerational transmission of attachment in abused and neglected mothers: The role of trauma-specific reflective functioning. Infant mental health journal, 36(2), 200-212.

**Berthelot, N., Lemieux, R., Garon-Bissonnette, J., Lacharité, C., & Muzik, M. (2019). The protective role of mentalizing: Reflective functioning as a mediator between child maltreatment, psychopathology and parental attitude in expecting parents. Child abuse & neglect, 95, 104065.

**Berthelot, N., Savard, C., Lemieux, R., Garon-Bissonnette, J., Ensink, K., & Godbout, N. (2022). Development and validation of a self-report measure assessing failures in the mentalization of trauma and adverse relationships. Child Abuse & Neglect, 128, 105017.

**Bérubé, A., Blais, C., Fournier, A., Turgeon, J., Forget, H., Coutu, S., & Dubeau, D. (2020). Childhood maltreatment moderates the relationship between emotion recognition and maternal sensitive behaviors. Child Abuse & Neglect, 102, 104432.

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*, 15248380211029403. Advance online publication.

Blair, R. J. R., Peschardt, K. S., Budhani, S., Mitchell, D. G., & Pine, D. S. (2006). The development of psychopathy. Journal of child psychology and psychiatry, 47(3-4), 262-276.

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research synthesis methods*, *1*(2), 97–111.

Borenstein, M., Hedges, L.V., Higgins, J.P.T. & Rothstein, H.R. (2014). *Comprehensive meta-analysis: A computer program for research synthesis (Version 3).* Englewood, New Jersey, USA: Biostat.

*Bottos, S., & Nilsen, E. S. (2014). The cross-generational effects of maternal maltreatment histories: Implications for children's mentalizing development. *Child Abuse & Neglect*, *38*(6), 1094-1105.

Buisman, R., Pittner, K., Tollenaar, M. S., Lindenberg, J., van den Berg, L., Compier-de Block, L., van Ginkel, J. R., Alink, L., Bakermans-Kranenburg, M. J., Elzinga, B. M., & van IJzendoorn, M. H. (2020). Intergenerational transmission of child maltreatment using a multi-informant multi-generation family design. *PloS one*, *15*(3), e0225839.

*Brown, S., Fite, P. J., Stone, K., & Bortolato, M. (2016). Accounting for the associations between child maltreatment and internalizing problems: The role of alexithymia. Child abuse & neglect, 52, 20–28.

*Brown, S., Fite, P. J., Stone, K., Richey, A., & Bortolato, M. (2018). Associations between emotional abuse and neglect and dimensions of alexithymia: The moderating role of sex. Psychological trauma : theory, research, practice and policy, 10(3), 300–308.

**Chen, L., Ngoubene-Atioky, A. J., Zanardelli, G., Yuanping, D., & Yu, L. (2020). Childhood abuse and suicidal behaviors among Chinese migrant workers: the mediating role of alexithymia and social support. Archives of suicide research, 24(4), 633-647.

Cicchetti, D., Rogosch, F. A., Maughan, A., Toth, S. L., & Bruce, J. (2003). False belief understanding in maltreated children. *Development and Psychopathology, 15*(4), 1067–1091.

Cross, D., Fani, N., Powers, A., & Bradley, B. (2017). Neurobiological Development in the Context of Childhood Trauma. *Clinical psychology : a publication of the Division of Clinical Psychology of the American Psychological Association*, *24*(2), 111–124.

Curtis, W. J., & Cicchetti, D. (2011). Affective facial expression processing in young children who have experienced maltreatment during the first year of life: an event-related potential study. *Development and psychopathology*, *23*(2), 373–395.

Curtis, W. J., & Cicchetti, D. (2013). Affective facial expression processing in 15-month-old infants who have experienced maltreatment: an event-related potential study. *Child maltreatment*, *18*(3), 140–154.

Cusi, A. M., Nazarov, A., Holshausen, K., Macqueen, G. M., & McKinnon, M. C. (2012). Systematic review of the neural basis of social cognition in patients with mood disorders. Journal of psychiatry & neuroscience : JPN, 37(3), 154–169.

DeCoster, J. (2012) Spreadsheet for converting effect size measures. Available from: http://www.stat-help.com/spreadsheets/Converting%20effect%20sizes%202012-06-19.xls (accessed 01.02.2022).

DeJonghe, E. S., von Eye, A., Bogat, G. A., & Levendosky, A. A. (2011). Does witnessing intimate partner violence contribute to toddlers' internalizing and externalizing behaviors?. Applied Developmental Science, 15(3), 129-139.

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. J., & Tweedie, R. L. (2000a). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56,* 455–463.

Dvir, Y., Ford, J. D., Hill, M., & Frazier, J. A. (2014). Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities. Harvard review of psychiatry, 22(3), 149–161.

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1998). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal, 315,* 629–634.

Elfenbein, H. A., & Ambady, N. (2002). On the universality and cultural specificity of emotion recognition: a meta-analysis. Psychological bulletin, 128(2), 203.

**English, L. H., Wisener, M., & Bailey, H. N. (2018). Childhood emotional maltreatment, anxiety, attachment, and mindfulness: Associations with facial emotion recognition. Child abuse & neglect, 80, 146-160.

**Ensink, K., Normandin, L., Plamondon, A., Berthelot, N., & Fonagy, P. (2016). Intergenerational pathways from reflective functioning to infant attachment through parenting. Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 48(1), 9.

Fearon, R., & Roisman, G. I. (2017). Attachment theory: progress and future directions. Current opinion in psychology, 15, 131–136.

Fernyhough, C. (2008). Getting Vygotskian about theory of mind: Mediation, dialogue, and the development of social understanding. *Developmental Review, 28*(2), 225–262.

Fonagy, P. (1999). Psychoanalytic theory from the viewpoint of attachment theory and research. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 595–624).

Fonagy, P., Gergely, G., Jurist, E. L., & Target, M. (2002). *Affect regulation, mentalization, and the development of the self.* Other Press.

Fonagy, P., & Target, M. (1997). Attachment and reflective function: Their role in self-organization. *Development and Psychopathology, 9*(4), 679–700.

Fonagy, P., Yakeley, J., Gardner, T., Simes, E., McMurran, M., Moran, P., & Bateman, A. (2020). Mentalization for Offending Adult Males (MOAM): study protocol for a randomized controlled trial to evaluate mentalization-based treatment for antisocial personality disorder in male offenders on community probation. *Trials*, *21*(1), 1-17.

*Gaher, R. M., Arens, A. M., & Shishido, H. (2015). Alexithymia as a Mediator Between Childhood Maltreatment and Impulsivity. Stress and health : journal of the International Society for the Investigation of Stress, 31(4), 274–280.

**Garon-Bissonnette, J., Duguay, G., Lemieux, R., Dubois-Comtois, K., & Berthelot, N. (2022). Maternal childhood abuse and neglect predicts offspring development in early childhood: The roles of reflective functioning and child sex. Child Abuse & Neglect, 128, 105030.

Gergely, G., Fonagy, P., Jurist, E., & Target, M. (2002). Affect regulation, mentalization, and the development of the self. *International Journal of Psychoanalysis*, 77, 217-234.

**Germine, L., Dunn, E. C., McLaughlin, K. A., & Smoller, J. W. (2015). Childhood adversity is associated with adult theory of mind and social affiliation, but not face processing. PloS one, 10(6), e0129612.

**Grainger, S. A., Crawford, J. D., Kochan, N. A., Mather, K. A., Chander, R. J., Draper, B., ... & Henry, J. D. (2020). An investigation into early-life stress and cognitive function in older age. International Psychogeriatrics, 32(11), 1325-1329.

**Hahn, A. M., Simons, R. M., & Simons, J. S. (2016). Childhood maltreatment and sexual risk taking: the mediating role of alexithymia. Archives of sexual behavior, 45(1), 53-62.

**Healy, C. J., Lee, K. A., & D'Andrea, W. (2021). Using psychedelics with therapeutic intent is associated with lower shame and complex trauma symptoms in adults with histories of child maltreatment. Chronic Stress, 5, 24705470211029881.

Hedges, L. V., & Vevea, J. L. (1998). Fixed-and random-effects models in meta-analysis. Psychological methods, 3(4), 486.

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.

Fisher, Z., & Tipton, E. (2015). Robumeta: An R-package for robust variance estimation in meta-analysis. *arXiv preprint arXiv:1503.02220*.

Fisher, Z., Tipton, E., Zhipeng, H., & Fisher, M.Z. (2017). Package 'robumeta'.

Hox, J. (2002). *Multilevel analysis techniques and applications.* Lawrence Erlbaum Associates Publishers.

Jewell, T., Collyer, H., Gardner, T., Tchanturia, K., Simic, M., Fonagy, P., & Eisler, I. (2016). Attachment and mentalization and their association with child and adolescent eating pathology: A systematic review. International Journal of Eating Disorders, 49(4), 354-373.

Johnson, A. L., Gibb, B. E., & McGeary, J. (2010). Reports of childhood physical abuse, 5-HTTLPR genotype, and women's attentional biases for angry faces. Cognitive therapy and research, 34(4), 380-387.

Joober, R., Schmitz, N., Annable, L., & Boksa, P. (2012). Publication bias: what are the challenges and can they be overcome?. Journal of psychiatry & neuroscience : JPN, 37(3), 149–152.

*Kapeleris, A. R., & Paivio, S. C. (2011). Identity and emotional competence as mediators of the relation between childhood psychological maltreatment and adult love relationships. Journal of Aggression, Maltreatment & Trauma, 20(6), 617-635.

Katz, C., Priolo Filho, S. R., Korbin, J., Bérubé, A., Fouche, A., Haffejee, S., & Varela, N. (2021). Child maltreatment in the time of the COVID-19 pandemic: A proposed global framework on research, policy and practice. *Child Abuse & Neglect*, *116*, 104824.

*Kaur, K., & Mearns, J. (2021). Negative mood regulation expectancies moderate the effect of childhood maltreatment on compulsive buying. Journal of Clinical Psychology, 77(4), 1116-1130.

Khan, A. N., & Jaffee, S. R. (2022). Alexithymia in individuals maltreated as children and adolescents: a meta-analysis. *Journal of child psychology and psychiatry*.

Koizumi, M., & Takagishi, H. (2014). The relationship between child maltreatment and emotion recognition. *PloS one*, *9*(1), e86093.

*Koren-Karie, N., & Getzler-Yosef, R. (2019). Mothers' insightfulness regarding their children's inner world: associations with mothers' history of sexual abuse and lack of resolution of the trauma. Attachment & human development, 21(6), 582–596.

Leist, T., & Dadds, M. R. (2009). Adolescents' ability to read different emotional faces relates to their history of maltreatment and type of psychopathology. *Clinical child psychology and psychiatry*, *14*(2), 237–250.

Lieberman M. D. (2007). Social cognitive neuroscience: a review of core processes. *Annual review of psychology*, *58*, 259–289.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis.* Sage Publications, Inc.

*Liu, H., Wang, W., Yang, J., Guo, F., & Yin, Z. (2021). The effects of alexithymia, experiential avoidance, and childhood sexual abuse on non-suicidal self-injury and suicidal ideation among Chinese college students with a history of childhood sexual abuse. Journal of affective disorders, 282, 272–279.

*Lloyd, C. S., Stafford, E., McKinnon, M. C., Rabellino, D., D'Andrea, W., Densmore, M., & Lanius, R. A. (2021). Mapping alexithymia: Level of emotional awareness differentiates emotion-specific somatosensory maps. Child Abuse & Neglect, 113, 104919.

Luke, N., & Banerjee, R. (2013). Differentiated associations between childhood maltreatment experiences and social understanding: A meta-analysis and systematic review. *Developmental Review, 33*(1), 1–28.

*Lutz-Zois, C. J., Phelps, C. E. R., & Reichle, A. C. (2011). Affective, behavioral, and social-cognitive dysregulation as mechanisms for sexual abuse revictimization. Violence and Victims, 26(2), 159-176.

Luyten, P., Malcorps, S., Fonagy, P., & Ensink, K. (2019). Assessment of mentalizing. *Handbook of mentalizing in mental health practice*, 37-62.

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.

Maris, H. (2022). Unpublished thesis.

Masten, C. L., Guyer, A. E., Hodgdon, H. B., McClure, E. B., Charney, D. S., Ernst, M., Kaufman, J., Pine, D. S., & Monk, C. S. (2008). Recognition of facial emotions among maltreated children with high rates of post-traumatic stress disorder. *Child abuse & neglect*, *32*(1), 139–153.

*Mazzeo, S. E., & Espelage, D. L. (2002). Association between childhood physical and emotional abuse and disordered eating behaviors in female undergraduates: An investigation of the mediating role of alexithymia and depression. Journal of Counseling Psychology, 49(1), 86.

*Mazzeo, S. E., Mitchell, K. S., & Williams, L. J. (2008). Anxiety, alexithymia, and depression as mediators of the association between childhood abuse and eating disordered behavior in African American and European American women. Psychology of Women Quarterly, 32(3), 267-280.

Midgley, N., & Vrouva, I. (Eds.). (2012). *Minding the child: Mentalization-based interventions with children, young people and their families.* Routledge/Taylor & Francis Group.

**Milan, S., Carlone, C., & Dáu, A. L. B. (2021). Emotion socialization in mothers who experienced maltreatment: Mentalizing the past may help the present. Journal of family psychology, 35(6), 851.

*Mohaupt, H., & Duckert, F. (2016). Parental reflective functioning in fathers who use intimate partner violence: Findings from a Norwegian clinical sample. Nordic psychology, 68(4), 272-286.

*Morie, K. P., Zhai, Z. W., Potenza, M. N., & Mayes, L. C. (2020). Alexithymia, Emotion-Regulation Strategies, and Traumatic Experiences in Prenatally Cocaine-Exposed Young Adults. The American journal on addictions, 29(6), 492-499.

*Mullet, N., Hawkins, L. G., Tuliao, A. P., Snyder, H., Holyoak, D., McGuire, K. C., & McChargue, D. (2021). Early trauma and later sexual victimization in college women: a multiple mediation examination of alexithymia, impulsivity, and alcohol use. Journal of interpersonal violence, 08862605211035876.

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.

Muscatell, K. A., Morelli, S. A., Falk, E. B., Way, B. M., Pfeifer, J. H., Galinsky, A. D., Lieberman, M. D., Dapretto, M., & Eisenberger, N. I. (2012). Social status modulates neural activity in the mentalizing network. NeuroImage, 60(3), 1771–1777.

**Nicolas, B., Lemieux, R., Garon-Bissonnette, J., Lacharité, C., & Muzik, M. (2019). The protective role of mentalizing: Reflective functioning as a mediator between child

maltreatment, psychopathology and parental attitude in expecting parents. Child abuse & neglect, 95, 104065.

Nolte, T., Guiney, J., Fonagy, P., Mayes, L. C., & Luyten, P. (2011). Interpersonal stress regulation and the development of anxiety disorders: An attachment-based developmental framework. *Frontiers in Behavioral Neuroscience, 5,* Article 55.

Office For National Statistics (2020). Child abuse in England and Wales - Office for National Statistics. [online] Ons.gov.uk.

**Paetzold, R. L., & Rholes, W. S. (2021). The link from child abuse to dissociation: The roles of adult disorganized attachment, self-concept clarity, and reflective functioning. Journal of Trauma & Dissociation, 22(5), 615-635.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Systematic reviews*, *10*(1), 1-11.

*Paivio, S. C., & McCulloch, C. R. (2004). Alexithymia as a mediator between childhood trauma and self-injurious behaviors. Child abuse & neglect, 28(3), 339-354.

Pears, K. C., & Fisher, P. A. (2005). Emotion understanding and theory of mind among maltreated children in foster care: evidence of deficits. *Development and psychopathology*, *17*(1), 47–65.

Pollak S. D. (2008). Mechanisms Linking Early Experience and the Emergence of Emotions: Illustrations From the Study of Maltreated Children. *Current directions in psychological science*, *17*(6), 370–375.

Pollak, S. D., & Kistler, D. J. (2002). Early experience is associated with the development of categorical representations for facial expressions of emotion. *Proceedings of the National Academy of Sciences of the United States of America*, *99*(13), 9072–9076.

Pollak, S. D., & Sinha, P. (2002). Effects of early experience on children's recognition of facial displays of emotion. *Developmental Psychology, 38*(5), 784–791.

Pollak, S. D., & Tolley-Schell, S. A. (2003). Selective attention to facial emotion in physically abused children. *Journal of Abnormal Psychology, 112*(3), 323–338.

Rnic, K., Sabbagh, M. A., Washburn, D., Bagby, R. M., Ravindran, A., Kennedy, J. L., Strauss, J., & 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, B. (2020) Isolated and struggling: social isolation and the risk of child maltreatment, in lockdown and beyond. [online] London: NSPCC.

Rosenthal, R. (1995). Writing meta-analytic reviews. *Psychological bulletin*, *118*(2), 183.

Rosenthal, R. (1979). The "file drawer problem" and tolerance for null results. *Psychological Bulletin, 86*, 638–641.

*San Cristobal, P., Santelices, M. P., & Miranda Fuenzalida, D. A. (2017). Manifestation of trauma: The effect of early traumatic experiences and adult attachment on parental reflective functioning. Frontiers in psychology, 8, 449.

*Schwarzer, N. H., Nolte, T., Fonagy, P., & Gingelmaier, S. (2021). Mentalizing mediates the association between emotional abuse in childhood and potential for aggression in non-clinical adults. Child Abuse & Neglect, 115, 105018.

Shakoor, S., Jaffee, S. R., Bowes, L., Ouellet-Morin, I., Andreou, P., Happé, F., Moffitt, T. E., & Arseneault, L. (2012). A prospective longitudinal study of children's theory of mind and adolescent involvement in bullying. Journal of child psychology and psychiatry, and allied disciplines, 53(3), 254–261.

Sheridan, M. A., & McLaughlin, K. A. (2014). Dimensions of early experience and neural development: deprivation and threat. *Trends in cognitive sciences*, *18*(11), 580-585.

Shipman, K., Zeman, J., Penza, S., & Champion, K. (2000). Emotion management skills in sexually maltreated and nonmaltreated girls: a developmental psychopathology perspective. *Development and psychopathology*, *12*(1), 47–62.

Simon, M., Németh, N., Gálber, M., Lakner, E., Csernela, E., Tényi, T., & Czéh, B. (2019). Childhood Adversity Impairs Theory of Mind Abilities in Adult Patients With Major Depressive Disorder. *Frontiers in psychiatry*, *10*, 867.

Skarderud F. (2007). Eating one's words, Part III: Mentalisation-based psychotherapy for anorexia nervosa. An outline for a treatment and training manual. *Eur Eat Disord Rev.* 2007;15:323–339.

**Stacks, A. M., Muzik, M., Wong, K., Beeghly, M., Huth-Bocks, A., Irwin, J. L., & Rosenblum, K. L. (2014). Maternal reflective functioning among mothers with childhood maltreatment histories: Links to sensitive parenting and infant attachment security. Attachment & human development, 16(5), 515-533.

Suzuki, A., Poon, L., Kumari, V., & Cleare, A. J. (2015). Fear biases in emotional face processing following childhood trauma as a marker of resilience and vulnerability to depression. Child maltreatment, 20(4), 240-250.

*Swannell, S., Martin, G., Page, A., Hasking, P., Hazell, P., Taylor, A., & Protani, M. (2012). Child maltreatment, subsequent non-suicidal self-injury and the mediating roles of dissociation, alexithymia and self-blame. Child abuse & neglect, 36(7-8), 572-584.

*Terock, J., Van der Auwera, S., Janowitz, D., Homuth, G., Hannemann, A., Schmidt, C. O., & Grabe, H. J. (2018). Childhood trauma and functional variants of 5-HTTLPR are independently associated with alexithymia in 5,283 subjects from the general population. Psychotherapy and psychosomatics, 87(1), 58-61.

*Terock, J., Van der Auwera, S., Janowitz, D., Wittfeld, K., Frenzel, S., Klinger-König, J., & Grabe, H. J. (2020). Childhood trauma and adult declarative memory performance in the general population: the mediating effect of alexithymia. Child abuse & neglect, 101, 104311.

Trickett, P. K., & McBride-Chang, C. (1995). The developmental impact of different forms of child abuse and neglect. Developmental review, 15(3), 311-337.

*Turgeon, J., Bérubé, A., Blais, C., Lemieux, A., & Fournier, A. (2020). Recognition of children's emotional facial expressions among mothers reporting a history of childhood maltreatment. *PloS one*, *15*(12), e0243083.

Van den Noortgate, W., López-López, J. A., Marín-Martínez, F., & Sánchez-Meca, J. (2015). Meta-analysis of multiple outcomes: a multilevel approach. *Behavior research methods*, *47*(4), 1274–1294.

Van Den Noortgate, W., & Onghena, P. (2003). Multilevel meta-analysis: A comparison with traditional meta-analytical procedures. *Educational and psychological measurement*, *63*(5), 765-790.

van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Coughlan, B., & Reijman, S. (2020). Annual Research Review: Umbrella synthesis of meta-analyses on child maltreatment antecedents and interventions: differential susceptibility perspective on risk and resilience. *Journal of child psychology and psychiatry*, *61*(3), 272-290.

van IJzendoorn, M. H., Vereijken, C. M., 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.

Veague, H. B., & Hooley, J. M. (2014). Enhanced sensitivity and response bias for male anger in women with borderline personality disorder. Psychiatry Research, 215(3), 687-693.

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of statistical software*, *36*(3), 1-48.

Vogt, K. S., & Norman, P. (2019). Is mentalization-based therapy effective in treating the symptoms of borderline personality disorder? A systematic review. Psychology and psychotherapy, 92(4), 441–464.

**Wang, X. (2022). Intergenerational effects of childhood maltreatment: The roles of parents' emotion regulation and mentalization. Child Abuse & Neglect, 128, 104940.

*Watson, L. B., Matheny, K. B., Gagne, P., Brack, G., & Ancis, J. R. (2013). A model linking diverse women's child sexual abuse history with sexual risk taking. Psychology of women quarterly, 37(1), 22-37.

World Health Organization. (2020). Child Maltreatment. Who.int; World Health Organization: WHO.

Part 2: Empirical Paper

Maternal mind-mindedness as a predictor of child behavioural and cognitive outcomes in a socio-economically disadvantaged population

Abstract

Aims: This longitudinal study sought to build on previous findings investigating the role of maternal mind-mindedness on child cognitive and behavioral development, in a socio-economically disadvantaged population.

Methods: Secondary data from the one and two year assessments of a multi-site randomized controlled trial was examined. The video-recorded interactions of 80 mother-infant dyads were coded for maternal mind-mindedness at one year using the Meins & Fernyhough's (Version 2.2.) interactional measure. Infant cognitive development and behavioral problems were assessed at two years, using the Bayley Scales of Infant and Toddler Development (third edition), and the Child Behavioural Checklist, respectively. A secondary analysis included maternal sensitivity and maternal reflective functioning as predictors, and separate moderator analyses were run. The data was analysed using a regression based path-analytic framework, involving the principles of moderation analysis.

Results: Maternal mind-mindedness at one year was not associated with child cognitive development at two years, $F(1,69)= .03$, $p=.86$, or child behavioral problems at two years $F(1,69)= .05$, $p=.83$. Results remained non-significant after controlling for household income, maternal education level, parental co-habitation, and sex of the child. Household income was indicated as the only covariate that approached significance. Results also indicated that maternal sensitivity was not associated with either child developmental outcome, whereas reflective functioning significantly predicted child cognitive development but not behavioral problems. Further moderation analyses revealed that results remained consistent after controlling for intervention effects, and that there was no significant interaction between maternal mind-mindedness and child attachment security. However, attachment security had a significant effect on child cognitive development.

Conclusion: The non-significant results of the current study diverge from prior findings. Further research is warranted to investigate the role of maternal mind-mindedness on child cognitive development and behavioral problems in a larger sample, with an assessment of child outcomes later in development. Limitations of the current research are discussed alongside directions for future research.

Introduction

Socioeconomic status (SES) has been associated with a wide range of health, cognitive, behavioral, and social-emotional outcomes, with negative effects persisting into adulthood (Bradley & Corwyn, 2002; Burneo-Gaces et al., 2018). For example, research shows that low SES children are more likely than their high SES counterparts to experience impairments to cognitive development, and the neuropsychological mechanisms that underpin domains such as verbal memory, language, and executive functioning (Burneo-Gaces et al., 2018; Farah et al., 2006). Relatedly, there is strong evidence to show that low SES children are more vulnerable to developing internalizing and externalizing difficulties (Meins et al., 2013). Low SES parents have also reported relatively higher levels of aggression, withdrawal, anxiety, and attention problems in their children (Meins et al., 2013; van Oort et al., 2011). Early and persistent cognitive and behavioral difficulties are closely linked with poor long-term outcomes including lower levels of social competence and higher levels of antisocial behavior and delinquency, poor academic achievement, and high economic impacts on social care and healthcare providers (Breslau et al., 2009; Kassing et al., 2019; Moffit & Caspi, 2001; Romeo et al., 2006). Understanding the mechanisms that contribute to the initial development and maintenance of early cognitive and behavioural difficulties in the context of socio-economic disadvantage is of clinical importance and warrants extensive research.

It is now generally accepted that the quality of the early parent-child relationship has significant effects on a child's future development and may be a key factor in linking disadvantage to child development outcomes (Bowlby, 1969; Cassidy & Shaver, 2002). A widely studied antecedent of infant developmental outcomes has been early childhood attachment. However, suggestions that attachment security alone can provide a robust framework for understanding infant cognitive or behavioural outcomes have been challenged, and several lines of inquiry have refocussed attention towards the *parenting* associated with early attachment security (Meins et al., 2001). Specifically, research has shown that the sensitivity of parenting, defined as a caregiver's ability to see things from their child's point of view and accurately respond to the infant's needs, has been positively linked to both child

attachment security (Ainsworth et al., 1978; Bigelow et al., 2010; Vereijken, 1997) and child developmental outcomes (Cooke et al., 2022; Mills-Koonce et al., 2015; Shipman & Zeman, 2001).

Evidence shows that when sensitive parenting is compromised, i.e. when a caregiver's ability to reflect on their own mental states and the mental states of their child is somehow impaired, by for example stressors associated with social deprivation, this can impact a child's behavioural regulation skills and cognitive abilities later on in life (Cooke et al., 2022; Mills-Koonce et al., 2015). Conversely however, researchers have shown that expressions of early maternal sensitivity can serve to protect children against vulnerability factors associated with social and economic disadvantage, and from developing behavioural problems and cognitive difficulties later on (Hughes et al., 2016; Meins et al 2013; Meins et al., 2019).

Maternal Sensitivity

In a series of seminal studies examining the antecedents of early attachment security, Ainsworth and colleagues proposed four distinct dimensions for assessing maternal behaviour in the early parenting relationship. These include maternal (1) accessibility, (2) co-operation, (3) acceptance, and (4) sensitivity (Ainsworth, 1969). Ainsworth and colleagues defined maternal sensitivity as a mother's ability to see things from her child's point of view and accurately respond to the infant's needs (Ainsworth et al., 1978). Research shows that mothers with more sensitive parenting styles also showed higher levels of acceptance, cooperation and accessibility towards their infants (Meins et al., 2001).

Maternal sensitivity has been operationalised using various measures, including the Maternal Sensitivity Scale developed by Ainsworth and colleagues (Ainsworth et al., 1978), the Global Rating Scale of Mother-Child Interactions (Gunning et al., 1999), and the Maternal Behaviour Q-Sort (Behrens et al., 2014; Moran et al., 1992). A wealth of research has reiterated the relationship between early maternal sensitivity and child attachment security, and this effect has been replicated across a diverse range of samples, including American, German and high risk populations (Ainsworth et al., 1978; Egeland & Farber 1984; Goldberg

et al 1986; Grossman et al., 1985; Isabela, 1993). Child social, emotional, cognitive and behavioural developmental outcomes have also been shown as significantly associated with early maternal sensitivity (Ainsworth et al., 1978; LE Malmberg et al., 2016; Shipman & Zeman, 2001). However, more remains to be learned about the particular mechanisms that form the relationship between sensitive parenting, quality of attachment, and child outcomes, to practically inform interventions that scaffold early parenting and support future child development in the context of socioeconomic disadvantage and residual stressors. Recent evidence suggests that a caregiver's compromised ability to reflect on their own mental states and the mental states of their child may play an important role.

Mind-mindedness : A re-evaluation of maternal sensitivity

Although sensitivity is an important antecedent to infant attachment, developmental researchers have challenged that it does not capture all of the intergenerational transmission between early parenting behaviours and infant attachment (Meins et al., 2012; van IJzendoorn, 1995). In a (1997) meta-analysis, De Wolff & van IJzendoorn conclude that sensitivity is "an important but not exclusive condition of attachment security", and that several other key features of parenting play an equally important role (De Wolff & van IJzendoom, 1997). Informed by the emergence of major theoretical constructs including and related to mentalization, researchers have therefore sought other mechanisms that might help to understand the key causal factors that account for this so-called "transmission gap" (De Wolff & van IJzendoom, 1997; McMahon & Bernier, 2017).

In view of these developments, Meins and colleagues coined the term maternal *mind-mindedness* to describe "the mother's proclivity 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). Mind-mindedness not only seeks to capture a more specific sensitivity to a child's ongoing mental states in a caregiver-child interaction, but also the degree to which a caregiver's attunement to the child's state of mind is appropriate, and accurately reflects the child's mental state. To be attuned therefore requires a caregiver's ability to 'understand' (this means being both

subjectively and objectively aware of a child's mind and capable of looking through the eyes of a child at their world as a representation), and then to acknowledge and express that representation through overt behaviour (Illingworth et al., 2016).

Fonagy, Meins, and colleagues establish that a parent's abilities in reflective functioning, to hold in mind the internal state of their child through a non-defensive and open thought process, provides the basis for accurate and appropriate responses. This is based on a wealth of literature that has established that the ability to perceive, reflect on, express and respond to the affective experiences of the self or of others, termed as 'affective consciousness', is linked to secure attachment (Fonagy et al., 1991). Affect consciousness, measured in this context through 'appropriate caregiver responses', is crucial in indicating to the child that their internal world is being recognized, modelling a proclivity to understand one's own internal world and the worlds of others, and by proxy, fostering a secure attachment environment (Fonagy & Campbell, 2016; Meins et al., 2001; Meins et al., 2012; Slade, 2005).

Mind-mindedness was originally operationalised as a representational measure, whereby mothers were interviewed and asked to provide a description of their child, and were assessed on the proportion of the child's mental attributes mentioned. It has more recently been operationalised as an interactional measure, specifically looking at the frequency with which caregivers use appropriate mind-related comments during caregiver-child interactions. Moreover, research shows that the interactional measure of maternal mind-mindedness is relatively stable over time, and may therefore described as a trait-like characteristic (Illingworth et al., 2016).

Behavioural & Cognitive Development

Mind-mindedness has been studied with growing interest since its advent 20 years ago. As maternal sensitivity has historically been considered the most effective predictor of secure child attachment, much of the research has looked to compare the relationship between maternal sensitivity and maternal mind-mindedness in the context of early attachment relationships (Aldrich et al., 2021; McMahon & Bernier, 2017).

Mind-mindedness has been established in the literature as a robust predictor of child attachment security (Arnott & Meins, 2007; Meins et al., 2012), as well as a wide range of child cognitive, behavioural and social outcomes, including theory of mind (Hughes et al., 2018; Kirk et al., 2015) , executive functioning skills (Cheng et al., 2018), language acquisition (Meins, 1998; Meins & Fernyhough, 1999), school readiness and academic achievement (Bernier et al., 2017; Meins et al., 2019), pretend or symbolic play (Meins et al., 1998; Meins et al., 2013) and behavioural difficulties (Centifanti et al., 2016; Hughes et al., 2017). Several of these findings have been replicated across a diverse range of samples.

A recent meta-analysis conducted by Aldrich et al in 2021 investigated the broad range of developmental outcomes associated with mind-minded parenting. In an examination of 42 studies with 170 comparisons, the study found broadly positive effects of mind-minded parenting on child development, with strongest impacts on child executive functioning, language abilities, and social cognition, specifically when assessed during toddlerhood (Aldrich et al., 2021). However, effect sizes were found to be smaller in low SES samples.

While no association was found in the meta-analysis between parental mind-mindedness and child behaviour (Aldrich et al., 2021), several studies have found that early mind-mindedness can produce mitigating effects of adversity on children's internalizing and externalizing difficulties across low SES families (Hughes et al., 2017; Meins et al., 2013). For example, a central study conducted by Meins and colleagues (2013) found that early maternal mind-mindedness was negatively linked to children's internalizing and externalizing difficulties at ages 44 and 61 months, and this effect took place exclusively in a low SES sample (Meins et al., 2013). It is of note that the study controlled for a series of contextual stressors that have been known to impact child behavioural development, including maternal depressive symptoms and perceived social support, in addition to child language ability and sex of the child. The study also controlled for maternal sensitivity. Hughes et al (2016) also showed similar effects in a pre-adolescent population, concluding that early maternal mind-mindedness can provide a buffer against the effects of family adversity and socioeconomic disadvantage on disruptive behaviour at age 12 (Hughes et al., 2017). In the context of

cognitive development, a similar study conducted by Meins et al (2019) on the association between early maternal mind-mindedness and child educational attainment in a sample of socioeconomically disadvantages families established that higher levels of maternal mind-mindedness predicted better achievement on children's reading and mathematical abilities at ages 7 and 11 (Meins et al., 2019). The current study will seek to build on these findings, investigating the role of maternal mind-mindedness on child cognitive and behavioral development in a socio-economically disadvantaged population, while assessing child outcomes earlier in development.

Developmental pathways

Research on developmental pathways has historically focused on increased attachment security as a key mechanism driving the positive effects of mind-mindedness on developmental outcomes. There is strong evidence for the association between secure parent-child attachment and child social and cognitive developmental outcomes (Fearon et al., 2010; Groh et al., 2017; Sroufe, 2005). Aldrich and colleagues succinctly sum up the role of attachment as serving as an "initial domino in a chain reaction of developmental competencies that interact within and across domains, ultimately altering the course of a child's life" (Aldrich et a, 2021). Although the origins of the concept of mind-mindedness came from attachment research and a desire to understand its determinants, subsequent research has independently investigated the role of MM in a wide range of outcomes, including cognitive development (Cheng et al., 2018; Hughes et al., 2018; Kirk et al., 2015; Meins, 1998; Meins & Fernyhough, 1999) and behavioural development (Centifanti et al., 2016; Hughes et al., 2017; Meins et al., 2013). This study will seek to add to this knowledge.

Another pathway that brings to light potential mechanisms underpinning the links between early maternal mind-mindedness and infant behavioural and cognitive development is rooted in Vygotskian principles (Aldrich et al., 2021; Meins et al., 2012). A study conducted by Lundy (2013), for example, suggests that representational mind-mindedness is associated with higher levels of effective scaffolding (Lundy, 2013). In this regard, the mind-minded

caregiver may have greater access to the child's internal world, a more accurate perception of the child's current abilities and functioning, and therefore greater access to effective scaffolding. A parent's ability and tendency to articulate their child's internal states may also model to the child how to identify, describe and explain what they are thinking and feeling. In short, the act of interpreting and articulating a child's reality allows the child to understand, from their caregiver, that their internal world is acknowledged, and how to perceive it. This in turn has demonstrable effects on the child's ability to learn how to understand, control or regulate their behaviours (Aldrich et al., 2021). Moreover, mind-mindedness is a parental trait based on linguistic behaviours, and may naturally produce a rich language environment for children, facilitating language exposure and learning through interaction (Aldrich et al., 2021).

Mind-mindedness, maternal sensitivity, and reflective functioning

According to Meins and colleagues (2001), a mind-minded caregiver must first form a representation of the child's internal thoughts, feelings, or internal state, and then use that representation to inform their behavioural interactions with the child (Meins et al., 2001). Previous literature has noted the overlap between mind-mindedness and related concepts such as reflective functioning, where mentalization lies at the intersection of these concepts (Choi-Kain & Gunderson, 2008). However, there are significant differences in the ways that each of these constructs are contextualized and measured. While prior research has compared the triangular relationship between parent mentalization (including mind-mindedness), parent sensitivity, and attachment security (Zeegers et al., 2017), there is limited research comparing the effects of mind-mindedness, sensitivity, and other mentalization-based constructs, such as reflective functioning, on developmental outcomes beyond the effects on and of attachment.

The current study

In a sample of socioeconomically disadvantaged young mothers, the current longitudinal study assesses the relationship between maternal mind-mindedness, using Meins

and Fernyhough's interactional measure (Meins & Fernyhough, 2015), and infant cognitive and behavioural outcomes one year later. The study will also compare maternal sensitivity, maternal mind-mindedness and reflective functioning, to take a lens to any differences between the effects of these mentalization-based measures on infant cognitive and behavioural development. This study will seek to understand the mechanisms by which mind-mindedness influences child cognitive and behavioural development beyond attachment security. However attachment can and should not be ignored in understanding these processes, and will therefore be considered as a moderator in the analysis. Summed up, the study aims to explore the following:

Aims of the current research: research questions and hypotheses

1. Does maternal mind-mindedness at 12 months predict infant cognitive development at 24 months, whilst controlling for household income, maternal education level, parental co-habitation, and sex of the child? We hypothesise that higher maternal mind-mindedness will lead to higher infant cognitive outcomes.

2. Does maternal mind-mindedness at 12 months predict infant problematic behaviours at 24 months, whilst controlling for household income, maternal education level, parental co-habitation, and sex of the child? We hypothesise that higher maternal-mindedness would predict fewer infant behavioural problems, and by proxy fewer infant internalizing and externalizing difficulties.

3. Do appropriate versus non-attuned responses mediate the association between maternal mind-mindedness and cognitive or behavioural outcomes? This research question will only be tested if a significant relationship is found in questions 1 or 2. We hypothesise that appropriate versus non-attuned responses will mediate the relationship between total maternal mind-mindedness and infant developmental outcomes.

4. Is the effect of maternal mind-mindedness on child outcomes independent of maternal reflective functioning and maternal sensitivity? We hypothesise that all three measures

of mentalization will predict positive infant outcomes. However, the relative comparison between the strength of each predictor remains a research question.

5. Does child attachment security moderate the relationship between maternal mind-mindedness, and infant cognitive and behavioural development? We hypothesise that child attachment security will significantly moderate the relationship between maternal mind-mindedness and infant outcomes.

Method

Setting

The current study took place as a secondary data analysis, using a sample taken from a randomised controlled trial of a preventative community home-visiting programme for vulnerable young mothers living in disadvantaged circumstances (Longhi et al., 2019). The programme was delivered across three sites in the United Kingdom, in Sheffield, York and Glasgow, and aimed to promote first-time young mothers' mental health, parental sensitivity and reflective capacity, secure attachment, and resulting child development. The current study was conducted as a joint project with two other UCL Clinical Psychology doctoral students, Yaman Alqadri and Helen Maris.

Procedure

Recruitment for the RCT was conducted across three separate sites in the United Kingdom. Expecting mothers were recruited from antenatal clinics, between 20 – 28 weeks gestation, across regional hospitals. Participants were followed up roughly 12 months after the baby was born, and then again at 24 months. Researchers visited participants in their respective homes at each timepoint. Participating mothers completed the assessment measures, and mother-infant interactions were video recorded while completing a series of semi-structured tasks (tasks outlined in the measures section below).

Ethical Approval

The current study is a secondary analysis of data taken from a randomized control trial that received NHS ethics approval. All participants in the trial consented at the beginning of the study and then again at the 12 month follow-up.

Participants

148 young mothers were originally recruited into the study, during the third trimester of pregnancy. To take part in the study, mothers had to meet the following eligibility criteria (Longhi et al., 2019):

Inclusion:

- Women expecting their first baby AND

- Aged 19 or under, OR aged between 20 to 25 and currently eligible for means- tested benefits (or someone they live with and depend upon such as a partner or parent, is eligible for means tested benefits) or live in a ward that fell below the 20th percentile for the national Indices of Multiple Deprivation.

Exclusion:

- Expectant mothers with any of the following:
  - a psychotic illness
  - substance abuse disorders/ chronic drug dependence
  - profound or severe learning disabilities
- Expectant mothers who would require the use of an interpreter
- Expectant parents with a life-threatening illness
- Expectant parents whose baby is expected to be born with a life threatening illness or profound disability

Sample Size

The total sample size of the trial was 148 mother-infant dyads at the point of entry. 98 mothers were followed up for data collection at 12 months postpartum, of which 86 gave permission to be video-recorded for assessments of sensitivity. This video data was used retrospectively for assessments of mind-mindedness. In the current study, 6 participants were excluded either as a result of an audio-only recording (*n*= 1), or if a significant portion of the mothers speech was in a language other than English (*n*= 5). The final sample size of the current study was 80 mother-infant dyads. A breakdown of the socio-demographic characteristics of the current sample is presented in Table 1.

Table 1. Sociodemographic Characteristics of Participants.

	M(SD)	Range
Age of mother (at baseline)	21.50 (2.43)	15 – 26
	n	%
Education	79	
None	6	7.6
GCSEs / O-levels or equivalent	25	31.6
A-levels or equivalent	10	12.7
NVQ, HND or equivalent	30	38
Degree	6	7.6
Postgraduate Degree	2	2.5
Ethnicity	80	
White	67	83.75
Asian	4	5
Black	5	6.25
Mixed	4	5
Other	0	0
Co-habitation Status	79	
Co-habiting	34	43
Not Co-habiting	45	57
Household Income	76	
Less than £10,000 pa	39	51.3
£10,000-£20,000 pa	15	19.7
£20,000-£30,000 pa	14	18.4
£30,000-£50,000 pa	7	9.2
£50,000+ pa	1	1.3
Sex of Child	80	
Male	40	50
Female	40	50

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

Power Calculation

The effect size used in the power analysis calculated was based on a prior meta-analysis conducted by Aldrich et al (2021) examining associations between parental mind-mindedness and children's developmental capacities, r = 0.14 (Aldrich et al., 2021). A fixed linear regression model with an alpha = .05 and 80% power indicated that a two predictor model would require a sample size of 72 (Faul et al., 2007). A one predictor model with four covariates would therefore require a sample size of 98.

Research Design

The design for the current study was a correlational longitudinal study. The main independent variable (predictor) is maternal mind-mindedness, measured at the 12 month timepoint, near to the child's first birthday. The dependent variables included infant cognitive and behavioral outcomes, both measured at the 24 month timepoint, near to the child's second birthday. Maternal education, parent cohabitation status, household income, and sex of child were also included as covariates to control for the effects of these variables on infant development.

Although this study used secondary data from a clinical trial, the primary purpose was not to investigate treatment effects. However, a regression analysis was run to control for the effect of condition in the RCT, to understand whether this contributed significantly to the variability in developmental outcomes. This was included as a footnote to the above section.

As no significant relationships were indicated in the analyses above, the analysis assessing the mediating role of appropriate versus non-attuned comments was not conducted.

To examine whether maternal mind-mindedness independently predicts infant developmental outcomes beyond other operationalizations of maternal mentalization, a regression analysis was run with maternal sensitivity and maternal reflective functioning as covariates.

Lastly, a moderator analysis was conducted to determine whether child attachment security changes the strength of the relationship between maternal mind-mindedness and infant cognitive and behavioral outcomes.

Measures

Measuring maternal mind-mindedness at 12 months:

Maternal mind-mindedness (MM) was coded at the 12 month timepoint using the interactional measure detailed in the Version 2.2 coding scheme of Meins and Fernyhough (Meins & Fernyhough, 2015). Mother-infant dyads were filmed in the home engaging in six distinct observation tasks, in the following order:

(1) The mother was given a storybook and asked to share it with her child.

(2) The mother was asked to engage in free-play with her child without using any toys.

(3) The mother was given a distracting questionnaire while the child was left to explore.

(4) The mother was given another book with strong attachment-related scenarios, and asked to share it with the child and describe what people in the book may be feeling.

(5) The infant was given a difficult toy to play with and the mother was invited to join them.

(6) Desirable toys were provided to and then taken away from the infant and the mother was asked to comfort her child.

The mothers speech from a total data set of 80 videotaped observations was transcribed verbatim and divided into individual utterances based on temporal or semantic breaks in the speech. All comments that included mind related content, i.e. comments that focus on the child's internal states, were identified. Each comment was then grouped into one of nine mind-related categories: (1) desires and preferences (e.g. do you like this book?); (2) cognitions (e.g. do you remember your birthday? [while the mother is reading about a birthday party]); (3) emotions (e.g. are you feeling grumpy?); (4) epistemic states (e.g. are you teasing?); (5) talking on the infants behalf (e.g. you say "I want the camera mummy!"); (6) funny / amusing (e.g. is that funny?); (7) clever (e.g. clever boy!); (8) cheeky (e.g. that's so cheeky); (9) intentions (e.g. are you trying to get the ball through the hoop?). All mind related comments

were then classified as either appropriate or non-attuned. Where questions and coding differences arose, Elizabeth Meins was consulted to ensure adherence to the manual. In order to control for differences in verbosity, the overall measure of mind-mindedness was calculated by taking the number of mind related comments as a proportion of the total number of comments made by the mother during the interaction. The intraclass correlation coefficient for the consistency of the three coders across the same 12 videos was .99.

Child development measures completed at 24 months:

The *Bayley Scales of Infant and Toddler Development, third edition (Bayley-III)* is a standardized assessment of infant cognitive development that is used to assess developmental delays in early childhood. The cognitive scale has 91 items that assess children's sensorimotor development, exploration and manipulation of objects, object relations, concept formation, and memory. Infants also complete tasks that measure their interest in novelty, problem solving skills, and attention to familiar and unfamiliar stimuli (Weiss et al., 2010). The Bayley-III is considered a gold standard series of behavioural assessments, and has been shown to be a comprehensive and appropriate instrument for assessing infant cognitive development (Del Rosario et al., 2021).

The *Child Behavioural Checklist (CBCL)* is a standardized parent-report questionnaire that is used to assess maladaptive behaviour and emotional problems in infants. Three CBCL broadband scales were included: Internalizing, Externalizing, and Total Behavioural Problems. Raw scores were converted into T-scores during the data preparation phase. The measure has strong reliability and validity (Nakamura et al., 2009).

Measures of maternal reflective functioning and maternal sensitivity at 12 months:

Maternal sensitivity scores were measured at the 12 month timepoint by the researchers involved in the original trial (Longhi et al., 2019). Mother-infant dyads were filmed in the home engaging in six distinct observation tasks described above (see: measuring maternal mind-mindedness at 12 months), and the recordings of individual tasks were then

coded using the well-validated Sensitivity Scales from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (NICHD, 1997), including only ratings related to the mother and omitting child ratings. Mothers were rated on the following subscales using a four-point rating scale (1 = not at all characteristic to 4 = very characteristic): Sensitivity to non-distress, Sensitivity to distress, Intrusiveness, Detachment / disengagement, Stimulation of development, Positive regard for the child, Negative regard for the child and Flatness of affect. An additional set of coding scores were recorded for the entire video. With regards to inter-rater reliability, the average inter-class correlation for overall maternal sensitivity was .84 (Longhi et al., 2019).

Maternal *Reflective Function (RF)* was measured using the *Parent Development Interview (PDI)* conducted and audio-recorded at the 12 month follow up (Longhi et al., 2019). The PDI is a semi-structured interview that taps into mothers' representations of themselves as parents, of their children, and of the relationship between them (Sleed et al., 2020). Interviews were transcribed and coded using the RF coding system (Fonagy et al., 1998). The RF scale ranges from -1 (representing negative or bizarre RF) to 9 (representing high RF). Scores below 3 are considered low, scored between 4 and 6 are considered moderate, and scores above 7 are considered high (Fonagy et al., 1998). Evidence for the validity of the RF rating scale on the AAI has been widely established (Sleed et al., 2020).

Measure of child attachment security at 24 months:

Child attachment security was measured using the *Attachment Q-Set (AQS)* (Waters et al., 1995) at the 24 month follow up, based on an observation of mother-child interactions over a period of roughly 1.5 hours. Assessments were scored immediately after each visit by trained assessors. Inter-rater reliability was reported as acceptable, with an intra-class correlation of .71 (Longhi et al., 2019).

Data analysis procedures

All statistical analyses were conducted using IBM SPSS Statistics (Version 24). Preliminary analyses were conducted at each stage by plotting and examining scatterplots and histograms to determine whether assumptions of normality, linearity, and homoscedasticity were met. For each regression model, the Durbin-Watson's test was performed to test for auto-correlation of the data (a value between 1-5 – 2.5 indicates that the residuals are independent of each other and therefore not problematic, and an exact value of 2 is considered no auto-correlation) (Watson & Durbin, 1951), and the variance inflation factor tested for multicollinearity (no multicollinearity was determined if the VIF value falls between 1 – 10) (Daoud, 2017). As missing data was limited, data was not imputed. However, pairwise deletion was used in the models to include as many participants in each statistical model as possible. Moderation analyses using the SPSS Process Macro (Hayes, 2013) was used to conduct hierarchical multiple regression analyses, to examine whether child attachment security moderates the relationship between maternal mind-mindedness, and infant cognitive and behavioural outcomes. Five thousand bootstrap samples were used for bias correction and to establish 95% CIs. Separate models were run to test each potential interaction, and Benjamini-Hochberg adjustment for multiple comparisons was used to control the false discovery rate (Benjamini & Hochberg, 1995).

Results

The results are presented in three sections. The first section includes the descriptive statistics of all variables of interest. The second section includes the correlation analyses, which were performed to understand the associations between the predictor variable (maternal mind-mindedness) and outcomes (infant cognitive and behavioral outcomes), in addition to specific covariates of interest (maternal reflective functioning, maternal sensitivity, and child attachment security). The third section reports the regression analyses used to examine whether the independent variable (maternal mind-mindedness) was associated with

infant cognitive and behavioral outcomes, while controlling for potential covariates including demographic variables (household income, maternal education level, parental co-habitation status, sex of child), the intervention group, and other measures of mentalization (maternal reflective functioning and maternal sensitivity). A planned mediator analysis was also included in this section to assess the mediating role of appropriate versus not-attuned comments, however, as there was no statistical relationship between maternal mind-mindedness and cognitive or behavioral outcomes, the analysis was not conducted. Finally, a moderator analysis was included to examine whether child attachment security moderates the relationship between maternal mind-mindedness and child cognitive and behavioral problems.

Descriptive statistics

Table 2 presents descriptive statistics for each variable of interest.

Table 2. Descriptive statistics for study variables.

	N	Mean (SD)	Range
Maternal Mind-mindedness	80	6.92 (4.19)	0-17
Infant Cognitive Development	75	88.33 (11.95)	60-115
Infant Behavioral Problems (Total)	75	44.11 (8.78)	28-63
Infant Behavioral Problems (Externalizing)	75	46.25 (9.95)	28-67
Infant Behavioral Problems (Internalizing)	75	44.15 (9.34)	29-71
Maternal Reflective Functioning	78	3.47 (1.38)	1-7
Overall Maternal Sensitivity	80	10.91 (1.37)	8.67-14.33
Child Attachment Security	75	.26 (.26)	-.36-.71

Note: N = Number, SD = Standard Deviation.

Correlational Analyses

Correlations were run to understand the associations across the study variables. As indicated in Table 3, maternal mind-mindedness was not significantly associated with any of the outcome variables (child cognitive or behavioral development). Despite maternal reflective functioning and maternal sensitivity being significantly correlated ($r = .29$, $p = .01$), reflective functioning was the only maternal measure of mentalization associated with infant developmental outcomes of interest, specifically infant cognitive outcomes ($r = .36$, $p = .00$). Notably, child attachment security was significantly correlated with maternal reflective

functioning (r = .29, *p* = .01), maternal sensitivity (r = .23, *p* = .05), and child cognitive development (r = .50, *p* < .001).

Table 3. Correlation matrix to show associations between variables of interest.

Variables	1	2	3	4	5	6	7
Primary predictor							
1. Maternal Mind-mindedness	-						
Secondary predictors (covariates)							
2. Maternal Reflective Functioning	.18	-					
3. Maternal Sensitivity	.11	.29*	-				
Outcomes							
4. Cognitive Development	.02	.36**	.16	-			
5. Behavioural Problems (Total)	-.03	-.19	-.02	-.15	-		
6. Behavioural Problems (Externalizing)	.02	-.13	-.06	-.17	.89**	-	
7. Behavioural Problems (Internalizing)	-.10	-.16	-.05	-.09	.74**	.57**	-
Moderator							
8. Child Attachment Security	.04	.29*	.23*	.50**	-.06	-.11	.02

*Note: * = correlation is significant at the 0.05 level (2-tailed), ** = correlation is significant at the 0.01 level (2 tailed).*

Regression Analyses

Does maternal-mindedness (at 12 months) predict infant cognitive development (at 24 months), whilst controlling for household income, education level, and parental co-habitation and sex of the child?

To answer the first research question, a linear regression analysis was conducted to test whether maternal mind-mindedness at 12 months predicted infant cognitive outcomes at 24 months, while controlling for household income, maternal educational level, parental co-habitation, and sex of the child. Scatterplots and a histogram showed that the assumptions of

normality, linearity and homoscedasticity were met. The variance inflation factor indicated there was no multicollinearity. The Durbin-Watson's test indicated that auto-correlation was not problematic in the data (1.86) (Watson & Durbin, 1951). The mind-mindedness data was also visually examined ahead of the entire analysis; the data was normally distributed, and a p value of .078 was indicated in the shapiro-wilkes test.

The regression analysis revealed that maternal mind-mindedness was not associated with later infant cognitive development, $F(1,69)= .03$, $p=.86$. Introducing household income, maternal educational level, parental co-habitation, and sex of the child as covariates into the model explained 3.9% of the variation in cognitive development (adj. $R^2 = .04$), compared with the adj. $R^2 = -.01$ that was indicated in the model without the covariates. The R^2 change was non-significant. The model remained non-significant even after introducing the covariates, $F(5,65) = 1.57$, $p=.18$. Results indicated household income as the only covariate that approached significance as a predictor of child cognitive development, $\beta = .25$, $p =0.05$, CI95%[-.01,5.41]. As household income increases, infant cognitive abilities also increase.

Table 4.

Variable	b	SE	β	t	p value	Lower bound CI	Upper bound CI	R	Adj. R^2	Change in R^2
Step 1								.02	-.01	.00
MM	.06	.34	.02	.17	.86	-.63	.75			
Step 2								.33	.04	.11
MM	-.05	.35	-.02	-.13	.90	-.75	.66			
Education	1.29	1.21	.13	1.07	.29	-1.13	3.71			
Cohabitation	-.51	2.99	-.02	-.17	.86	-6.48	5.46			
Household income	2.70	1.36	.25	1.99	.05	-.01	5.41			
Child sex	2.27	2.94	.10	.77	.44	-3.60	8.14			

Does maternal-mindedness (at 12 months) predict infant behavioural difficulties (at 24 months), whilst controlling for household income, education level, and parental co-habitation and sex of the child?

To answer the second research question, three linear regression analyses were conducted to test whether maternal mind-mindedness at 12 months predicted infant overall

behavioral problems, externalizing difficulties, and internalizing difficulties, at 24 months respectively, while controlling for household income, maternal educational level, parental co-habitation, and sex of the child.

In the first analysis, the CBCL Total Problems T-Score was included as the dependent variable, and household income, education level, parent co-habitation, and sex of the child were included as covariate variables. Scatterplots and a histogram showed that the assumptions of linearity, normality and homoscedasticity were met. The variance inflation factor indicated there was no multicollinearity. The Durbin-Watson's test indicated that auto-correlation was not problematic in the data (2.10) (Watson & Durbin, 1951),

The first regression analysis revealed that maternal mind-mindedness was not associated with children's overall behavioral problems, $F_{(1,69)}$= .05, p=.83. Introducing household income, maternal educational level, parental co-habitation, and sex of the child, as covariates into the model explained 2.9% of the variability in behavioral problems (adj. R^2 = .03), compared with the adj. R^2 = -.01 that was indicated in the model without the covariates. The R^2 change was non-significant. The model remained non-significant even after introducing the covariates, $F_{(5,65)}$ = 1.42, p=.23. Results indicated household income as the only covariate that approached significance as a predictor of child behavioral problems, β = -.22, p =.09, CI95%[-3.74,.26]. As household income increases, children's overall behavioral problems decrease.

Table 5.

Variable	b	SE	β	t	p value	Lower bound CI	Upper bound CI	R	Adj. R^2	Change in R^2
Step 1								.03	-.01	.00
MM	-.05	.25	-.03	-.21	.83	-.56	.45			
Step 2								.31	.03	.10
MM	-.04	.26	-.02	-.17	.87	-.56	.48			
Education	-1.15	.90	-.16	-1.28	.20	-2.94	.64			
Cohabitation	-2.40	2.21	-.14	-1.09	.28	-6.81	2.01			
Household income	-1.74	1.00	-.22	-1.74	.09	-3.74	.26			
Child sex	-.09	2.17	-.01	-.04	.97	-4.42	4.25			

The second regression analysis similarly revealed that maternal mind-mindedness was not associated with children's externalizing difficulties, $F(1,69) = .03$, $p = .87$. When introducing household income, maternal educational level, parental co-habitation, and sex of the child as covariates into the model, the model remained non-significant, $F(5,65) = 1.38$, $p = .24$. None of the covariates were indicated as significant predictors of externalizing difficulties.

The final regression analysis revealed that maternal mind-mindedness was not associated with children's internalizing difficulties, $F(1,69) = .67$, $p = .42$. When introducing household income, maternal educational level, parental co-habitation, and sex of the child as covariates into the model, the model remained non-significant, $F(5,65) = 1.82$, $p = .12$. Again, none of the covariates were indicated as significant predictors of children's internalizing difficulties.

Do the results remain consistent even after controlling for the intervention group as a covariate?

Cognitive development:

When introducing the randomized control condition as a covariate into the model, the results remained consistent, $F(6,64) = 1.31$, $p = .26$. The effect of the intervention condition on infant cognitive outcomes was non-significant, $\beta = .052$, $p = .70$.

Behavioural development:

When introducing the randomized control condition as a covariate into the model predicting overall behavioral problems, the results remained consistent, $F(6,64) = 1.57$, $p = .17$. The effect of the intervention condition on infant behavioral problems was non-significant, $\beta = .19$, $p = .15$.

When introducing the randomized control condition as a covariate into the model predicting infant externalizing difficulties, the results remained consistent, $F(6,64) = 1.59$, $p =$

.16. The effect of the intervention condition on infant externalizing difficulties was non-significant, β = .21, p = .12.

When introducing the randomized control condition as a covariate into the model predicting infant internalizing difficulties, the results remained consistent, $F(6,64) = 1.55$, $p = .18$. The effect of the intervention condition on infant internalizing problems was non-significant, β = .08, $p = .57$.

Do appropriate versus non-attuned comments mediate the relationship between maternal-mind-mindedness, and child cognitive development or behavioral problems?

As there was no statistical relationship between maternal mind-mindedness and child cognitive development or behavioral problems, there was no need to test the mediating role of appropriate versus non-attuned comments in the relationship. The analysis was therefore not conducted. It is of note however that a mean average of 6% of parent's comments towards their babies in the sample were coded as appropriate mind-related references. Non-attuned mind-related references were produced far less frequently, and constituted a mean average of 1% of the parents speech. This study follows the protocol of previous literature, in which non-attuned comments have occurred too infrequently to be distinguished in the analyses when studying mind-mindedness in various contexts (Bernier et al., 2017; Colonnesi et al., 2017).

Is the effect of maternal mind-mindedness (at 12 months) on child outcomes (at 24 months) independent of maternal reflective functioning (at 12 months) and maternal sensitivity (at 12 months)?

It can be noted from the correlation analyses conducted above (Table 3) that no significant association was found between maternal mind-mindedness and maternal reflective functioning, or between maternal mind-mindedness and maternal sensitivity (*p*s >.11). Despite this, regression analyses were run to further explore this research question.

Cognitive development:

A regression model was used to compare measures of maternal mentalization and each of their effects on later infant cognitive development. Maternal mind-mindedness, maternal reflective functioning, and maternal sensitivity, each measured at 12 months, were included as predictors. Child cognitive development was included as the dependent variable, and no covariates were included in the model. Scatterplots and a histogram showed that the assumptions of linearity, normality and homoscedasticity were met. The variance inflation factor indicated there was no multicollinearity. The Durbin-Watson's test indicated that auto-correlation was not problematic in the data (1.85) (Watson & Durbin, 1951).

The model including all 3 mentalization predictors was statistically significant, $F(3,69)$ = 3.55, p = .02. Results indicated that reflective functioning was the only significant independent predictor of cognitive outcomes, β = .35, p = .01, 95%CI[.96, 5.07]. Maternal mind-mindedness and maternal sensitivity did not indicate any significant effects.

Behavioural development:

A regression model was used to compare measures of maternal mentalization and each of their effects on later infant behavioral development. Maternal mind-mindedness, maternal reflective functioning, and maternal sensitivity, each measured at 12 months were included as predictors. Child behavioral problems was included as the dependent variable, followed by externalizing difficulties and then internalizing difficulties in separate models, and no covariates were included. Scatterplots and a histogram showed that the assumptions of linearity, normality and homoscedasticity were met. The variance inflation factor indicated there was no multicollinearity. The Durbin-Watson's test indicated that auto-correlation was not problematic in the data (2.25) (Watson & Durbin, 1951).

With regards to overall infant behavioral difficulties, the model including all 3 mentalization predictors was statistically non-significant, $F(3,69)$ = .92, p = .44. Results indicated that none of these were significant predictors of overall later behavioral difficulties.

With regards to infant externalizing difficulties, the model including all 3 mentalization predictors was statistically non-significant, $F(3,69) = .45$, $p = .72$. Results indicated that none of these were significant predictors of later externalizing difficulties.

With regards to infant internalizing difficulties, the model including all 3 mentalizing predictors was statistically non-significant, $F(3,69) = .70$, $p = .55$. Results indicated that none of these were significant predictors of later internalizing difficulties.

Does child attachment security (at 24 months) moderate the relationship between maternal mind-mindedness (at 12 months) and child cognitive outcomes (at 24 months)?

A moderator analysis was conducted using the Process Macro with maternal mind-mindedness as the predictor, child cognitive development as the dependent variable, and child attachment security as the moderator. The overall model explained 25% of the variance in cognitive outcomes ($R^2 = .25$), $F(3,71) = 8.07$, $p = .00$. However, results indicated that although child attachment security has a significant effect on cognitive outcomes, b = 19.62, $p = .019$, as demonstrated in the correlational analyses, there was no significant interaction between maternal mind-mindedness and child attachment security, $p = .63$.

Does child attachment security (at 24 months) moderate the relationship between maternal mind-mindedness (at 12 months) and overall child behavioural problems (at 24 months)?

A moderator analysis was conducted using the Process Macro with maternal mind-mindedness as the predictor, overall behavioral problems as the dependent variable, and child attachment security as the moderator. The overall model explained 1.4% of the variance in overall child behavioral problems ($R^2 = .01$), but was not significant, $F(3,21) = .35$, $p = .79$. Neither maternal mind-mindedness, child attachment security, nor the interaction between the two, significantly predicted overall child behavioral problems.

Discussion

The current study was designed to investigate the influence of maternal mind-mindedness on infant behavioral difficulties and cognitive outcomes in a sample of first-time mothers living in conditions of high socioeconomic disadvantage. The key goal of this study was to test whether the findings of previous research in low-risk volunteer samples also apply in the context socioeconomically disadvantaged mother-infant dyads, assessing infant outcomes at 24 months of age.

Main findings

Although previous research has indicated that early maternal mind-mindedness can impact both cognitive development (Hughes, 2016; Meins, 2019) and behavioral problems (Centifanti et al., 2016; Hughes et al., 2017), no association was found when assessing maternal mind-mindedness at 12 months and infant cognitive or behavioral development at 24 months, with behavioral problems extending to both internalizing and externalizing problems independently, and while controlling for household income, maternal education level, parental co-habitation, and sex of the child. The results pertaining to cognitive development run contrary to the 2021 meta-analytic findings of Aldrich et al which show overall significant effects between maternal mind-mindedness and child cognitive abilities, and academic performance (Aldrich et al., 2021). However, the meta-analysis did show relatively lower effect sizes across lower SES populations. In the meta-analysis, child behavioral problems were indicated as the only developmental domain that held no association with early maternal mind-mindedness (Aldrich et al., 2021). Despite this, several empirical studies have shown that early mind-mindedness can produce mitigating effects on children's behavioral problems in low SES families (Hughes et al., 2016; Meins et al 2013). Similar effects have been shown in the context of early mind-mindedness and children's educational attainment in low SES families (Meins et al., 2019).

It was noted in the original RCT, and is important to reiterate here, that 24 months is a relatively young age to be assessing child developmental outcomes (Longhi et al., 2019).

Evidence shows that behavioral problems typically begin to emerge at this age and tend to peak closer to age three (Kristensen et al., 2010). Similarly, cognitive development continues to change rapidly at this age and stage of development, and lines of research suggest that it typically stabilizes after age three (Janssen et al., 2011). Previous studies which have precedented significant findings on early mind-mindedness and related outcomes have typically assessed cognitive and behavioral development later on in the child's developmental trajectory (Hughes et al., 2016; Meins, 2013; Meins, 2019). To this end, a longer term follow up and assessment of these outcomes may indicate that the full effects of maternal mind-mindedness on developmental outcomes emerge later on in life. Nonetheless, the non-significant results of this study pose an interesting question around when in the developmental trajectory effects tend to emerge, with clinical implications on windows of preventative action.

Results from the current study indicated that household income was the only covariate that approached significance as a predictor of child cognitive development, suggesting that as household income increases, children's overall cognitive development also increases. The same results were indicated in the context of child behavioral problems, where as household income increases, child overall behavioral problems decrease. As substantiated by previous research, it can be interpreted that family financial difficulties indicate a high risk of a negative developmental trajectory. The absence of resource, but also the contextual stressors that manifest from financial burden are likely to hold a powerful effect on maternal behavior and parenting. There are various underlying mechanisms that may explain this effect, for example, considering the negative effects of poverty and financial strain on maternal mental health (Dijkstra-Kersten, 2015; Marcil et al., 2020), which can then strike a domino effect on parenting and child outcomes (Wickham et al., 2017). The pathway involved in the observed results remains unclear in this study, and future research may look to explore what drives the effect.

A relevant point to note in the context of this research is Patterson's (1982) "coercive family process" model which provides a framework to the reciprocity of effects in the development of child behavioral difficulties (Meins et al., 2013; Patterson & Oregon, 1982), especially in the context of socioeconomic disadvantage. According to this framework, when

a caregiver experiences a perceived unsuccessful interaction with a child exhibiting behavioral difficulties they may respond with hostility, or withdraw, creating a vicious cycle whereby caregiver's responses can serve to exacerbate the child's behavior. A study conducted by Yates et al (2010) in a high risk family sample reiterates the complex transactional relationships between contextual strain (including stressful life events, social support, relationship quality), parenting quality, and early child behavioral and academic adjustment, where reciprocal effects of child and parent behavior are found to exacerbate the primary contextual strain (Yates et al., 2010). Contextual stressors that drive these effects can be particularly pronounced in the context of socioeconomic disadvantage and are increasingly pronounced in light of the coronavirus pandemic (van den Heuval et al., 2022). One particular example of this is perinatal mental health, including a maternal history of trauma, depression or anxiety, or intimate partner violence for example, which have been exacerbated in light of the recent pandemic and can profoundly affect infant development (Dijkstra-Kersten, 2015; Mueller & Tronick, 2019), and may be considered as controls in future research.

A mediation analysis was originally planned to test the mediating role of appropriate versus non-attuned comments in the relationship between maternal mind-mindedness and child cognitive and behavioral development, however it was not pursued in the final analysis as non-attuned comments occurred too infrequently to be distinguished. More specifically, non-attuned mind related comments constituted only an average of 1% of the mother's speech. Future research, in which a larger proportion of the mother's speech is coded as non-attuned, may look to further explore this analysis.

Furthermore, a regression model was used to compare maternal mind-mindedness, maternal sensitivity, and reflective functioning on cognitive and behavioral outcomes. Of the three, reflective functioning was the only significant predictor of cognitive outcomes, where none of the three measures predicted behavioral difficulties. Reflective functioning in this context refers to a mother's capacity to "understand themselves and others in terms of intentional mental states, such as feelings, desires, wishes, goals and attitudes" (Fonagy et al., 1998). Reflective functioning, like mind-mindedness and maternal sensitivity, taps into the

construct of mentalization, however, it taps into distinct 'dimensions' of mentalization and therefore may engage different neural processes than mind-mindedness for example. (Bateman & Fonagy, 2019). Understanding the specific mentalization-based processes, and dimensions of mentalization (Bateman & Fonagy, 2019), that may provide early protection against cognitive vulnerabilities associated with low SES, is of clinical importance in informing early and preventative intervention and warrants further investigation. Future research may also consider a focus on the role of reflective functioning as a precursor to maternal mind-mindedness, and conduct a deeper dive into the mechanisms that link the two constructs.

When controlling for intervention effects as a covariate the results remained consistent, and the effect of the intervention condition on cognitive and behavioral outcomes was non-significant. This differed from the original RCT which showed that the intervention was associated with lower behavioral problems (Longhi et al., 2019). The difference in effects is likely a result of the smaller sample used in this study – participants were excluded from this dataset where the assumptions of the coding manual could not be met i.e. in the case of non-English speaking or non-video participants.

Finally, the moderator analysis indicated that there was no significant interaction between maternal mind-mindedness and child attachment security in predicting infant cognitive or behavioral outcomes. However, as supported by previous literature, and likely through various mediating mechanisms (West et al., 2013), child attachment security did have independent effects on child cognitive outcomes. The overall moderation effects are inconsistent with previous findings in the research which show that higher levels of caregiver mind-mindedness in the first year of life predict secure child attachment (Arnott & Meins, 2007; Lundy, 2003; Meins et al., 2001; Meins et al., 2012). The lack of statistical significance may be accounted for by the limitations listed below.

Central Limitations

While the current study contributes to an understanding of maternal mind-mindedness and infant cognitive and behavioral outcomes in the context of a low SES sample, results should be interpreted in light of the following limitations.

First, the power analysis, calculated based on a previous meta-analysis conducted by Aldrich et al., indicated that the model lacked statistical power and required a larger sample size to detect effects. Running the regression models with multiple predictors reduced the power to detect effects. However, the correlation matrix revealed an absence of associations that would be expected considering previous research, and therefore indicated no need to reduce the number of predictors or covariates in the model. It is possible that the expected effects would emerge with a larger sample, though as this study was a secondary data analysis there was no scope to increase the sample size.

Second, in spite of the evidence surrounding the predictive validity of observational methods (Patterson & Forgatch, 1995), it is necessary to note the possibility that participants behavior may have been influenced or biased by the presence of an observer, in this case the researcher, and the imposition of tasks as opposed to unstructured free play. Similarly, the instruments used to measure infant cognitive and behavioral outcomes were exclusively maternal self-reports, and it is possible they may have involved some degree of parental bias.

Moreover, there was a high level of diversity in the ethnicity of participants, some of whom did not speak English as a primary language. While mind-mindedness has been shown to account for cross-cultural differences in infant outcomes, such as theory of mind for example (Hughes et al., 2017), it is ultimately a language-based measure that benefits from a wide and rich vocabulary. As the coders were only able to code in English, it is possible that the number of mind-minded comments was under-represented for mothers who typically speak a non-English language at home, and who may have access to a richer and more diverse range of vocabulary in their mother tongue. Future research may seek to evaluate mind-mindedness in the primary language of all participants where resources allow.

Lastly, 43% of the mothers in the sample were cohabiting with their partners at the time of assessment. It is likely that children's development may be impacted by paternal mind-

mindedness or mind-minded caregiving from other family members. This is particularly true of more collectivist cultures where larger family households and the involvement of extended family in caregiving is a more common practice. Future research may seek to consider and control for such variables.

Future directions of research and clinical implications

Previous research has considered maternal mind-mindedness a reliable predictor of child behavioral and cognitive outcomes, however the added complexity of a high risk and socioeconomically disadvantaged sample of young mothers holds important clinical implications as to risks and latent vulnerabilities in development. The non-significant findings of the current research raises important questions around when the effects of early maternal mind-mindedness on child cognitive and behavioral development may begin to emerge. The findings of this study reiterate the complexities of the pathways that link early parenting and child cognitive and behavioral development.

Future research may look to build on these findings in light of the limitations listed above, to be able to inform targeted clinical interventions and windows of preventative action. Policy-makers may pay particular attention to these developing lines of research, particularly in light of benefits given to socially disadvantaged mothers, who often experience systemic and institutional barriers which hinder abilities in early mentalization, and services provided to facilitate sensitive caregiving. Moreover, where the current study investigates an exclusively low income and high risk sample, future research may benefit from a stratified sample to investigate the differential impact of psychosocial risk on a socioeconomically diverse group of mother-infant dyads, and how mind-mindedness might modulate the extensive effects of limited resources and inequality. Furthermore, considering maternal mental health as a key factor in this analysis may increase an understanding of the complex pathways involved. In light of the coronavirus pandemic, which continues to impose extraordinary effects on costs of living, social deprivation, mental health, and family systems, implications of such research on policy remains pertinent.

References

Ainsworth, M. D. S. (1969). Maternal sensitivity scales. *Power*, *6*, 1379-1388.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation.* 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.

Arnott, B., & Meins, E. (2007). Links among antenatal attachment representations, postnatal mind-mindedness, and infant attachment security: a preliminary study of mothers and fathers. *Bulletin of the Menninger Clinic*, *71*(2), 132–149.

Bateman, A. W., & Fonagy, P. (Eds.). (2019). Handbook of Mentalizing in Mental Health Practice (2nd ed.). American Psychiatric Publishing, Inc.

Behrens, K. Y., Parker, A. C., & Kulkofsky, S. (2014). Stability of maternal sensitivity across time and contexts with Q-sort measures. *Infant and Child Development*, *23*(5), 532-541.

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal statistical society: series B (Methodological)*, *57*(1), 289-300.

Bernier, A., McMahon, C. A., & Perrier, R. (2017). Maternal mind-mindedness and children's school readiness: A longitudinal study of developmental processes. Developmental psychology, 53(2), 210.

Bowlby, J. (1969). Attachment and Loss, Vol. 1: Attachment. London: Hogarth Press and the Institute of Psycho-Analysis.

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual review of psychology*, *53*(1), 371-399.

Breslau, J., Miller, E., Breslau, N., Bohnert, K., Lucia, V., & Schweitzer, J. (2009). The impact of early behavior disturbances on academic achievement in high school. *Pediatrics*, *123*(6), 1472-1476.

Bigelow, A. E., MacLean, K., Proctor, J., Myatt, T., Gillis, R., & Power, M. (2010). Maternal sensitivity throughout infancy: Continuity and relation to attachment security. *Infant behavior and Development*, *33*(1), 50-60.

Burneo-Garcés, C., Cruz-Quintana, F., Pérez-García, M., Fernández-Alcántara, M., Fasfous, A., & Pérez-Marfil, M. N. (2019). Interaction between Socioeconomic Status and Cognitive Development in Children Aged 7, 9, and 11 Years: A Cross-Sectional Study. *Developmental neuropsychology*, *44*(1), 1–16.

Cassidy, J., & Shaver, P. R. (Eds.). (2002). *Handbook of attachment: Theory, research, and clinical applications*. Rough Guides.

Centifanti, L., Meins, E., & Fernyhough, C. (2016). Callous-unemotional traits and impulsivity: distinct longitudinal relations with mind-mindedness and understanding of others. *Journal of child psychology and psychiatry, and allied disciplines*, *57*(1), 84–92.

Cheng, N., Lu, S., Archer, M., & Wang, Z. (2018). Quality of maternal parenting of 9-month-old infants predicts executive function performance at 2 and 3 years of age. *Frontiers in Psychology, 8,* Article 2293.

Choi-Kain, L. W., & Gunderson, J. G. (2008). Mentalization: ontogeny, assessment, and application in the treatment of borderline personality disorder. *The American journal of psychiatry*, *165*(9), 1127–1135.

Colonnesi, C., van Polanen, M., Tavecchio, L., & Fukkink, R. G. (2017). Mind-Mindedness of Male and Female Caregivers in Childcare and the Relation to Sensitivity and Attachment: An Exploratory Study. *Infant behavior & development*, *48*(Pt B), 134–146.

Cooke, J. E., Deneault, A. A., Devereux, C., Eirich, R., Fearon, R. P., & Madigan, S. (2022). Parental sensitivity and child behavioral problems: A meta-analytic review. *Child Development*.

Daoud, J. I. (2017). Multicollinearity and regression analysis. In Journal of Physics: Conference Series (Vol. 949, No. 1, p. 012009). IOP Publishing.

De Wolff, M., & van IJzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68*(4), 571–591.

Del Rosario, C., Slevin, M., Molloy, E. J., Quigley, J., & Nixon, E. (2021). How to use the Bayley scales of infant and toddler development. *Archives of Disease in Childhood-Education and Practice*, *106*(2), 108-112.

Dijkstra-Kersten SMA, Biesheuvel-Leliefeld KEM, van der Wouden JC, Penninx BWJH, & van Marwijk HWJ (2015). Associations of financial strain and income with depressive and anxiety disorders. *Journal of Epidemiology and Community Health*, 69(1), 660–665.

Egeland, B., & Farber, E. A. (1984). Infant-mother attachment: Factors related to its development and changes over time. *Child development*, 753-771.

Farah, M. J., Shera, D. M., Savage, J. H., Betancourt, L., Giannetta, J. M., Brodsky, N. L., Malmud, E. K., & Hurt, H. (2006). Childhood poverty: specific associations with neurocognitive development. *Brain research*, *1110*(1), 166–174.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.

Fearon, R. P., Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., Lapsley, A. M., & Roisman, G. I. (2010). The significance of insecure attachment and disorganization in the development of children's externalizing behavior: a meta-analytic study. *Child development*, *81*(2), 435-456.

Fonagy, P., & Campbell, C. (2016). Attachment theory and mentalization. In A. Elliott & J. Prager (Eds.), *The Routledge handbook of psychoanalysis in the social sciences and humanities* (pp. 115–131). Routledge/Taylor & Francis Group.

Fonagy, P., Steele, M., Steele, H., Moran, G. S., & Higgitt, A. C. (1991). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant mental health journal*, *12*(3), 201-218.

Fonagy, P., Target, M., Steele, H., & Steele, M. (1998). Reflective-functioning manual version 5 for application to adult attachment interviews.

Goldberg, S., Perrotta, M., Minde, K., & Corter, C. (1986). Maternal behavior and attachment in low-birth-weight twins and singletons. *Child development*, 34-46.

Groh, A. M., Fearon, R. P., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., & Roisman, G. I. (2017). Attachment in the early life course: Meta-analytic evidence for its role in socioemotional development. *Child Development Perspectives*, *11*(1), 70-76.

Grossmann, K., Grossmann, K. E., Spangler, G., Suess, G., & Unzner, L. (1985). Maternal sensitivity and newborns' orientation responses as related to quality of attachment in northern Germany. *Monographs of the Society for Research in Child Development*, 233-256.

Gunning, M., Fiori-Cowley, A., & Murray, L. (1999). The global ratings of mother– infant interaction—Scoring manual (2nd Ed.). Reading, UK: Winnicott Research Unit, University of Reading

Hayes, A. F. (2013). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. Guilford Press.

Hughes, C., Aldercotte, A., & Foley, S. (2017). Maternal mind-mindedness provides a buffer for pre-adolescents at risk for disruptive behavior. *Journal of Abnormal Child Psychology*, *45*(2), 225-235.

Hughes, C., Devine, R. T., & Wang, Z. (2018). Does Parental Mind-Mindedness Account for Cross-Cultural Differences in Preschoolers' Theory of Mind?. *Child development*, *89*(4), 1296–1310.

Illingworth, G., MacLean, M., & Wiggs, L. (2016). Maternal mind-mindedness: Stability over time and consistency across relationships. *European Journal of Developmental Psychology*, *13*(4), 488-503.

Isabella, R. A. (1993). Origins of attachment: Maternal interactive behavior across the first year. *Child development*, *64*(2), 605-621.

Janssen, A. J., Akkermans, R. P., Steiner, K., de Haes, O. A., Oostendorp, R. A., Kollée, L. A., & Nijhuis-van der Sanden, M. W. (2011). Unstable longitudinal motor performance in preterm infants from 6 to 24 months on the Bayley Scales of Infant Development—Second edition. Research in developmental disabilities, 32(5), 1902-1909.

Kassing, F., Godwin, J., Lochman, J. E., & Coie, J. D. (2019). Using early childhood behavior problems to predict adult convictions. *Journal of abnormal child psychology*, *47*(5), 765-778.

Kirk, E., Pine, K., Wheatley, L., Howlett, N., Schulz, J., & Fletcher, B. (2015). A longitudinal investigation of the relationship between maternal mind-mindedness and theory of mind. *British journal of developmental psychology*, *33*(4), 434-445.

Kristensen, S., Henriksen, T. B., & Bilenberg, N. (2010). The Child Behavior Checklist for Ages 1.5–5 (CBCL/1½–5): Assessment and analysis of parent-and caregiver-reported problems in a population-based sample of Danish preschool children. Nordic journal of psychiatry, 64(3), 203-209.

Longhi, Elena & Murray, Lynne & Wellsted, David & Hunter, Rachael & Mackenzie, Kathryn & Taylor-Colls, Samantha & Fonagy, Peter & Fearon, Richard. (2019). Minding the Baby® (MTB) home-visiting programme for vulnerable young mothers: results of a randomised controlled trial in the UK. London: NSPCC.

Lundy, B. L. (2003). Father- and mother-infant face-to-face interactions: Differences in mind-related comments and infant attachment? *Infant Behavior & Development, 26*(2), 200–212.

Lundy, B. L. (2013). Paternal and maternal mind-mindedness and preschoolers' theory of mind: The mediating role of interactional attunement. *Social Development*, *22*(1), 58-74.

Lundy, B. L., & Fyfe, G. (2016). Preschoolers' mind-related comments during collaborative problem-solving: Parental contributions and developmental outcomes. *Social Development*, *25*(4), 722-741.

Malmberg, L. E., Lewis, S., West, A., Murray, E., Sylva, K., & Stein, A. (2016). The influence of mothers' and fathers' sensitivity in the first year of life on children's cognitive outcomes at 18 and 36 months. *Child: care, health and development*, *42*(1), 1-7.

Marcil, L. E., Campbell, J. I., Silva, K. E., Hughes, D., Salim, S., Nguyen, H. T., Kissler, K., Hole, M. K., Michelson, C. D., & Kistin, C. J. (2020). Women's Experiences of the Effect of Financial Strain on Parenting and Mental Health. *Journal of obstetric, gynecologic, and neonatal nursing : JOGNN*, *49*(6), 581–592.

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.

Meins, E. (1998). The effects of security of attachment and maternal attribution of meaning on children's linguistic acquisitional style. *Infant Behavior & Development, 21*(2), 237–252.

Meins, E., Centifanti, L. C., Fernyhough, C., & Fishburn, S. (2013). Maternal mind-mindedness and children's behavioral difficulties: mitigating the impact of low socioeconomic status. *Journal of abnormal child psychology*, *41*(4), 543–553.

Meins, E., & Fernyhough, C. (1999). Linguistic acquisitional style and mentalising development: The role of maternal mind-mindedness. *Cognitive Development*, *14*(3), 363-380.

Meins, E., & Fernyhough, C. (2015). *Mind-mindedness coding manual, Version 2.2*. Unpublished manuscript. University of York, York, UK.

Meins, E., Fernyhough, C., Arnott, B., Leekam, S. R., & de Rosnay, M. (2013). Mind-mindedness and theory of mind: mediating roles of language and perspectival symbolic play. *Child development*, *84*(5), 1777–1790.

Meins, E., Fernyhough, C., & Centifanti, L. C. (2019). Mothers' early mind-mindedness predicts educational attainment in socially and economically disadvantaged British children. *Child development*, *90*(4), e454-e467.

Meins, E., Fernyhough, C., de Rosnay, M., Arnott, B., Leekam, 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.

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. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *42*(5), 637-648.

Meins, E., Fernyhough, C., Russell, J., & Clark-Carter, D. (1998). Security of attachment as a predictor of symbolic and mentalising abilities: A longitudinal study. *Social development*, *7*(1), 1-24.

Mills-Koonce, W. R., Willoughby, M. T., Zvara, B., Barnett, M., Gustafsson, H., Cox, M. J., & Family Life Project Key Investigators (2015). Mothers' and Fathers' Sensitivity and Children's Cognitive Development in Low-Income, Rural Families. *Journal of applied developmental psychology*, *38*, 1–10.

Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Development and psychopathology*, *13*(2), 355–375.

Moran, G., Pederson, D. R., Pettit, P., & Krupka, A. (1992). Maternal sensitivity and infant-mother attachment in a developmentally delayed sample.Infant Behavior and Development, 15, 427–442.

Mueller, I., & Tronick, E. (2019). Early life exposure to violence: Developmental consequences on brain and behavior. *Frontiers in behavioral neuroscience*, *13*, 156.

Nakamura, B. J., Ebesutani, C., Bernstein, A., & Chorpita, B. F. (2009). A psychometric analysis of the child behavior checklist DSM-oriented scales. *Journal of Psychopathology and Behavioral Assessment*, *31*(3), 178-189.

NICHD Early Child Care Research Network. (1997). The effects of infant child care on infant-mother attachment security: Results of the NICHD Study of Early Child Care. *Child Development,* 860-879.

Patterson, G. R., & Forgatch, M. S. (1995). Predicting future clinical adjustment from treatment outcome and process variables. *Psychological Assessment, 7*(3), 275–285.

Patterson, G. R., & Oregon, E. (1982). A social learning approach, Volume 3: Coercive family process.

Romeo, R., Knapp, M., & Scott, S. (2006). Economic cost of severe antisocial behaviour in children--and who pays it. *The British journal of psychiatry : the journal of mental science*, *188*, 547–553.

Slade A. (2005). Parental reflective functioning: an introduction. *Attachment & human development*, *7*(3), 269–281.

Sleed, M., Slade, A., & Fonagy, P. (2020). Reflective Functioning on the Parent Development Interview: validity and reliability in relation to socio-demographic factors. *Attachment & Human Development*, *22*(3), 310-331.

Shipman, K. L., & Zeman, J. (2001). Socialization of children's emotion regulation in mother–child dyads: A developmental psychopathology perspective. *Development and psychopathology*, *13*(2), 317-336.

Sroufe, L. A. (2005). Attachment and development: A prospective, longitudinal study from birth to adulthood. *Attachment & human development*, *7*(4), 349-367.

van den Heuvel, M. I., Vacaru, S. V., Boekhorst, M., Cloin, M., van Bakel, H., Riem, M., de Weerth, C., & Beijers, R. (2022). Parents of young infants report poor mental health and more insensitive parenting during the first Covid-19 lockdown. BMC pregnancy and childbirth, 22(1), 302.

van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin, 117*(3), 387–403.

van Oort, F. V., van der Ende, J., Wadsworth, M. E., Verhulst, F. C., & Achenbach, T. M. (2011). Cross-national comparison of the link between socioeconomic status and emotional and behavioral problems in youths. *Social psychiatry and psychiatric epidemiology*, *46*(2), 167–172.

Vereijken, C. M., Riksen-Walraven, J. M., & Kondo-Ikemura, K. (1997). Maternal sensitivity and infant attachment security in Japan: A longitudinal study. *International Journal of Behavioral Development*, *21*(1), 35-50.

Waters, E. (1995). Appendix A: The attachment Q-set (version 3.0). *Monographs of the society for research in child development*, 234-246.

Watson, G. S., & Durbin, J. (1951). Exact tests of serial correlation using noncircular statistics. *The Annals of Mathematical Statistics*, 446-451.

Weiss, L. G., Oakland, T., & Aylward, G. P. (2010). Bayley-III clinical use and interpretation (1st ed.). Elsevier.

West, K. K., Mathews, B. L., & Kerns, K. A. (2013). Mother–child attachment and cognitive performance in middle childhood: An examination of mediating mechanisms. *Early childhood research quarterly*, *28*(2), 259-270.

Wickham S, Whitehead M, Taylor-Robinson D, & Barr B (2017). The effect of a transition into poverty on child and maternal mental health: A longitudinal analysis of the UK Millennium Cohort Study. *Lancet Public Health*, 2(3), e141–e148.

Yates, T. M., Obradović, J., & Egeland, B. (2010). Transactional relations across contextual strain, parenting quality, and early childhood regulation and adaptation in a high-risk sample. *Development and psychopathology*, *22*(3), 539-555.

Zeegers, M., Colonnesi, C., Stams, G., & Meins, E. (2017). Mind matters: A meta-analysis on parental mentalization and sensitivity as predictors of infant-parent attachment. *Psychological bulletin*, *143*(12), 1245–1272.

Part 3: Critical Appraisal

Introduction

Part 1 of this thesis explored the detrimental effects of childhood abuse on mentalization abilities in adulthood. Part 2 sought to replicate existing evidence on the protective effects of early maternal mind-mindedness against the systemic impact of social deprivation on early child cognitive and behavioral developmental outcomes. This research comes at a socially and politically turbulent time, where the coronavirus pandemic has had an extraordinary effect on family systems and, although the evidence remains mixed and complex, most likely on child development. The current economic and cost-of-living crisis in the UK and rising inflation have contributed to a significant increase in poverty and impacted children's access to education, food, and health resources (Taylor, 2021). Recent statistics published by the NSPCC show the pandemic has increased the vulnerability of children to abuse in the home (Romanou & Belton, 2020). These effects are not limited to the UK, but are global (Katz et al., 2021). This thesis has reiterated to me the necessity of bringing research-based evidence to the important claim that the field of clinical psychology cannot be divorced from politics, and the importance of mentalization as a transdiagnostic construct in clinical assessment, intervention, and prevention.

This critical appraisal will discuss three issues relevant to the research at hand:

1. Reasons for choosing this topic.

2. The advantages and disadvantages of the methodological approach taken in the empirical study.

3. Clinical reflections and implications of both parts.

Reasons for choosing this topic

I have held a longstanding interest in developmental psychology, with a specific commitment to attachment as a framework for understanding relational patterns and development. Inherent in this study is a focus on early intervention, both on an individual and societal level.

It has been my privilege to have worked with resilient and inspiring clients, both in the refugee and asylum-seeking population in Hong Kong, and various socioeconomically disadvantaged groups in the UK's NHS. Through these experiences, the close links between political systems and mental health have become apparent. I believe that it is necessary to bring a further understanding to the wider, social determinants of psychopathology, and to not conflate objectivity with neutrality. In line with Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1979), clinical psychologists must look beyond the individual and at the broader systems that influence development.

My current placement in a chronic pain service, where we work from a Compassion Focused Therapy perspective, has served as a prime example of this. The social and political trauma that clients present, for example through a lack of access to healthcare, benefits, or housing, can weaken or disrupt access to a sense of safety and security. It is of crucial importance to understand how attachment is intertwined with the social and political environment, and how social systems and conditions can feed into intergenerational cycles of trauma, insecure attachment, and compromised development. It is through this process that research in clinical psychology can seek to inform practice, with a hope that practice can inform policy, and policy can empower people.

On a more personal level, this research process has strengthened my skills in clinical practice and formulation. An increasing awareness of historical and ongoing conversations in the research, as well as the narratives that are formed in the evidence base, has naturally contributed to my abilities in forming theory-practice links. I am very grateful to have had these opportunities.

Empirical study: Advantages and disadvantages of a secondary data analysis

The current study was conducted as a joint research project and used data that was collected as part of a larger, multisite, randomized clinical research trial. Using secondary data came with many benefits. Firstly, the study was able to use a longitudinal design, which provided a rich opportunity to identify developmental trends in the data. We were able to

assess maternal mind-mindedness at 12 months and infant cognitive and behavioral outcomes one year later. Given the time constraints of the clinical doctorate, we would not otherwise have been able to independently collect and analyze this data, or effectively gain access to a sample of disadvantaged mother-infant dyads. We also did not have to go through the time-consuming process of re-applying for ethics.

Secondly, the original RCT specifically sought to engage a sample of high-risk young mothers, and gave access to a rich and diverse bank of data on variables relevant to a socially disadvantaged population. Where most studies on mind-mindedness and parental sensitivity tend to examine a general population, this provided a rich opportunity to understand an increasingly important socio-political context. That said, it can be noted that in the original RCT there was attrition of participants between timepoints. It is possible that families with more contextual stressors, i.e. those who did not have access to the time or ability to continue participation, may have dropped out, and therefore the final sample of participants may have indirectly filtered out the most high risk participants.

Having access to an already existing sample and dataset also allowed us to reallocate time to becoming proficient in the mind-mindedness coding system. Being able to complete this study as part of a joint research project meant that we could distribute the coding workload and therefore each have access to a larger, combined, sample size, which was beneficial in powering the study. We were also able to consult with Elizabeth Meins herself while learning the coding system and working towards inter-rater reliability, which was an enormous privilege. The coding process was tedious and time consuming but incredibly rewarding in both informing research and my own clinical practice.

There were also some limitations that arose on account of using secondary data. One of the primary difficulties was the inconsistency in the length of the videos. Although all participants were asked to complete the same six tasks, some of the tasks lasted longer for some mothers compared with others, in addition to the time recorded before and after the tasks. This may have also partly been because the original RCT was a multi-site trial with various researchers. As the measure of mind-mindedness was taken as the proportion of

mind-related comments over total verbosity, this would have likely impacted the results. As the allocated time per task was not standardized, we did not choose to code a fixed period in the video, as we worried this would bias our measure. However, future research may seek to explore this option. Future research may also wish to incorporate total verbosity as a control or a moderator of the relationship between mind-mindedness and child outcomes, but would require consistency in video length to do so.

Although there were clear efforts made by the visiting facilitators to help the participating women feel comfortable in the process, the nature of the experiment was such that these mothers were being recorded interacting with their children in their own homes. While watching the videos it was clear that some mothers did experience a level of discomfort. For example one participant expressed that she "doesn't feel comfortable singing in front of the camera" but proceeded to do so anyway. On this basis the degree of ecological validity must be considered, and, it is likely that the presence of the researcher, and the added pressure of the camera, may have biased the interactions to a degree. An important consideration here, given the population, is that an overwhelming number of families involved in the child welfare system generally come from socioeconomically disadvantaged backgrounds (Zilberstein, 2016). It is possible that some of the mothers, who may have had exposure to such services through historical or current interactions, may have worried about how their behavior would reflect their parenting capacity.

With regards to methodological consistency, it is also of note that there were sometimes other family members present in some videos, including a father or an extended family member. In some instances, there were multiple languages being spoken. Firstly, I am interested to explore further the role of paternal mind-mindedness, and mind-minded caregiving on behalf of extended cohabiting family members, especially in more collectivist cultures where larger family households and the involvement of extended family in caregiving is a more common practice. Secondly, mind-mindedness is fundamentally a linguistic representation of social-cognitive and relational processes, and may differ across both cultures and languages. A study conducted by Hughes et al (2017) comparing parental mind-

mindedness across UK and Hong Kong samples provides evidence for the universality of mind-mindedness as a predictor of preschoolers' theory of mind, and showed that mind-mindedness even accounted for cultural differences in theory of mind development. However, parents in Hong Kong made fewer mind-related comments overall in interactions with their children compared with the parents from the UK (Hughes et al., 2017). Further research may seek to continue exploring cultural differences as well as differences in other languages, where words relating to mental-state processes might translate differently.

Relatedly, our choice of mind-mindedness as a coding construct sparked extensive conversation between us researchers as we familiarized ourselves with the manual, and worked collaboratively through coding the videos. In some circumstances, we informally reflected that clear displays of maternal sensitivity and attunement were not always being accounted for in the mind-mindedness construct. Moreover, from a qualitative perspective, it felt that British mothers who spoke English as a mother tongue were more likely to use the particular phrases and language captured in the construct compared with minority participants, especially those who spoke English as a second language. One specific example of this was the term "clever boy/girl", which sparked discussion during our coding meetings. Future research may seek to explore this validity of this claim, and any potential bias in the construct by introducing ethnicity or minority group status as a moderator of the relationship.

In some circumstances, where there was an absence of mind-related comments, other measures of attunement and communication, for example maternal touch, which is thought to play a vital role in early cognitive, social and physiological development (Crucianelli et al., 2018), may have been present. It is important to recognize the limitations of mind-mindedness as a measure, especially in the context of groups where social-cognitive processes that rely on a rich or extensive vocabulary may be less accessible.

Expanding on clinical implications and future directions of Part 1: Literature Review

Where the literature review presented in this thesis looked specifically at childhood abuse and mentalization in a general adult population, the meta-analyses produced by my

colleagues as part of the larger, joint research project looked at childhood neglect and mentalization in a general adult population (Alqadri, 2022), and general childhood maltreatment and mentalization in an adolescent population. (Maris, 2022). There is clinical value in considering each of these pieces as a whole project, and to compare the subtypes of childhood maltreatment and how they may correspond to distinct outcomes in development.

The Adverse Childhood Experiences (ACES) study is a seminal study that has informed decades of research and practice in the field of developmental psychology (Felitti et al., 1998). However, one of the biggest current limitations of research in childhood maltreatment is around the conflation of 'adverse childhood experiences', and the inattention paid to distinct experiences of maltreatment. Emerging behavioral and neuropsychological research is pointing us towards a recognition of these differences (Sheridan & McLaughlin, 2014), and to this end a review of previous research that presents on these differences is warranted.

Given the time restraints of the clinical doctorate, a lack of manpower, and the time-consuming nature of reviewing each article through the various screening processes detailed in the review, I was only able to include research on the general adult population. There is an obvious need to carry on this research to review the literature, in the same context, in the context of a clinical population. Childhood maltreatment significantly increases vulnerability to psychiatric comorbidities (Benarous, 2015; Blair, 2005; Dvir, 2014). To consider the effects of childhood abuse on adult mentalization in the absence of a clinical sample is to only consider part of the puzzle. From both a clinical and non-clinical standpoint, however, current research indicates a need to consider mentalization as a transdiagnostic concept, that is relevant in the development of various psychopathologies, but also general self-esteem, resiliency and well-being (Ballespi, 2018).

Another interesting direction for future reference would be to incorporate attachment-related search terms to cast a wider, attachment-focused net in the research. A wealth of evidence indicates a multidirectional pathway between early childhood maltreatment, attachment, and mentalization (Bateman & Fonagy, 2012; Huang et al., 2020). To this end it

would be interesting and highly informative to understand how attachment (and by proxy attachment-related interventions) can buffer or worsen the effects of childhood abuse on mentalization.

Expanding on clinical implications and future directions of Part 2: Empirical Study

Some practical directions for future research were reflected in the methodological section above. This section will take a more theoretical and wider perspective.

There is a complex and often intergenerational cycle of interplay between mentalization difficulties, parenting, and mental health or interpersonal difficulties. This cycle is more prevalent in socially and economically disadvantaged populations where sensitive caregiving is often disrupted by a highly insensitive socio-political environment. Due to the time constraints and word limit of the doctoral thesis, maternal mental health variables were not incorporated into the analysis. However, for future research, variables such as a mothers' history of trauma, perinatal depression, historical or ongoing presentations of other mental health difficulties, or involvement in mental health services may be a first point of call. Maternal mental health remains an increasingly important variable in the relationship between sensitive parenting and child outcomes, especially in the context of the current pandemic.

A recent study conducted by Hueval et al., for example, indicates the strain of the coronavirus pandemic on parental mental health, and the significant impact this is having on sensitive caregiving practices. Specifically, the study looks at the effects of lockdown on family routines, with disruptions to work schedules, closures of daycares, and lack of access to extended family, all of which contribute to contextual stress, worse parental mental health, and less sensitive caregiving (van den Hueval et al., 2022). A direction for future research that is noted in this study is the implications of these effects on child outcomes and future generations. In a similar line of inquiry, the current study may be further explored in the context of social and economically disadvantaged parents during the coronavirus pandemic, taking into account pandemic-related stressors that may have disproportionately negative effects on high risk populations.

It was unexpected that significant results were not found in this study. However, the results highlight some important questions, and contribute to building a narrative in the literature around how research may be best conducted in this context. For example, the results pose questions around the age at which developmental outcomes begin to be affected by early parenting. Furthermore, the study highlights the complexities in the pathways that link the early home environment and child developmental outcomes. Future research building on this topic can contribute to developing nuances in the conversation and empowering targeted early intervention.

Conclusions

This critical appraisal brings to light some of the reasons for choosing this research topic, provides a more extensive consideration of methods chosen in the empirical study, and elaborates on important clinical implications and future directions of both parts of the research. The research process has proved to be very challenging at times, but has taught me an incredible amount on how to conduct research, how to be a better clinician, and the powerful role of clinical psychology in a larger socio-political context.

References

Alqadri, Y. (2022). Unpublished thesis.

Ballespí, S., Vives, J., Debbané, M., Sharp, C., & Barrantes-Vidal, N. (2018). Beyond diagnosis: Mentalization and mental health from a transdiagnostic point of view in adolescents from non-clinical population. *Psychiatry research*, *270*, 755–763.

Bateman, A. W., & Fonagy, P. E. (2012). *Handbook of mentalizing in mental health practice*. American Psychiatric Publishing, Inc..

Benarous, X., Guilé, 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.

Blair, R. J. R., Peschardt, K. S., Budhani, S., Mitchell, D. G., & Pine, D. S. (2006). The development of psychopathy. Journal of child psychology and psychiatry, 47(3-4), 262-276.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard university press.

Crucianelli, L., Wheatley, L., Filippetti, M. L., Jenkinson, P. M., Kirk, E., & Fotopoulou, A. K. (2019). The mindedness of maternal touch: An investigation of maternal mind-mindedness and mother-infant touch interactions. *Developmental cognitive neuroscience*, *35*, 47–56.

Dvir, Y., Ford, J. D., Hill, M., & Frazier, J. A. (2014). Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities. Harvard review of psychiatry, 22(3), 149–161.

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.

Huang, Y. L., Fonagy, P., Feigenbaum, J., Montague, P. R., Nolte, T., & Mood Disorder Research Consortium. (2020). Multidirectional pathways between attachment,

mentalizing, and posttraumatic stress symptomatology in the context of childhood trauma. *Psychopathology*, *53*(1), 48-58.

Hughes, C., Devine, R. T., & Wang, Z. (2018). Does parental mind-mindedness account for cross-cultural differences in preschoolers' theory of mind?. *Child development*, *89*(4), 1296-1310.

Katz, C., Priolo Filho, S. R., Korbin, J., Bérubé, A., Fouche, A., Haffejee, S., & Varela, N. (2021). Child maltreatment in the time of the COVID-19 pandemic: A proposed global framework on research, policy and practice. *Child Abuse & Neglect*, *116*, 104824.

Maris, H. (2022). Unpublished thesis.

Romanou, E. & Belton, B. (2020) Isolated and struggling: social isolation and the risk of child maltreatment, in lockdown and beyond. [online] London: NSPCC.

Sheridan, M. A., & McLaughlin, K. A. (2014). Dimensions of early experience and neural development: deprivation and threat. *Trends in cognitive sciences*, *18*(11), 580-585.

Taylor, R. (2021). Covid-19: impact on child poverty and on young people's education, health and wellbeing. [online] House of Lords Library.

van den Heuvel, M. I., Vacaru, S. V., Boekhorst, M., Cloin, M., van Bakel, H., Riem, M., de Weerth, C., & Beijers, R. (2022). Parents of young infants report poor mental health and more insensitive parenting during the first Covid-19 lockdown. *BMC pregnancy and childbirth*, *22*(1), 302.

Zilberstein, K. (2016). Parenting in families of low socioeconomic status: A review with implications for child welfare practice. *Family Court Review*, *54*(2), 221-231.

Appendix

Outline of contributions to joint study

Both the literature review and empirical study were undertaken as joint research projects in collaboration with my colleagues, Yaman Alqadri and Helen Maris, who are concurrently completing the DClinPsy.

The literature review search, screening, and coding procedures were divided equally between the three of us, with guidance from Dr Pasco Fearon, Dr Peter Fonagy, and a team at Liden University, including Sabine Asdonk and Dr Lenneke Alink. The three of us frequently met jointly with our shared supervisor, Dr Pasco Fearon, throughout the course of research, and intermittently with the broader team to refine the methods and procedures. Ultimately, all three projects were written up independently. Where my meta-analysis honed in on childhood abuse and mentalization in adulthood, Yaman focused her research on childhood neglect and mentalization in adulthood, and Helen focused her research on childhood maltreatment and mentalization in adolescence.

We also worked collaboratively to achieve inter-rater reliability on the mind-mindedness construct for the empirical study. We consulted with Elizabeth Meins where necessary, and again, met frequently with our shared supervisor Dr Pasco Fearon throughout the course of the project. We each coded one third of the videos. However, the individual analyses for each of our projects and the writing up was done independently. Yaman's empirical research studies the impact of the Minding the Baby home-visiting programme on maternal mind-mindedness, and Helen's research studies the associations between maternal mental health, maternal mind-mindedness, and infant attachment security.