Minding the Baby: Examining the impact of a reflective home-visiting programme in promoting maternal Mind-Mindedness

Yaman Alqadri

D.Clin.Psy. Thesis (Volume 1)

2022

University College London

UCL Doctorate in Clinical Psychology

Thesis Declaration Form

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

Signature:

Name: Yaman Alqadri

Date: 31 – July – 2022

Overview

Part 1: Literature Review

The first section of this thesis consists of a meta-analysis. The current review synthesises the evidence pertaining to the relationship between the various types of childhood neglect and the later capacity for mentalization in adulthood. Results indicated a small, significant, effect size of a negative association between child neglect and adult mentalizing. While drawing attention to early adverse experiences of emotional and physical neglect as risk factors for poorer mentalizing ability in adulthood, this review highlights the need for a specialized operationalization and measurement of childhood neglect.

Part 2: Empirical Paper

The second section of this thesis is an empirical paper that builds on previous testing of Minding The Baby (MTB; a mentalization-based home-visiting programme) in the UK, in order to examine its effectiveness in relation to maternal mind-mindedness. The study did yield evidence of impact for mothers' mind-mindedness profiles, particularly in the domain of spontaneous mentalizing of their infants. The study further substantiates the existing evidence of finding effective and accessible ways to promote better outcomes for high-risk families living in adverse socio-economic circumstances.

Part 3: Critical Appraisal

The critical appraisal reflects on the choice of the research topic and the process through which the coding was conducted, providing a brief overview of some methodological challenges. While the theoretical component of the research was enjoyable, the lack of prior technical experience made for some difficulties. Given the cross-cultural setting of the research, a significant shortage in the literature is highlighted.

Impact statement

This research aimed to contribute to the ever-growing body of literature on the concept of mentalizing and its crucial connection to early childhood experiences. In the first part of this thesis, mentalization is examined as an outcome of adverse childhood experiences –focusing on early neglect. In the second part of the thesis, mentalization is empirically investigated as it informs intervention targeting the early mother-baby relationship for the purpose guarding against potential adverse child outcomes. As such, the two parts of the thesis, although independent, do theoretically complement each other in highlighting the intergenerational aspect of mentalization and its relation to optimal psychological development.

The meta-analysis detailed in this thesis highlights the deleterious impact of childhood neglect on the adult's capacity to represent, and reflect on, one's own and other's actions in terms of intentional mental states. The evidence attesting to the centrality of this capacity, or lack thereof, to various mental health difficulties has been paramount. A meta-analytic investigation that addresses the nature of the long-term impact of early neglect on mentalizing, is a necessary first step towards promoting best interventive practice to ameliorate potential threats to the development of healthy mentalizing. Understanding the risk factors to adults' mentalizing capacities can inform and guide clinical practice as mental health practitioners attempt to engage, formulate, and treat patients, irrespective of the modality of therapy. The findings of the meta-analysis highlighted the need to achieve consensus on defining, as well as reliably measuring, childhood neglect with important implications for the academic, clinical, and social policy efforts in protecting and supporting neglected children.

As childhood adversity is often relational and involves the quality of the primary relationship with caregivers, clinical effort attending to this key relationship for the developing child are undoubtedly warranted. Such interventive efforts become all the more important when

considering vulnerable families living in adverse socio-economic circumstances, often with histories of trauma and familial distress. The study detailed in the second part of this thesis is an empirical examination of a highly promising home-visiting intervention programme, designed to support vulnerable mothers throughout the first two years of the baby's life. Minding the Baby programme implements a clinically unique approach in that it draws on contemporary attachment theory, as well as the accumulating evidence attesting to the importance of parental mentalizing in nurturing optimal child development. Our results further contribute to the existing evidence on the efficacy of MTB by demonstrating its impact on with regards to maternal mind-mindedness. That is mothers' spontaneous proclivity to treat her child as a child with thought, feelings, desires, wishes and intentions, rather than a creature with needs to be satisfied.

Findings of both papers of this thesis have important implications in furthering our understanding of the relation between a key human capacity – the capacity to mentalize – and the quality of early relationships, namely within the parent-infant dyad.

Table of contents

List of tables and figures

Part 1: Literature Review

Part 1: Empirical Paper

ACKNOWLEDGEMENTS

This thesis project would not have been accomplished without the valuable support I received from my supervisor, Professor Pasco Fearon.

I am also grateful for Samara and Helen, the two lovely research partners with whom I spent much of the past year learning, chattering, and strategizing a happy end to our third doctorate year. And we did it!

I am forever indebted to my mother, Eman, whose complete faith in me made everything I am and whom I could never thank enough; and to my father, Huzaifa, who has taught me all my sciences in school and spent nights by my side as I studied for exams.

Many thanks to Ammar and Dana, the best friends one could wish for on such a long journey, who were never tired of listening and providing support whenever needed. Thanks also to Ameer, whose genius, brilliance and sense of humour were utterly invaluable.

I would also like to thank my family members and friends in Montreal for the warmth and support they offered me as I began my academic journey in Canada: Amina, Bashar, Maya, Feras, and Ibrahim. Many thanks to Maryam for having helped me change my life trajectory. I would also extend my thanks to Glorianne, an inspiring psychologist who has been a key figure in setting me on the path of clinical psychology training at UCL.

Last but not least, I am beyond grateful to my husband and life partner, Yasser, for his wisdom, unwavering support, and unconditional love that got me through the long days and nights of the last three years.

PART 1: LITERATURE REVIEW

Childhood neglect as a risk factor for mentalization in adulthood: a meta-analysis of general population studies

Abstract

Background: The role of early maltreatment in the development of mentalization has been studied in various independent studies. Given the complexity of developmental pathways from childhood to adulthood, quantifying the association across multiple studies offers a higher precision of estimate and allows an objective integration of quantitative evidence pertaining to this association. This meta-analysis aims to estimate the strength of the association between the experience of neglect in childhood and mentalization measured in adulthood.

Methods: The meta-analysis offers a synthesis of extant literature pertaining to the association between childhood maltreatment, especially experiences of neglect, and adult mentalization. In order to identify the relevant studies, systematic electronic searches were conducted in line with PRISMA guidelines. In total, 20 eligible studies (23 separate samples) with 34,802 participants were included for the study of the association between childhood neglect and mentalizing in adulthood. Additional 18 studies (19 separate sample) of 17,163 participants were independently analysed to examine the association between overall childhood maltreatment and adult mentalizing. The two effect sizes were compared to each other. A multivariate mixed-effects model was adopted to identify possible moderators of the relation between childhood neglect and mentalization.

Results: In line with the expectations, childhood neglect was negatively associated with adults' capacity to mentalize. The results showed a pooled correlation of $r = 0.15$ between experiences of childhood neglect and later mentalization. The highest value of association with mentalization was produced by emotional neglect ($r = 0.17$), followed by total neglect ($r = 0.16$), and finally physical neglect ($r = 0.14$), however, they did not statistically differ from each other. Meta-regression showed that younger age at the assessment of mentalization, and percentage of participants from ethnic minority backgrounds, were positively associated with higher impairment of mentalization. This suggests that samples including a higher proportion

of minoritized ethnicities, and participants of younger age, produced stronger associations. Lastly, general maltreatment had a marginally stronger association with adult mentalizing (r = 0.17) but not statistically different from childhood neglect.

Conclusion: Given the apparent lack of consensus on defining neglect, significant challenges in measuring neglect and its associated developmental outcomes are still present in the research literature. Findings from this meta-analysis could be utilised to inform future research efforts studying the long-term outcomes of early experiences of neglect.

Introduction

Mentalizing is defined as an imaginative mental activity which enables individuals to perceive and interpret human behaviours in terms of intentional mental states, such as beliefs, reasons, desires, needs, purposes, and goals (Bateman & Fonagy, 2006; Fonagy & Target, 2005). Similar to other forms of social understanding, mentalization is conceptualized to be a developmental achievement wherein the emotional relationship between the caregiver and the child functions as an important environment within which children learn to recognize a thought, a feeling, or an intention within themselves or in others (Fonagy & Target, 2005). Given that the capacity to mentalize develops within the context of the primary relationships experienced by the child, it is therefore believed to be susceptible to extreme deviations from evolutionary-expectable environmental conditions that are imperative to a healthy human development (Fonagy, Gergely, Jurist & Target, 2018). Physical or psychological abuse, severe neglect, molestation, or other forms of maltreatment experienced during childhood are all different examples of such severe deficiencies in expectable environmental experiences.

Previous meta-analytic studies have shown that individuals with an impaired/under-developed capacity to mentalize are at a higher risk of various psychopathologies, particularly in relation to personality disorders (Bora, 2021; McLaren, Gallagher, Hopwood & Sharp, 2022) but also schizophrenia (Sprong, Schothorst, Vos, Hox & van Engeland, 2007) and eating disorders (Simonsen, Jakobsen, Grøntved, & Kjaersdam Telléus, 2020). Additionally, meta-analytic efforts have evidenced the impact of maltreatment on various closely related constructs to mentalization. These meta-analyses focussed on investigating maltreatment in relation to theory of mind in children (Benarous, Guile, Consoli & Cohen, 2015), social understanding in children (Luke & Banerjee, 2013), and emotion recognition in adults. The direct association between childhood maltreatment and mentalization has not yet been meta-analytically explored in the adult general population. Studying this association is important in order to learn about

the predictive value of maltreatment for difficulties in mentalizing in adulthood. As maltreatment is a construct that combines experiences of childhood abuse and neglect, and their impacts appear to be quite distinctive, this study focuses on childhood neglect (physical and emotional neglect) and its relation to mentalization in the general non-clinical adult population. Another arm of this review is being simultaneously conducted with a specific focus on experiences of childhood abuse (Melwani, 2022).

Mentalization

To mentalize is to engage in an imaginative mental activity that facilitates the perception and interpretation of human behaviours in terms of intentional mental states (Allen, Fonagy & Bateman, 2008). A similar imaginative leap is necessary to understand one's own mental experiences, which results in mentalization consisting of a self-reflective and an interpersonal component. Moreover, research on mentalization attests to its vital role in self-organization and affect regulation, consequently acting as a protective mechanism against various clinical psychopathologies (Fonagy, Luyten, & Strathearn, 2011). However, the extent to which individuals are able to master this fundamental capacity is crucially influenced by quality of early experiences as well as genetic dispositions. Therefore, the optimal development of the capacity to mentalize is dependent on the interaction with other sensitive and mature minds, and to understand these processes, it is imperative to consider the facilitative role played by attachment in the development of mentalization.

The first building block of the theoretical accounts of mentalization is the infant's innate capacity to detect features of his world that react contingently to his own signals (Fonagy, Target Gergely, Allen & Bateman, 2003). Initially, the baby realizes that he is a *physical agent* as well as a *social agent,* as he learns that his actions bring about perfectly contingent changes in the bodies, behaviours, and emotions of caregivers (Leslie, 1994;

Neisser, 1988). Later, the baby's preference shifts towards high-but-imperfect contingencies, which are characteristic of the attuned caregiver's mirroring responses to child's emotional displays. In addition, parental mirroring – unlike a mirror – has the quality of being *marked* (empathic but slightly exaggerated), which helps the baby see the representation of his inner state without the risk of escalating his emotional display (Allen, Fonagy & Bateman, 2008). As the caregiver continues to understand and respond to the infant's signals of moment-to-moment changes in state, these repeated mirroring responses enable the infant to differentiate his internal self-states and a dyadic regulatory system gradually emerges. As such, secure attachment is crucial in facilitating early mentalizing skills by allowing the infant to "*discover his/her psychological self in the social world"* (Gergely & Watson, 1996; Gergely, 2001).

It has been well established that mentalization, as a construct, is not a static unitary skill or trait but rather multifaceted and dynamic mental function. Importantly, mentalization encompasses multiple polarities and individuals might have impairments in some but not necessarily in others (Fonagy & Lutyen, 2009; Luyten et al., 2011). Four distinct polarities/dimensions have been proposed to underpin mentalization: automatic vs. controlled, internally focused vs. externally focused, self-oriented vs. other-oriented, cognitive process vs. affective process. When taken together, the outcome emerges as a comprehensive matrix for the conceptualization of the various aspects of mentalization. In this way, mentalization demonstrates its relation to closely related constructs such as empathy, theory of mind, mindfulness, psychological mindedness, alexithymia, and insightfulness (Allen & Fonagy, 2006). These dimensions operate as systems in which a deficit at one end of the pole is manifested as an excess at the other end. For example, an impairment in self-oriented mentalization may be exhibited as excessively other-oriented mental representations (Bateman & Fonagy, 2012). Considering this operationalization of mentalization as a multidimensional matrix, the search terms employed in this meta-analysis were inclusive of most closely related

phenomena to mentalization. We believe a broad operational definition that incorporates the various ways of capturing mentalizing skills and abilities will contribute to a higher quality and more complete appraisal of the evidence.

Maltreatment and neglect

Child maltreatment is defined as any act of commission or omission by a caregiver that could result in threat of harm, potential for harm, or actual harm inflicted on the child (conventionally interpreted as 18 years of age or younger), regardless of whether harm was the intended result or not (Gilbert et al., 2009). Four types of maltreatment are commonly recognised: physical abuse; sexual abuse; psychological abuse, sometimes referred to as emotional abuse; and neglect. Maltreatment of children by their parents or other caregivers remains a main social-welfare and public-health problem. In addition to significantly contributing to child mortality and morbidity, population estimates attribute approximately 45% of childhood psychiatric disorders to experiences of childhood maltreatment, including abuse and neglect, suggesting that it might be the greatest predictor of mental health difficulties (Teicher & Samson, 2016). However, child maltreatment is a heterogenous phenomenon that includes different types of abuse and neglect. An emergent body of literature suggested that different forms of childhood maltreatment have differential effects on psychopathology (Danielson et al., 2005; Teicher et al., 2006; Lobbestael et al., 2010; Teicher and Samson, 2013).

Although child sexual and physical abuse are considered the most severe forms of child maltreatment by the public, emotional abuse and child neglect continue to be the most common reasons for placing children in child-protection systems. The serious cumulative harm these psychological forms of maltreatment cause is only beginning to receive the attention it warrants (Scott, 2009). Neglect is defined as the failure to meet a child's basic physical, emotional,

medical, or educational needs. Physical neglect is characterized by a lack of basic physical necessities, including safe, clean, and adequate housing, food, health care, and clothing. Psychological neglect is characterized by a lack of caregiver warmth, nurturance, support, and encouragement, along with limited opportunities for developmental enrichment (Erickson & Egeland, 2002).

In attempting to understand how environmental exposure to different adverse experiences and events early in life produce negative outcomes years later, the cumulative risk model (long-term adverse outcomes are better predicted by the total number of environmental risk exposures) has established itself as the primary thesis and is widely accepted in developmental psychopathology (e.g., Adverse Childhood Experiences, ACEs). Accumulating evidence has led many researchers to propose that the dose, timing, and nature of adverse experiences, indeed, matter. Because the developing brain anticipates certain kinds of environmental input at certain times, substantial deviations from what is needed and anticipated can compromise brain and behavioural development (Fox, Leavitt, & Nelson, 2010; Rutter, O'Connor, & ERA Study Team, 2004). Multiple research groups have noted that adverse experiences can be conceptualized by distinguishing harmful input (threat/abuse/violence exposure) and between inadequate input (neglect/deprivation). Consistent with this understanding, it was suggested by Humphreys and Zeanah (2015) that trauma and deprivation represented distinct deviations from the expectable environment; they also systematically reviewed evidence linking each to various types of psychopathology. Similarly, McLaughlin, Sheridan, and Lambert (2014) suggested that threat and deprivation are two distinct pathways to psychopathology through identifiable brain circuits.

In light of the above, the current meta-analysis limits its scope to childhood neglect and, in addition to examining its impact relative to those not exposed, the review will also compare its effect on mentalization to that of global measures of maltreatment.

The relation between maltreatment/neglect and mentalization

A considerable body of evidence links maltreatment of children to problems of mentalization. For example, it has been shown that maltreated children engage in less dyadic and symbolic play (Alessandri 1991), have a more restricted internal state lexicon (Beeghly & Cicchetti, 1994), may have difficulty displaying empathic responses to observed distress in peers (Klimes-Dougan & Kistner, 1990), and show a delay in the development of theory of mind capabilities (Cicchetti, Rogosch, Maughan, Toth, & Bruce, 2003). Furthermore, an empirical study conducted by Pears and Fisher (2005) showed that maltreatment was associated with worse emotional understanding (emotion recognition and affective perspective-taking), even when accounting for age, intelligence, and executive function.

As for the specific impact of childhood neglect on mentalization, one systematic review presented evidence that individuals with history of early negligence present alterations to the ability of perceiving facial emotional expression (Doretto & Scivoletto, 2018). Additionally, a recent meta-analysis (2022), showed that forms of neglect were more strongly associated with alexithymia in comparison to physical or sexual abuse (Khan & Jaffee, 2022). This may indicate that individuals who were neglected in childhood not only have difficulty recognizing others' emotions but may also be unaware of their own emotional experiences.

Theoretically, it has been proposed that maltreatment affects mentalization by compromising the unconstrained, open, reflective communication between parent and child (Fonagy, Gergely, & Target, 2007). Within the model of mentalization, neglect is effectively depriving the developing child from the necessary opportunities for a caregiver to consider, comprehend and respond to his or her perspective. Consequently, neglecting the child's communicated needs can devastate their internal world as they fail to internalize representations of their own mind, which results in the later distortions of their social-cognitive functioning (Bateman & Fonagy, 2012). When the natural process of maturation for

mentalizing is undermined by violating the child's evolutionary expectation of attuned social input, a potential vulnerability to stressful psychosocial experiences is created (particularly under conditions of high arousal and threats to attachment). This can further undermine future opportunities for the development of mentalizing into adulthood, resulting in a higher susceptibility to trauma and the development of psychopathology across a lifetime (Bick & Nelson, 2017).

The current review

This meta-analysis aims to estimate the strength of the association between the experience of neglect in childhood and mentalization, measured in adulthood. Given the hypothesis that the strength of this association may differ depending on whether individuals experienced physical or emotional neglect, effect sizes between mentalization and each form of childhood neglect will be estimated and compared. In addition, the effect size representing the relationship between childhood neglect and mentalization will be compared to that of the relationship between overall childhood maltreatment and mentalization.

Given the developmental element to the research question of the current investigation, it is hypothesised that childhood neglect precedes the observed impairment in mentalizing in adulthood. This will be investigated through a sperate analysis of the longitudinal studies included in this review in comparison to the cross-sectional designs - where childhood maltreatment and mentalization were measured at the same point in time.

Several sample characteristics were included as potential moderators of the relationship between childhood neglect and mentalization. These included gender, ethnicity, and age, due to evidence that they may account for individual differences in mentalization. Given that various measures may tap into different dimensions of mentalization, the study characteristic of mentalization measure was included as a potential moderator.

Methods

Studies were selected through the extensive search of PsycInfo, Medline, PubMed, Web of Science, and Cochrane Library using a comprehensive list of search criteria to capture both types of maltreatment as well definitions of mentalization. Databases were searched in September 2021 with an updated search conducted in February 2022 to capture papers published since the first search. The literature search was filtered to only include articles, journal articles, or peer-reviewed journals in English, German and Dutch. No chronological time limit was used when searching the databases to identify all relevant studies published regardless of publication date. The full list of search terms used for this review can be found in Appendix 1.

Inclusion and exclusion criteria

Titles and abstracts were reviewed by two coders, requiring agreement by both of them. Any disagreements were settled through discussion and consensus. Multiple inclusion criteria were implemented to select the studies for this review. First, studies had to include measure of childhood maltreatment or otherwise referred to as childhood trauma. Second, studies had to include a measure of mentalization defined as mentalization or as one of the following: reflective function, theory of mind, social cognition, emotion recognition, alexithymia, mind mindedness, insightfulness, mindedness, or mind related. Third, studies measured mentalization in adulthood only. Fourth, the studies had to provide sufficient statistical information to calculate an effect size.

Papers were excluded for the following reasons: (a) they did not specifically measure childhood maltreatment (e.g., studies measuring general childhood adversity); (b) they did not measure mentalization as psychological construct (e.g., measuring brain activity associated with mentalization); (c) they did not directly examine or report on the relationship between

maltreatment and mentalization and these statistics could not be obtained via contacting the authors (e.g., variables included as mediators or moderators only); (d) were not empirical in their design (e.g., case studies); (e) recruited participants from the clinical population; (f) measured mentalization in childhood or adolescence; (g) the full text could not be obtained (Figure 1.1).

Literature search

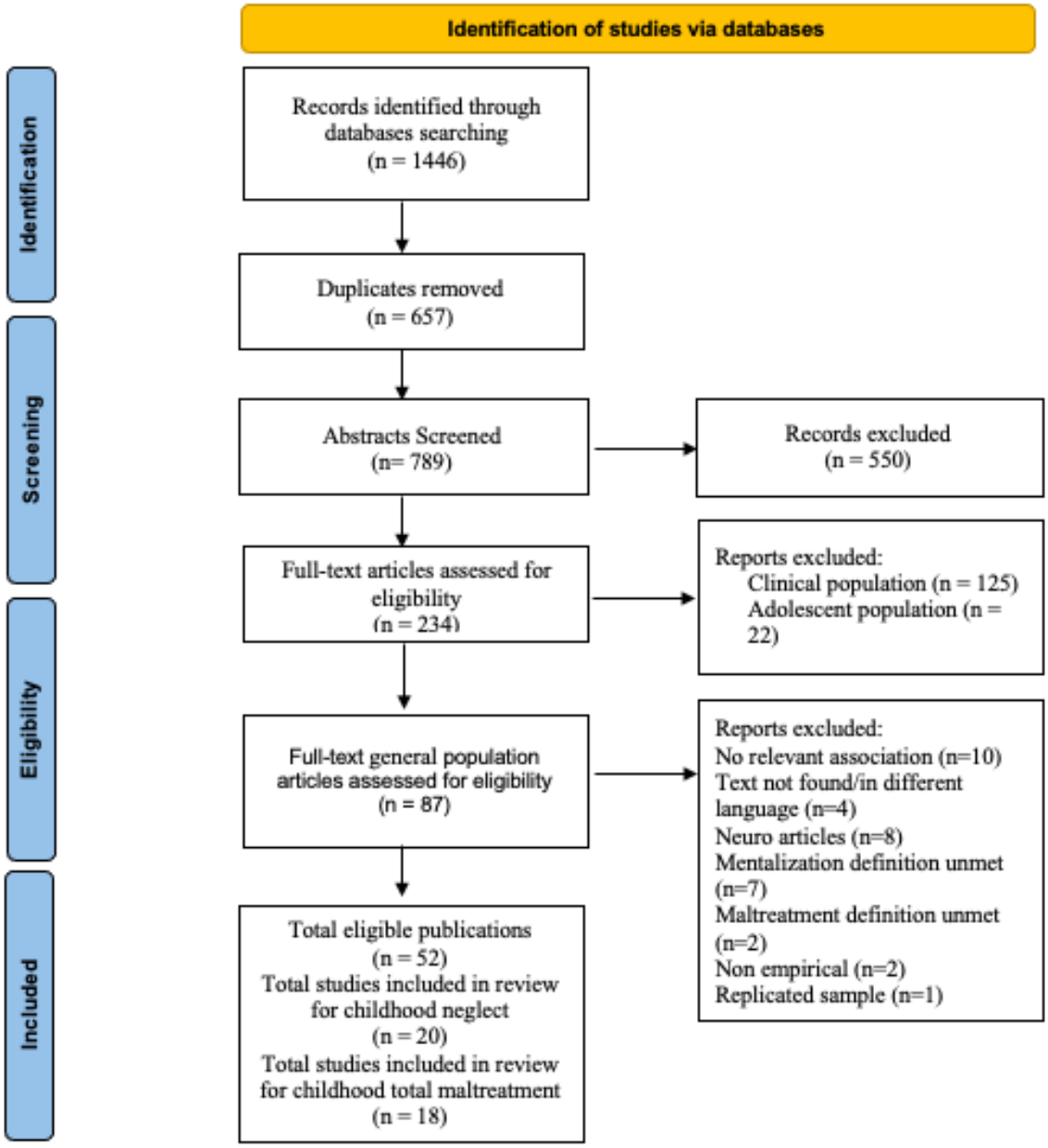
The initial search returned five partially overlapping sets of studies (N = 1446) which contained 789 unique articles after removing duplicates. These abstracts were read and evaluated for inclusion by the two coders. In the first instance the abstracts were screened to identify studies that fit criteria of an empirical investigation (cross sectional/ longitudinal/ intervention study), and mention the variable mentalization and either childhood maltreatment, adult attachment, or both. Ultimately, 550 studies were discarded because they did not meet the baseline of inclusion criteria. The remaining 234 articles were then classified by sample, yielding 87 of a general population, 125 of a clinical population, and 22 of an adolescent population. As this review maintains specific focus on the general population, the latter two categories were excluded in this phase. Although some articles investigating the clinical population included control samples taken from the general population, the effect sizes were generally not possible to distinguish and therefore these papers were excluded from the review.

The 87 general population articles were then reviewed individually for eligibility using the full set of inclusion criteria. Of these, 34 additional studies were excluded for the following reasons: (a) 7 papers did not meet the definition of mentalizing, (b) 10 papers presented no relevant associations, (c) 8 papers were neurological, (d) 4 we were unable to find the full text or was in a different language, (e) two papers did not meet the definition of maltreatment, (f)

and two other papers did not present an empirical study. Two additional papers were identified with overlapping samples, and as the effect sizes presented were identical, one of them was excluded. One study was not included for the purpose of this review as it exclusively looked at the relationship between attachment and mentalization with no acknowledgement of childhood maltreatment. The final number of eligible publications was therefore 52, of which 20 articles were included in this meta-analysis that included data looking specifically at the association between neglect and mentalization. Additionally, 18 studies were also included as they looked at the association between total experiences of childhood maltreatment and mentalization. One study was overlapping between the two samples (Swannell et al., 2012) as it reported independent effect sizes for both measures: total maltreatment and neglect only. Studies that reported exclusive data on childhood abuse (mainly sexual or physical abuse) and mentalization were not used in this meta-analysis but were included in the other arm of this review by Melwani (2022; joint doctorate in clinical psychology research project) specifically focussing on experiences of childhood abuse. Therefore, out of the 52 eligible publications, 37 studies were used in this meta-analysis as it has a specific focus on childhood neglect.

Figure 1

Flow chart of the search process and exclusion of papers



Data extraction and coding

Data was extracted from the full text articles of all included studies and recorded in an independent coding spreadsheet. Any queries or disagreements between the coders were settled

via discussion and consensus. The information extracted included details of the studies' characteristics including: the study design, sample size, percentage of sample that was male or female, mean and range age of the sample, percentage of the sample that was from an ethnic minority group, the country in which the study occurred. Additionally, details of the measurements used for all variables of interest were coded: including the type of instrument, its reliability score, and the direction of measuring (i.e., whether higher scores on a certain scale reflect higher or lower mentalizing/maltreatment). Additional characteristics were coded, such as the frequency, severity, perpetrator, and age of maltreatment, but were not included as moderators because the majority of studies did not provide sufficient information. Each study was further coded for characteristics related to the effect size or multiple effect sizes reported in the results sections of the articles. Authors of studies that investigated our variables of interest but did not report on the relationship between the two, were contacted via email to provide the relevant effect sizes.

Table 1

Study characteristics of final sample of studies for childhood neglect and mentalization

Study	Sample Size	Mean Age (years)	Gender (% female)	Ethnicity (% minority)	Childhood Neglect Measure	Mentalization Measure
Brown et al. (2016)	339	19	46	28	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Brown et al. (2018)	500	19	50	28	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Gaher et al. (2015)	407	20.3	65	7	Child Abuse and Trauma Scale	Toronto Alexithymia Scale
Germine et al. (2015)	2242	32.5	67	25	TestMyBrain Childhood Experiences Questionnaire	Reading the Mind in the Eye Task
Kajanoja et al. (2020)	2595	31.8	66		The Trauma and Distress Scale	Toronto Alexithymia Scale
Kapeleris et al. (2011)	187	22	74	33	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Kaur et al. (2021)	646	23.1	97	65	Computer Assisted Maltreatment Inventory	Toronto Alexithymia Scale
Lloyd et al. (2021)	98	38.4	60	28	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Mazzeo et al. (2002)	406	19.1	100	18	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
McCuaig Edge (2020)	2927	27	10		Adverse childhood experiences questionnaire	Toronto Alexithymia Scale

Mohaupt et al. (2016)	36	36.2	0	0	TEC	Parental reflective functioning – revised
Morie et al. (2020)	57	22.9	46	80	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Paivio et al. (2004)	100	21	100		Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Cristobal et al. (2017)	124	29.7	100		Childhood Trauma Questionnaire	Reflective functioning questionnaire – Prementalizing
Swannell et al. (2012)	7103	52.1	100		Childhood Trauma Questionnaire	Toronto Alexithymia Scale – one item
Terock et al. (2018)	5283	53.5	52	0	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Turgeon et al. (2020)	63	32	100	20	The French brief screening version of Childhood Trauma Questionnaire	Computarized task resembling the facial expression Mega mix
Mazzeo et al. (2008)	412	19.6	100	0	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Mazzeo et al. (2008)*	192	20.2	100	100	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Terock et al. (2020)	1916	55	53	0	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Terock et al. (2020)*	3658	51	51	0	Childhood Trauma Questionnaire	Toronto Alexithymia Scale
Terock et al. (2019)	2069	55.2	53		Childhood Trauma Questionnaire - German Version	Toronto Alexithymia Scale
Terock et al. (2019)*	3442	51	51		Childhood Trauma Questionnaire - German Version	Toronto Alexithymia Scale

Note. * Repeated studies treated independently as they were conducted on a unique sample.

Calculations and Analyses

Effect sizes were presented as correlation coefficients. It was hypothesized that childhood experiences of emotional and physical neglect would be associated with poorer mentalization, or with higher impairment in self-mentalizing skills as reflected in alexithymia. All correlations were keyed into the same direction so these coefficients could be compared to each other. A statistically positive correlational value indicated that the aggregated effect size was in line with the proposed hypothesis, that is, childhood neglect was hypothesized to be associated with less or impaired mentalization in adulthood. According to Cohen's (1998) formulated criteria for interpreting effect sizes, effect sizes around $r = .10$ were considered as small, effect sizes around $r = .30$ as medium, and effect sizes around $r = .50$ as large. When necessary, non-correlational statistics were converted into correlational scores using the converter spreadsheet of DeCoster (2012) and Comprehensive Meta-Analysis (CMA) software (Borenstein, Hedges, Higgins & Rothstein, 2014, Version 3)

The continuous variables (mean age, proportion of females, proportion of ethnic minorities) were centred around their mean, and categorical variables were recoded into dummy variables. Correlation coefficients *r* were recoded into Fishers *z*-values for analysis, and back into *r* for interpretation. Treating the correlation coefficient through converting them into standardized values is the recommended practice as it corrects for problems with standard error and the distribution of the statistic at extremes (Lipsey and Wilson, 2001). CMA (2014) was also used to obtain the standardized Fisher z-values and their respective estimated standard errors.

For the majority of studies pertaining to the main question of the relation between childhood neglect and mentalization, it was possible to extract more than one effect size per study. This was mainly because most studies provided statistics on the relation between the

different types of childhood neglect and mentalization separately. Due to the possibility that the effect sizes from the same study are more similar compared to effect sizes extracted from different studies, the assumption of independence of effect sizes that underlie classical meta-analytic strategies will be violated (Hox 2002; Lipsey and Wilson 2001). Given that traditional meta-analysis models are ill-equipped to handle non-independent effect sizes, we used another approach to account for the sampling covariance by using multivariate meta-analytic models (van Houwelingen, Arends & Stijnen, 2002; Arends, Voko & Stijnen, 2003), in which the precision of the estimates of the population effect sizes is maximized by weighting the observed effect sizes by their estimated precision.

One way to conduct a multivariate meta-analysis is through using the robust variance estimation (RVE) approach that accounts for the hierarchical structure of the data – in which the effect sizes are nested within studies (Fisher & Tipton, 2015; Van Den Noortgate & Onghena, 2003). This approach enables using all effect-sizes reported in the primary studies, so that all information is preserved, and maximum statistical power is achieved. More recent adjustment by Tipton (2011) to the RVE improved its performance in small samples, when studies are less than 40. Importantly, RVE allows the estimation of both within-cluster ($\omega 2$) and between-cluster ($\tau 2$) true heterogeneity—that is, the amount of heterogeneity that was not due to sampling error. These analyses were performed with the Robumeta R package (Fisher, Tipton, & Zhipeng, 2017). Furthermore, this model offers flexibility that can be extended to include the outcomes as predictors to potentially explain the variance at the outcome level.

In this meta-analysis, we estimate the mean effect for each separate outcome variable (i.e., types of neglect) by dropping the intercept and regressing the observed effect sizes on a set of dummy variables, one for each level of outcome. The coefficients of the dummy variables then provide the population effect sizes for the separate outcomes.

The results indicated heterogenous effect size distribution, meaning that effect sizes cannot be treated as estimates of a common effect size. In this regard, moderator analyses were conducted to test whether the variance between the effect sizes could be explained by some of the sample or measurement characteristics. Categorical moderator analyses were only performed if each level of the candidate moderator contained at least three studies. The Metafor R package (Viechtbauer, 2010) was used for this analysis.

As for the set of studies only reporting on the association between total measure of childhood maltreatment and adult mentalization, a traditional meta-analysis was conducted as the assumption of independence was met for these studies. In computing this meta-analytic value, a random effect model was used as it is more conservative and assumes that differences in effect sizes are due not only to sampling error but also other random variability between studies (Lipsey and Wilson, 2001). The weighted average effect size for the total maltreatment studies was compared to the weighted hierarchical correlation coefficient of the child neglect studies. To examine whether there was a significant difference between the two separate meta-analytic correlational values, a simple z-test was conducted. The Metafor R package (Viechtbauer, 2010) was used.

Results

The first research question examined whether experiences of childhood neglect were systematically related to later adulthood mentalizing capacity within the general population. Additionally, this review tested whether there were meaningful differences between the different types of childhood neglect in their relation to later adult mentalizing.

Secondly, this review looked at the association between overall experiences of maltreatment (including but not limited to neglect) and mentalizing capacities in the adult

general population. Following the results of these two main meta-analytic correlational values, this review examined the difference between childhood neglect and general experiences of childhood maltreatment in relation to mentalization.

In subsequent analyses, moderating variables were tested to examine whether specific sample characteristics were related to the variation in the strength of association between childhood neglect and adulthood mentalizing.

Neglect

The meta-analysis included 20 studies, three of which were considered as six independent studies as each one reported unique data for two separate samples. Therefore, the total aggregation yielded 43 outcomes/effect sizes across 23 independent-samples, and a total of 34,802 participants. The results of the multivariate meta-analysis on the relation between childhood neglect and adult mentalization in the general adult population are presented in Tables 3 and 4. The overall associations can be found in the table as well as the moderator analyses.

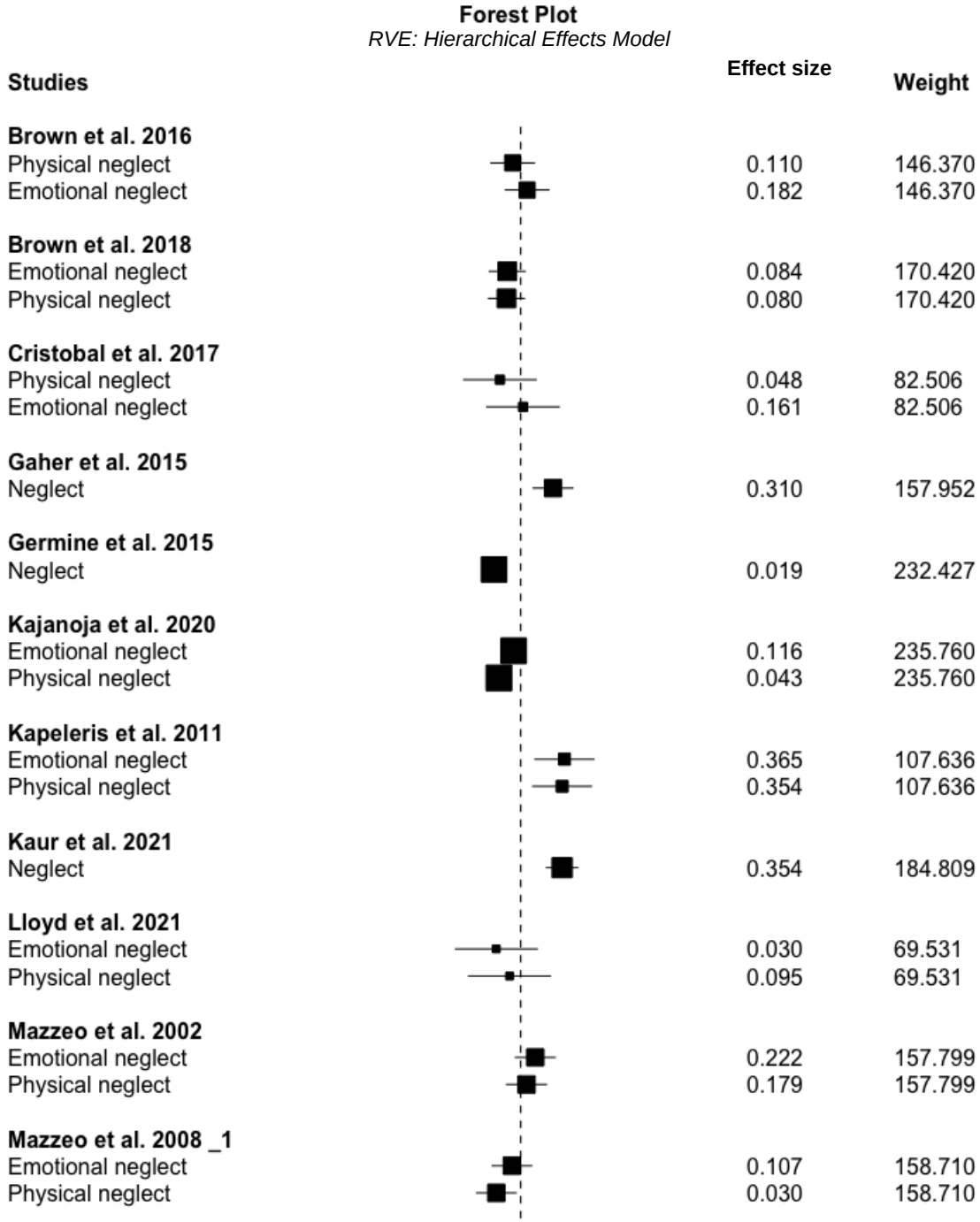
Overall Association Between Childhood Neglect and Mentalization

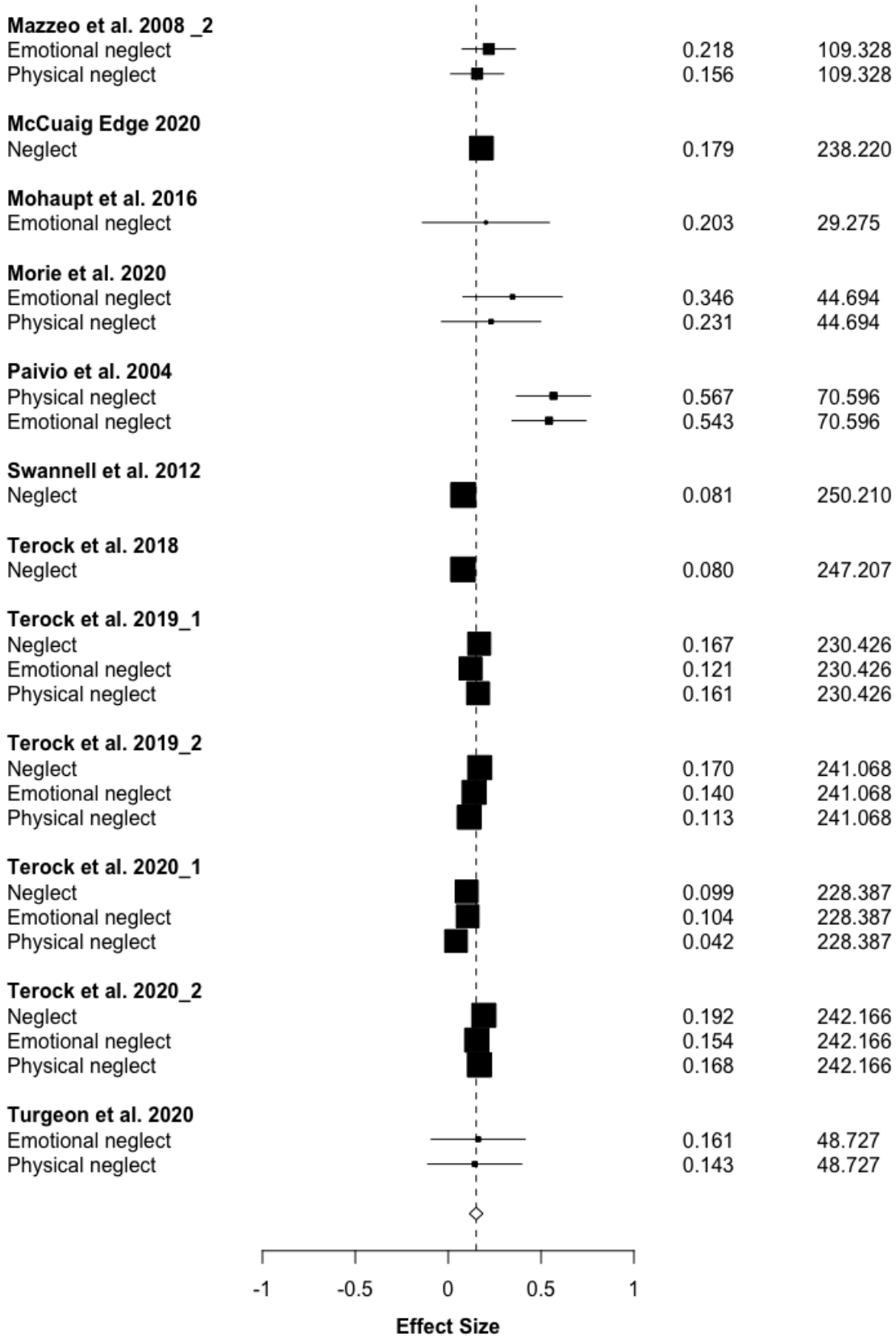
Overall, a significant association was found between childhood experiences of neglect and adult mentalization, $r = 0.15$, $SE = 0.02$, 95% CI [0.11, 0.19], $m = 23$, $k = 43$, $df = 22$, $p < .01$; indicating that, in line with the expectations, childhood neglect is positively correlated with lower capacity of mentalization in adulthood (Figure 2 for forest plot). This weighted average correlation corresponds to a small effect size, $d = 0.3$ (Cohen, 1988). The traditional meta-analytic random-effect (RE) model yielded very similar estimates: $r = 0.16$, 95% CI [0.13; 0.20], $p < .0001$. More specifically, the association between neglect and mentalization was significant for both cross-sectional ($r = 0.16$, $p < 0.0001$) and longitudinal studies ($r =$

0.14, $p < 0.001$) indicating that childhood neglect may precede the observed impairment in mentalizing in adulthood – which is in line with the proposed hypothesis.

Figure 22

Forest plot of multilevel meta-analysis




Mazzeo et al. 2008 _2
Emotional neglect 0.218 109.328
Physical neglect 0.156 109.328
McCuaig Edge 2020
Neglect 0.179 238.220
Mohaupt et al. 2016
Emotional neglect 0.203 29.275
Morie et al. 2020
Emotional neglect 0.346 44.694
Physical neglect 0.231 44.694
Paivio et al. 2004
Physical neglect 0.567 70.596
Emotional neglect 0.543 70.596
Swannell et al. 2012
Neglect 0.081 250.210
Terock et al. 2018
Neglect 0.080 247.207
Terock et al. 2019_1
Neglect 0.167 230.426
Emotional neglect 0.121 230.426
Physical neglect 0.161 230.426
Terock et al. 2019_2
Neglect 0.170 241.068
Emotional neglect 0.140 241.068
Physical neglect 0.113 241.068
Terock et al. 2020_1
Neglect 0.099 228.387
Emotional neglect 0.104 228.387
Physical neglect 0.042 228.387
Terock et al. 2020_2
Neglect 0.192 242.166
Emotional neglect 0.154 242.166
Physical neglect 0.168 242.166
Turgeon et al. 2020
Emotional neglect 0.161 48.727
Physical neglect 0.143 48.727
-1
-0.5
0
0.5
1
Effect Size

Tests of Heterogeneity

To examine the variability of the effect sizes, heterogeneity tests were conducted. The between-studies-within-cluster variance component for the hierarchical effects model (ω^2) was calculated using the method suggested in Hedges, Tipton, and Johnson (2010). The examination revealed that this meta-analytic model exhibits high internal consistency. No considerable within-cluster true heterogeneity was observed ($\omega^2 = 0.00$).

The between-cluster variance component in the hierarchical effects model (τ^2) was also calculated using the same method (Hedges et al., 2010). The model report some between-study true heterogeneity ($\tau^2 = 0.004$). Using the non-hierarchical random-effect model, the homogeneity estimate indicated between-outcomes heterogeneity for all the effect sizes reported: Q (42) = 280.66, p < .0001. Similarly, I^2 statistic, which depicts the proportion of variability that is due to heterogeneity beyond chance, also revealed substantial heterogeneity (I^2 = 85%) (Higgins and Thompson, 2002; Higgins, Thompson, Deeks & Altman, 2003). Because of this heterogeneous effect size distribution, we conducted moderator analyses to examine whether the strength of the association between childhood neglect and adult mentalization is affected by study, sample, neglect, and measurement characteristics.

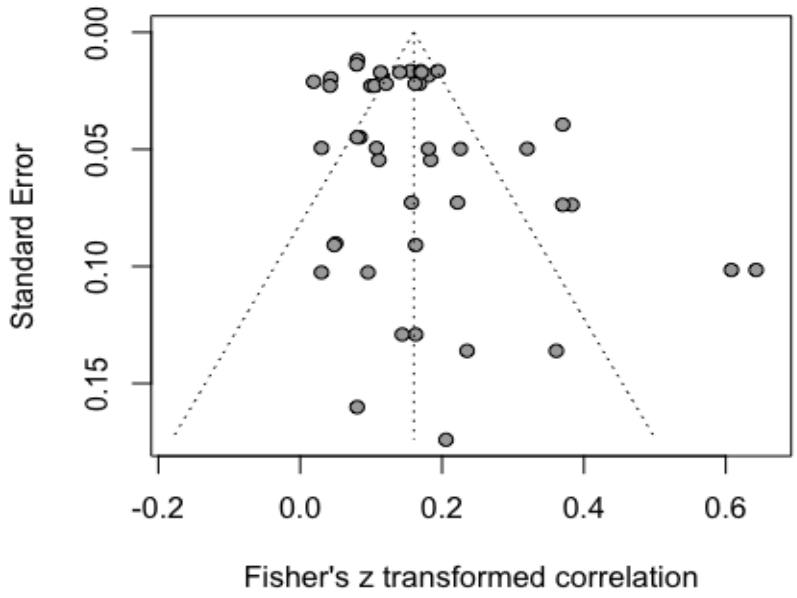
Publication Bias

Regarding publication bias, funnel plot inspection (Figure 3) using Egger's regression test (Egger, Smith, Schneider, & Minder, 1998) reflected a probable bias. Egger's test regresses the standardized effect sizes on their precisions (e.g., standard errors), weighted by the inverse of their variances. In the absence of publication bias, the weighted regression's slope, is expected to be zero (Rothstein et al., 2005; Lin & Chu, 2018). The degree of asymmetry observed in the Funnel plot suggests the data are biased and that small studies with small effect sizes are systematically underrepresented. The funnel plot for the effect sizes was asymmetric,

t (41) = 2.39, p = 0.02 suggesting that null results from unpublished studies may have influenced the findings.

Figure 3

Funnel plot of standard error by Fisher's Z



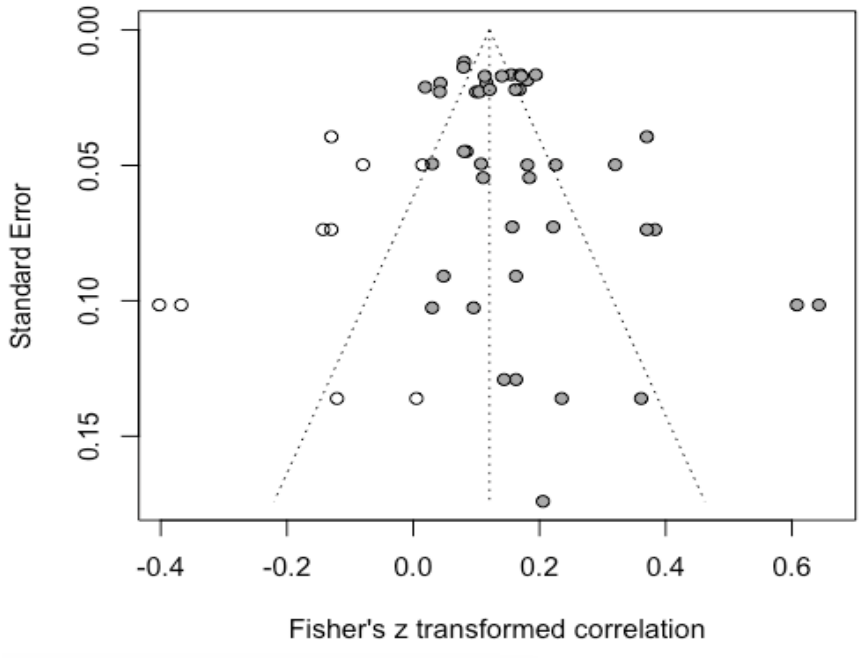
Another effective method to examine the impact of publication bias on our meta-analysis is Duval and Tweedie's trim and fill procedure (2000). Studies who include a larger number of participants are expected to produce more accurate estimates of effect size with smaller standard error. Therefore, effect sizes should become increasingly spread as standard error increases, resulting in a funnel shape if no data censoring was present. However, at times it could be less likely that smaller or non-significant studies are published, known as the 'file-drawer' issue (Mullen, 1989). This type of publication bias becomes evident if the funnel plot looks to be missing studies in the lower left-hand corner. The basis of the 'trim-and-fill' method is to 'trim' the most right-side studies considered to be symmetrically unmatched on the left-

hand side, and then impute, or 'fill' the missing counterparts to these studies as mirror images of the 'trimmed' outcomes on the left-hand side.

This test revealed that this meta-analysis may have missed nine hypothetical, non-published studies with a negative effect size (Duval & Tweedie, 2000). The missing studies are represented visually by the funnel plot (Figure 4). Duval and Tweedie's (2000) also showed how to impute the missing values and give estimates of the effect on the inferences in the meta-analysis due to the publication bias. The overall weighted meta-regression value on the relation between neglect and mentalization was r = 0.12, 95% CI [0.072, 0.17] after adjusting for the estimated nine unpublished effect sizes of null values.

Figure 4

Funnel plot of standard error by Fisher's Z with Duval and Tweedie's trim and fill (2000)



Additionally, Rosenthal's fail-safe N was calculated, which identifies the number of studies averaging null results that would have to be added to the given set of observed outcomes

to reduce the combined significance level (p-value) to a target alpha level of .05 (Rosenthal, 1979). In this meta-analysis, a fail-safe N of 13336 study outcomes was obtained.

Moderators of the association between childhood neglect and mentalization

To try to explain the heterogeneity in the data, a multivariate mixed-effects model was adopted to identify possible moderators of the relation between childhood neglect and mentalization. In a mixed-effects model, effect sizes are tested in a random-effects model while the predictors/moderators are estimated in a fixed-effects model.

The analyses included testing the effect of continues moderators using meta-regression. These were the mean age of participants in the study when mentalization was assessed, the percentage of females in the sample, and the percentage of ethnic minorities in the sample. As recommended by Hedges (1994) weighted least squares regression procedures were employed, with effect sizes weighted by the inverse of the variance.

Additional analyses were employed to examine the effect of each of the following categorical variables on the association between childhood neglect and mentalization: subtypes of childhood neglect, measure of mentalization (Table 4). In this procedure, effect sizes are grouped according to the levels of the categorical moderator variable. If the test of moderators in the mixed-effect model is insignificant, meaning that the levels of the moderator are not different from each other, the intercept was dropped to provide the population averaged correlational value for the separate levels.

Measurement characteristics

Subtypes of childhood neglect. Three main types of childhood neglect were examined to see whether different estimates of effect sizes would be obtained from the separate relations between experiences of childhood emotional neglect and mentalizations, childhood physical neglect and mentalizations, and childhood total neglect and mentalizations. The highest value of association with mentalization was produced by childhood emotional neglect (r = 0.17), followed by total neglect (r = 0.16), and finally physical neglect (r = 0.14). Although each one of three neglect sub-types is significantly different from zero, the test of variance when including the intercept in the model showed that we cannot reject the null hypothesis that total neglect and physical neglect are different from emotional neglect, in their relation to mentalization. In other words, emotional, physical, and total childhood neglect were each significantly correlated with poorer adult mentalization, but they did not differ from each other in their effect sizes.

Measure of mentalization. Given the broad conceptualisation of mentalization used in this meta-analysis, the effect sizes obtained from the studies were grouped into three main categories: Alexithymia (exclusively measured using Toronto Alexithymia scale), Mentalization (measured using all types of reflective functioning scales and Reading the Mind in the Eyes Test), and facial emotional recognition (measured using computerized emotional faces tasks). As the facial emotional recognition level of this moderator included only two effect sizes, it was excluded from this analysis. Correlations were significantly higher when mentalization was measured using Alexithymia scale (r = 0.16, p < .001), however, adding the intercept to the model revealed that correlations between childhood neglect and mentalization did not significantly differ across the measurement groups.

Sample characteristics

***Age*.** The mean age of adult participants at the time of assessment of mentalization in the studies included in the current meta-analysis ranged between 19 years and 55.2 years. Given the wide variety in age among recruited samples, the mean adult age at the time of mentalization assessment was used in the analysis as a continues variable. The mean age of adult participants at the time of the mentalization assessment for the entire sample was 34.2 years (SD = 14.3).

The meta-regression showed that younger age at the assessment of mentalization was significantly associated with higher impairment of mentalization (Table 4). The current analyses showed that age as a covariate explained nine percent of the variance in the distribution of effect sizes (R^2 = 9.4%).

Gender. The effect of the participants' gender (defined as males and females) on the relation between childhood neglect and mentalization was assessed by using the percentage of females in the sample as a continues moderator. The overall proportion of females in the total sample was 63%. Moderation analyses revealed that the proportion of females was insignificantly associated (p = 0.16) with the correlation between childhood neglect and mentalization. Gender as a covariate explained only 0.83% of the variance in the distribution of the effect sizes.

Ethnicity. Proportion of ethnic minority groups in the sample of each study was examined as another continues moderator. For the studies that did not report on the ethnic background of their participants, the ethnicity data was coded as missing and thus these studies were omitted from the moderation analysis for this variable. Studies that had a total sample from ethnic majority background (e.g. white European) were assigned a score of true zero for ethnicity. The overall proportion of ethnic minority groups in our total sample was 5%. Minority participants were mainly from black, Hispanic, Asian, and native/indigenous ethnic backgrounds. Moderation analyses revealed that the percentage of participants from ethnic minority backgrounds was significantly associated with the correlation between mentalization and neglect. This moderator explained 14.2% of the variance observed in the distribution of the effect sizes. In other words, the higher the proportion of ethnic minorities in the sample, the stronger the association between childhood maltreatment and adults' capacity to mentalize.

Multivariate Model. We examined the unique contribution of the significant moderators to the variance in effect sizes by applying a multivariate model. We included the sample characteristic moderators that were significant in the separate bivariate models. It was found that the model including both Age and Ethnicity explained 13.3% of the variance. As ethnicity alone explained more of the variance (14.2%) than the combined model, we can infer that ethnicity has the highest predictive power regarding the association between childhood neglect and mentalization. This means that gender – being a male or a female – did not add to the explanatory power of difference in ethnicity.

Overall maltreatment

A separate meta-analysis was conducted on a set of studies reporting on the association between overall experiences of childhood maltreatment and adult mentalization (Figure 5). It

included 18 studies with 19 independent samples and a total of 17,163 participants. Using a random-effect model, a significant association was found between childhood maltreatment and adult mentalization, $r = 0.17$ (95% CI [0.07; 0.26], $p = 0.002$) indicating that, in line with the hypothesis, childhood maltreatment is negatively associated with adults' mentalization capacities. This weighted average correlation converts to a small effect size, $d = 0.34$ (Cohen, 1988). The homogeneity estimate (Chochran's Q test) indicated a sizable degree of between-study heterogeneity for the estimated correlations: Q (18) = 451.01, $p < 0.0001$, $I^2 = 95\%$ (Higgins and Thompson, 2002; Higgins, Thompson, Deeks & Altman, 2003). The fail-safe number of studies reporting null results needed to reduce the effect size to non-significance was 1769, exceeding Rosenthal's criterion and providing evidence that the effect size is robust and is not accounted for by the 'file-drawer problem'. The trim-and-fill approach was employed to examine whether there was any evidence of publication bias or data censoring. Five studies were trimmed and filled, with a resulting significant combined effect size of $r = 0.10$ (95% CI [0.04; 0.13]; $p = 0.23$; Q (23) = 1046.09).

Table 2

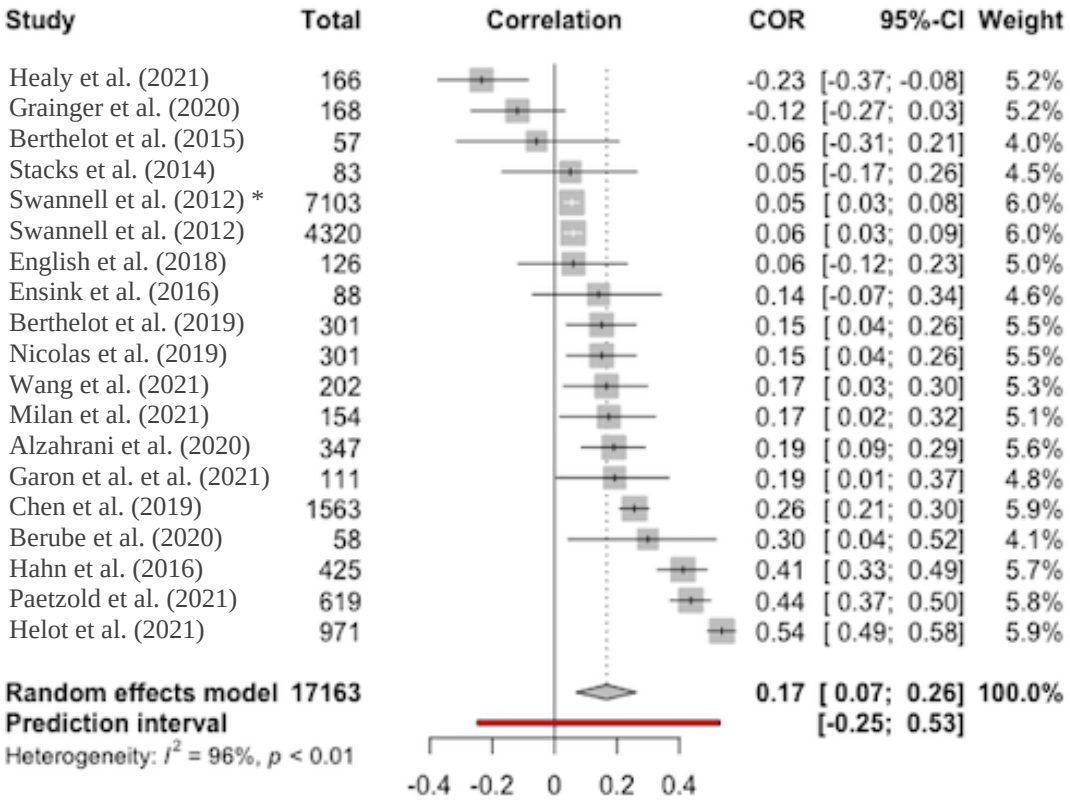
Study characteristic of sample of studies for total childhood maltreatment and mentalization

Study name	Sample size	CM Measure	ME Measure
Alzahrani et al. (2020)	347	Interview	Toronto Alexithymia Scale (TAS-20)
Berthelot et al. (2015)	57	Childhood Experience of Care and Abuse (CECA)	Reflective-Functioning Manual for Application to Adult Attachment Interviews
Berthelot et al. (2019)	301	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ)
Berthelot et al. (2021)	971	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ-8) – Short Form
Berube et al. (2020)	58	Childhood Trauma Questionnaire (CTQ)	A method similar to the Facial Expression Megamix Task
Chen et al. (2019)	1563	Childhood Trauma Questionnaire (CTQ)	Toronto Alexithymia Scale (TAS-20)
English et al. (2018)	126	Childhood Trauma Questionnaire (CTQ)	Emotional Faces Task
Ensink et al. (2016)	88	Telephone interview and Adult Attachment Interview (AAI)	Reflective-Functioning Manual for Application to Adult Attachment Interviews
Garon-Bissonnette et al. (2021)	111	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ)
Grainger et al. (2020)	168	Childhood Trauma Questionnaire (CTQ)	Reading the Mind in the Eye Task (RMET)

Hahn et al. (2016)	425	The Child Abuse and Trauma Scale (CATS)	Toronto Alexithymia Scale (TAS-20)
Healy et al. (2021)	166	Childhood Trauma Questionnaire (CTQ)	Reading the mind in the Eye (RMET)
Milan et al. (2021)	154	Childhood Trauma Questionnaire (CTQ)	Linquistic Inquiry and Word Count (LIWC)
Nicolas et al. (2019)	301	Childhood Trauma Questionnaire (CTQ)	Reflective Functioning Questionnaire (RFQ)
Paetzold et al. (2021)	619	The Child Trauma Screening Questionnaire (CTSQ)	Reflective Functioning Questionnaire (RFQ)
Stacks et al. (2014)	83	Childhood Trauma Questionnaire (CTQ)	Parent Development Interview-Revised Short Form (PDI-R2-S)
Swannell et al. (2012)	4320	Childhood Trauma Questionnaire (CTQ)	One item from the Toronto Alexithymia Scale (TAS)
Swannell et al. (2012)	7103	Childhood Trauma Questionnaire (CTQ)	One item from the Toronto Alexithymia Scale (TAS)
Wang et al. (2021)	202	Adverse Childhood Experiences Questionnaire (ACEs)	Parental Reflective Functioning Questionnaire (PRFQ)

Figure 5

Forest plot of random effects meta-analysis on total maltreatment and mentalization



Comparing Total maltreatment to Neglect

A simple Z-test was run to compare the effect sizes across the two meta-analyses and it revelated a nonsignificant difference between the effects of childhood neglect and general maltreatment on adult mentalizing abilities, z = 1.79, p = 0.07. The direction of difference between the two aggregated effect sizes indicated that total maltreatment had a slightly stronger association with poorer mentalizing abilities in adulthood compared to childhood neglect only, but the difference was not significant.

Table 3

Summary of overall associations with mentalization

	s	*k*	Mean *r*	*t*	*p*	95% CI
Childhood neglect	23	43	0.15	8.54	< .01	.11, .19
Childhood maltreatment	18	19	0.17	3.59	.002	.07, .26

Note. *s* = number of total publications, *k* = number of total outcomes/effect sizes, *t* = t-test value

Table 4

Summary of moderator effects of the relation between childhood neglect and mentalization

Moderator variable	*s*	*k*	Mean *r*	*se*	*t*	*p*	95% CI
Neglect category	*F* (2, 40) = 0.39, *p* = 0.68						
Emotional	17	17	0.17	0.03	6.58	<.0001	.12, .23
Total neglect	10	10	0.16	0.03	5.58	<.0001	.10, .22
Physical	16	16	0.14	0.03	5.29	<.0001	.09, .19
Measure of ME	*F* (1, 39) = 2.13, *p* = 0.15						
Reflective Function (RF)	4	6	0.07	0.06	1.27	0.21	-.04, .19
Alexithymia	19	37	0.16	0.02	10.33	<.0001	.13, .19
Age	*F* (1, 41) = 5.60, *p* = 0.02						
	23	43	-0.002	0.001	-2.37	0.02	-.004, -.00
Gender	*F* (1, 41) = 1.75, *p* = 0.19						
	23	43	0.09	0.07	1.32	0.19	-.05, .23
Ethnicity	*F* (1, 27) = 4.65, *p* = 0.04						
	16	29	0.141	0.07	2.16	0.04	.007, .28

Note. *s* = number of total publications, *k* = number of total outcomes/effect sizes, *se* = standard error, *t* = t-test value

Discussion

This section starts by summarizing the key findings of the present meta-analytic review and discuss then in context of previous literature. Subsequently, limitations of the review and implications for practice and research are discussed.

Overall Association Between Childhood Neglect and Mentalization

The current meta-analysis aimed to test the association between experiences of childhood neglect and mentalization in the general adult population using a multilevel approach, and to examine potential moderators of this association. Overall, we found a significant but small correlation of r = .15 between childhood neglect and adult mentalization, indicating that experiencing maltreatment in the form of neglect in childhood is negatively correlated with mentalizing capacity in adulthood. A similar significant correlation value was found (r = 0.12) after statistically controlling for publication bias.

Additionally, the current meta-analytic study evidenced this negative association between childhood neglect and adult mentalization in both cross-sectional and longitudinal designs. Kraemer et al. (2001) proposed a framework to aid a meaningful interpretation of associations. Following the terminology used by Kraemer et al. (2001), it can be concluded from this investigation that child neglect and mentalization are correlates, meaning that there is a small yet reliable co-occurrence between the two variables. Furthermore, as child neglect was often measured retrospectively but also shown to precede mentalization in longitudinal designs, it can be concluded that child neglect is a risk factor for lower metallization skills in adulthood. Although the size of this meta-analytic association falls within the small range, it was nevertheless robust in its directionality and across the different models and sensitivity analyses performed.

Given the scarcity of research on the long-term consequences of child neglect, this correlation could not be directly compared to previous meta-analytic findings pertaining specifically to the impact of childhood neglect on adults' socio-cognitive outcomes in the general population. To our knowledge, this is the first meta-analysis of this emerging area of research interest. However, similar associations were systematically reviewed within the clinical population by Rokita, Dauvermann, and Donohoe (2018), among younger children by Hildyard and Wolfe, (2002), and in relation to adults' recognition of facial expressions by Doretto and Scivoletto, (2018). Findings of these reviews converge on the conclusion that there is a significant association between early childhood neglect and poorer social, emotional, and cognitive performance.

The developmental trajectory of acquiring mentalization is theoretically assumed to be dependent on the quality of attachment with caregivers, and these attachment experiences shape the internal working model of the child, that is, generalized expectancies about the self and others (Bowlby 1969). There are numerous empirical reasons to believe that certain dysfunctional types of early attachment relations have significant disruptive effects on one's later capacity to helpfully use the 'innate' ability for mentalization (Gergely & Unoka, 2008; Lyons-Ruth & Jacobvitz, 2008). Therefore, attachment is conceptualized to offer the necessary secure milieu to ensure that the brain processes serving social cognition are appropriately organized, preparing the child to develop social intelligence (Fonagy & Allison, 2012).

Considering the established evidence in the field showing a significant positive association between insecure attachment and child maltreatment (Lo, Chan, & Ip, 2019), it was hypothesized that mentalization will follow a similar pattern in relation to childhood neglect, especially as neglected children are as likely to have insecure attachments to their caregivers, and many develop disorganized attachment patterns (Crittenden & Ainsworth, 1989; Egeland & Sroufe, 1981). However, recent accumulating evidence is beginning to show that the

developmental pathway from insecure or disorganized infant attachment to later negative outcomes is complex and often circuitous (Fonagy & Allison, 2012). Thus, it can be argued that rather than a developmentally reductionist model, moving directly from infancy to adulthood, we should envisage a complex series of steps, encompassing factors of risk and resilience constantly interacting with past and future phases of development. Within this framework, the small but consistent effect size found in this meta-analysis studying 34,802 participants is justified in highlighting child neglect as a single risk factor for poorer mentalizing in adulthood.

Moderators of the Neglect-Mentalization Association

In the current meta-analysis, considerable variance at the between study level was observed, indicating that the effect size distribution was heterogeneous, and that moderating variables may explain differences in the strength of the overall effect size.

Subtypes of neglect:

One of the main goals of this investigation was to examine whether there is a difference in the strength of association among the different types of childhood neglect. The multilevel moderation analysis allowed us to assess this question. Our results indicated that although total measure of neglect, physical neglect, and emotional neglect are not significantly different from each other in their association with adult mentalization, the correlational values observed indicated a direction of effect ranking emotional neglect at the top of the order (r = .17) relative to total neglect (r = .16) and physical neglect (r = .14) in their negative association with mentalization. This apparent order of effect was also observed when looking at the relation between the subtypes of childhood abuse and mentalization (Milwani, 2022). The lack of statistical significance in the strength of association across the subtypes could be explained by the fact that subtypes of neglect may co-occur and that most studies are conducted with

participants who have experienced several types of maltreatment. This makes it difficult to determine how child neglect differs from other types of maltreatment and how the subtypes of child neglect differ from each other with respect to various psychological outcomes. Nevertheless, the apparent hierarchy of effect is considered an observation of theoretical interest.

Erickson and Egeland (2002) describe neglectful parents as "psychologically unavailable... who overlook their infants' cues and signals, particularly the children's cries and pleas for warmth and comfort" (Polonko, 2006). The social biofeedback model of parental affect-mirroring (Fonagy, Gergely, Jurist, & Target, 2018) explains how the externalized representation of infant's affective states serves a 'teaching' function for the child's understanding of mental states in self and others. Therefore, emotional neglect can be understood to deprive the developing child of these early mirroring opportunities, which may explain the higher correlations observed between emotional neglect and adult mentalization, compared to physical neglect. This pattern is in line with Bottos and Nilsen's (2014) study that specifically highlighted a higher adverse effect of emotional maltreatment, in comparison to physical and sexual abuse. The authors found that the parents' childhood experiences of emotional maltreatment were the most significant predictor of their children's mentalization outcomes.

Measure of mentalization

With regards to the different measures used to assess mentalization – as broadly defined in the current review, our results revealed that a higher association between childhood neglect and alexithymia was observed but did not significantly differ from other classical measures of mentalization. However, caution is required regarding this finding given that the majority of studies reviewed investigated the impact of maltreatment on alexithymia. We hypothesise that

the reason of this skewedness towards alexithymia is due to the exclusive focus of this meta-analysis on the adult non-clinical population.

Age

The finding that the age of the adult affected the relationship between childhood neglect and mentalization is important, suggesting that younger adults are at higher risk of impaired mentalization following childhood neglect compared to older adults. This could be seen in line with the mixed evidence observed regarding the stability of attachment across the life course (Fearon & Roisman, 2017). Considering the non-linear model of development mentioned earlier (Sroufe, Carlson, Levy, & Egeland, 1999), it is possible that as individuals successively interact with the environment, higher number of restorative relationships and developmental opportunities are available, which protect against the negative impact of early neglect.

Gender

In examining the moderating effect of gender, results show that male and female participants are at similar risk for impairment in mentalization following experiences of childhood neglect. These findings contradict previous literature on sex differences in mentalization and theory of mind skills. For example, one study showed that brain activity during mentalization-relevant tasks were higher in male adults (Krach et al., 2009), and others showed that females obtained higher scores on Reading the Mind in the Eyes Task and measures of empathy in neurotypical as well as high functioning autistic adults (Baron-Cohen et al., 2001; Baron-Cohen & Wheelwright, 2004). However, it is important to note that these previous mixed findings are limited to the specific measures used in each study and are independent of the question of the impact of childhood experiences.

Ethnicity

The finding that the proportion of participants from ethnic minority backgrounds in the samples was associated with higher correlation between childhood neglect and mentalization

was of a particular interest; especially as it remained the strongest predictor of variance compared to other sample characteristics. Given that most studies included in this review reported maltreatment data on the total sample, it was not possible to assess whether there were differences in the severity of childhood neglect experienced by ethnic minority groups compared to ethnic majority groups; hence the interpretation of this finding should be done with caution.

To our knowledge, two hypotheses could explain the moderation effect of ethnicity. The first is to assume a difference in the dose-effect relationship between neglect and mentalization across ethnic groups. A considerable body of literature highlights the exposure to risks – such as poverty and racism – and its association with higher levels of childhood abuse or neglect, which then leads to a higher level of involvement in the child welfare system (Lanier, Maguire-Jack, Walsh, Drake & Hubel, 2014; Hearn, 2011).

The second hypothesis pertains to cross-cultural differences in mentalization irrespective of the impact of childhood experiences. One meta-analysis (Elfenbein & Ambady, 2002) showed a significant difference in emotion recognition between minority and majority group members. Other studies pointed to ethnolinguistic correlates of alexithymia (Dion, 1996; Lo, 2014), encouraging a more cultural perspective to understanding ethnic group differences in alexithymia. Taking a more theoretical perspective, Social Identity theory (Turner & Oakes, 1986) stresses that individuals' internal structures and social cognitive processes are socially guided depending on their group or collective frames of reference.

Comparing neglect to total maltreatment

We compared the effect size of the relationship between childhood neglect and mentalization to that of the relationship between overall childhood maltreatment and mentalization. The results indicated that mentalization had a marginally stronger – but not

significantly so – association with general maltreatment (r = 0.17) compared to the specific association with experiences of child neglect (r = 0.15). The direction of this finding is in line with the classical hypothesis about child development, that long-term negative outcomes are better predicted by the total number of environmental risks during childhood. From a theoretical perspective, physical aggression, and cruelty, when present in addition to neglect, could be understood as adding further effect as the child could defensively inhibit his or her capacity to think of the malevolent intent of the abuser (Fonagy & Bateman, 2008). It has been proposed that the averseness to mentalize by the abused individual could be understandable given the hostile thoughts and feelings the abuser must hold to justify their actions against a vulnerable child (Fonagy & Bateman, 2008). However, the lack of statistical difference in the strength of association may either be due to the small sample of studies included in the analysis, or that neglect alone has an equally deleterious effect on mentalization as both abuse and neglect combined. Therefore, it is recommended that future meta-analytic efforts, with a larger sample of studies, investigate this differential effect further.

Limitations

There are several limitations of this meta-analysis that are important to be mentioned. First, this analysis tested whether there is an association between childhood neglect and mentalization, but this does not mean causality (Kreamer et al. 2001). The retrospective nature of measuring maltreatment in adults, and the results from the longitudinal studies, imply that neglect is a risk factor for poorer mentalization. However, the current meta-analysis did not focus on investigating whether neglect is a *causal* risk factor – that when changes, is shown to change the outcome. Therefore, we recommend that future meta-analyses focus on assessing intervention studies, using quasi-experimental or experimental designs, to test whether changes in extent of childhood neglect are related to changes in mentalization.

Second, the majority of studies that met all inclusion criteria for this meta-analysis pertained to the association between childhood neglect and alexithymia. This skewedness of results towards one dimension of mentalization is a limitation to the generalizability of the current findings. We hypothesize that a more comprehensive representation of mentalization measures in the sample would be found if the scope of analysis included studies of the clinical population, as well as studies of adolescents and young people. The focus of this meta-analysis on the adult non-clinical population has potentially limited the inclusion of more conventional mentalization measures that have been historically more linked to studies of mentalization in relation to psychopathology.

Another related limitation is that childhood neglect was not measured in isolation from other types of maltreatment (i.e., sexual, physical, and emotional abuse) and the subtypes of neglect were not measured independently from each other. In most of the studies reviewed, participants who provided information on their early experiences of neglect also answered questions about their history of abuse. Given the likelihood of co-occurrence of various forms of maltreatment, such designs make it more challenging to infer an unconfounded association between the main variables of interest – neglect and mentalization. To address this concern, future studies may recruit participants who have only been neglected, either physically or emotionally, in childhood but not necessarily physically or sexually abused.

Given the heterogenous effect size distribution of the data, more moderators could have been included in the analysis to explain the variance. For example, some of the relevant dimensions to this study are the developmental timing of child neglect, the duration and severity of neglect experienced, as well as the type of perpetrator. Multiple studies in the literature discussed the differential impact of these key characterises of childhood maltreatment on various developmental outcomes (Howells & Rosenbaum, 2008; Manly, Kim, Rogosch, & Cicchetti, 2001). Unfortunately, all studies included in this meta-analysis did not report

sufficient data on these measures and therefore could not be investigated as potential moderators. This could be because in most of the studies, testing the association between maltreatment and mentalization was only one of the research aims.

Another limitation is that a formal quality appraisal of the studies was not conducted, which would be important to consider for future research as the validity of the summary estimates depends on the quality of the included studies.

Conclusion and clinical implications

This research is one of the first attempts to systematically review the available evidence pertaining to the relationship between early experiences of maltreatment and later quality of mentalization in adults. Our objective was to focus on the unique experience of neglect as it is the most common type of child victimization (Allin, Wathen & MacMillan, 2005) as well as to examine possible differential effects of sub-types of neglect on mentalizing. Given the apparent lack of consensus on defining neglect, significant challenges in measuring neglect and its associated developmental outcomes are still present in the extant research literature. However, as this develops overtime, findings from this review could be utilised to inform future research efforts studying the long-term outcomes of early experiences of neglect.

Additionally, this research has implications for clinical practice whether when working with at risk children and their families, or when offering psychological therapies to adult victims of childhood neglect. For example, there has been preliminary support for the effectiveness of therapeutic day treatment programs to increase neglected children's self-concept (Allin, Wathen & MacMillan, 2005). Furthermore, it has been shown that compromised mentalizing partially mediates the association between childhood maltreatment and severe forms of psychopathology (Stagaki, Nolte, Feigenbaum, King-Casas, Lohrenz, Fonagy, 2022). Findings from this study further corroborate previous research effort in

highlighting the importance of mentalization-informed psychotherapies for this population group.

Theoretically, Bateman and Fonagy (2003) explained how one of the number of different ways in which early experience can disrupt a child's emerging sense of self is to experience neglect – wherein interactional deficits deprive the child from the opportunity of 'finding' him or herself accurately represented in the mind of the caregiver. Therefore, such severe absence of early psychological attunement enhances the risk of neglected children to have an impaired mentalization capacity. This, in turn, result in various psychopathologies including self-harm and suicidality (Stagaki et al., 2022). This strong theoretical support for mentalization being disrupted by attachment trauma (such as abuse and neglect) requires a similar strength of empirical support. This study's findings add to the increasing empirical evidence pertaining to the association between childhood maltreatment and mentalization. Clinically, the findings of this meta-analysis and multiple other systematic reviews provide support for the potential of mentalization-based therapies or other psychological interventions that aim to mitigate the risk of developmental psychopathologies (including, but not limited to, personality disorders, post-traumatic reactions, self-harm and suicidality) among individuals who have experienced childhood traumas visa increasing understanding of self and other mental activities.

References

References marked with an asterisk (*) indicate studies included in the meta-analysis.

Alessandri, S. M. (1991). Play and social behavior in maltreated preschoolers. *Development and Psychopathology, 3*(2), 191-206.

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

Allin, H., Wathen, C. N., & MacMillan, H. (2005). Treatment of child neglect: A systematic review. *The Canadian Journal of Psychiatry, 50*(8), 497-504.

*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.

Arends, L. R., Vokó, Z., & Stijnen, T. (2003). Combining multiple outcome measures in a meta-analysis: an application. *Statistics in medicine*, *22*(8), 1335-1353.

Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with asperger syndrome or high functioning autism, and normal sex differences. Journal of Autism and Developmental Disorders, 34,163–175. doi:10.1023/B:JADD.0000022607.19833.00.

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "Reading the mind in the eyes" Test revised version: A study with normal adults, and adults with asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry,* 42, 241–51. doi:10.1111/1469-7610.00715.

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

Beeghly, M., & Cicchetti, D. (1994). Child maltreatment, attachment, and the self system: Emergence of an internal state lexicon in toddlers at high social risk. *Development and psychopathology*, *6*(1), 5-30.

Benarous, X., Guile, J. M., Consoli, A., & Cohen, D. (2015). A systematic review of the evidence for impaired cognitive theory of mind in maltreated children. *Frontiers in Psychiatry*, *6*, 108.

*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. (2021). Development and validation of a self-report measure assessing failures in the mentalization of trauma and adverse relationships. *Child Abuse & Neglect*, 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.

Bick, J., & Nelson, C. A. (2017). Early experience and brain development. *Wiley Interdisciplinary Reviews: Cognitive Science*, *8*(1-2), e1387.

Bora E. (2021). A meta-analysis of theory of mind and 'mentalization' in borderline personality disorder: a true neuro-social-cognitive or meta-social-cognitive impairment?. Psychological medicine, 51(15), 2541–2551.

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.

*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.

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.

*Cristobal, S., 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. Front Psychol, 8, 449.

Danielson, C. K., Arellano, M., De Kilpatrick, D. G., Saunders, B. E., and Resnick, H. S. (2005). Child maltreatment in depressed adolescents: differences in symptomatology based on history of abuse. Child Maltreat. 10, 37–48. Doi: 10.1177/1077559504271630.

Dion, K. L. (1996). Ethnolinguistic correlates of alexithymia: Toward a cultural perspective. *Journal of Psychosomatic Research, 41*(6), 531-539.

Doretto, V., & Scivoletto, S. (2018). Effects of early neglect experience on recognition and processing of facial expressions: a systematic review. *Brain sciences*, *8*(1), 10.

Doretto, V., & Scivoletto, S. (2018). Effects of early neglect experience on recognition and processing of facial expressions: a systematic review. *Brain sciences*, *8*(1), 10.

Doretto, V., & Scivoletto, S. (2018). Effects of early neglect experience on recognition and processing of facial expressions: a systematic review. *Brain sciences*, *8*(1), 10.

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. P., & Roisman, G. I. (2017). Attachment theory: progress and future directions. *Current Opinion in Psychology*, *15*, 131-136.

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

Fonagy, P., & Allison, E. (2012). What is mentalization? The concept and its foundations in developmental research. *Minding the child: Mentalization-based interventions with children, young people and their families*, 11-34.

Fonagy, P., Gergely, G., & Target, M. (2007). The parent–infant dyad and the construction of the subjective self. *Journal of child psychology and psychiatry*, *48*(3-4), 288-328.

Fonagy, P., Gergely, G., Jurist, E. L., & Target, M. (2018). Affect regulation, mentalization, and the development of the self. Routledge.

Fonagy, P., Luyten, P., & Strathearn, L. (2011). Borderline personality disorder, mentalization, and the neurobiology of attachment. *Infant mental health journal*, *32*(1), 47-69.

*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. (2021). Maternal childhood abuse and neglect predicts offspring development in early childhood: The roles of reflective functioning and child sex. *Child Abuse & Neglect*, 105030.

Gergely, G., & Unoka, Z. (2008). Attachment and mentalization in humans: The development of the affective self. In E. L. Jurist, A. Slade, & S. Bergner (Eds.), *Mind to mind: Infant research, neuroscience, and psychoanalysis* (pp. 50–87). Other Press.

*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.

Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The lancet*, *373*(9657), 68-81. DeCoster, J. (2012). Converting effect sizes.

*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), 5362

*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.

Hearn, J. (2011). Unmet needs in addressing child neglect: Should we go back to the drawing board?. *Children and Youth Services Review*, *33*(5), 715-722.

Hedges LV, Tipton E, Johnson MC (2010). "Robust Variance Estimation in Meta-Regression With Dependent Effect Size Estimates." *Research Synthesis Methods*, 1(1), 39–65.

Hildyard, K. L., & Wolfe, D. A. (2002). Child neglect: developmental issues and outcomes☆. *Child abuse & neglect*, *26*(6-7), 679-695.

Howells, N. L., & Rosenbaum, A. (2008). Effects of perpetrator and victim gender on negative outcomes of family violence. Journal of Family violence, 23(3), 203-209.

Hox, J. J., & Maas, C. J. (2002). Sample sizes for multilevel modeling.

Hox, J. J., Moerbeek, M., & Van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications*. Routledge.

Humphreys, K.L., & Zeanah, C.H. (2015). Deviations from the expected environment in early childhood and emerging psychopathology. Neuropsychopharmacology, 40, 154–170.

*Kajanoja, J., Karukivi, M., Scheinin, N. M., Ahrnberg, H., Karlsson, L., & Karlsson, H. (2020). Early-life adversities and adult attachment in depression and alexithymia. Development and Psychopathology, 1-9.

*Kapeleris, A. R., & Paivio, S. C. (2011). Identity and emotional competence as mediators of the relation between childhood psychological maltreatment and adult love relationships [Behavior Disorders & Antisocial Behavior 3230]. Journal of aggression, maltreatment & trauma, 20(6), 617-635.

*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*.

Klimes-Dougan, B., & Kistner, J. (1990). Physically abused preschoolers' responses to peers' distress. *Developmental psychology*, *26*(4), 599.

Krach, S., Blümel, I., Marjoram, D., Lataster, T., Krabbendam, L., Weber, J., ... & Kircher, T. (2009). Are women better mindreaders? Sex differences in neural correlates of mentalizing detected with functional MRI. *BMC neuroscience*, *10*(1), 1-11.

Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American journal of psychiatry*, *158*(6), 848-856.

Lanier, P., Maguire-Jack, K., Walsh, T., Drake, B., & Hubel, G. (2014). Race and ethnic differences in early childhood maltreatment in the United States. *Journal of Developmental & Behavioral Pediatrics*, *35*(7), 419-426.

Lin, L., & Chu, H. (2018). Quantifying publication bias in meta-analysis. *Biometrics*, *74*(3), 785-794.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thou- sand Oaks, CA: Sage publications.

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

Lo, C. (2014). Cultural values and alexithymia. *SAGE Open, 4*(4), 2158244014555117.

Lo, C., Chan, K. L., & Ip, P. (2019). Insecure Adult Attachment and Child Maltreatment: A Meta-Analysis. *Trauma, violence & abuse*, *20*(5), 706–719.

Lobbestael, J., Arntz, A., and Bernstein, D. P. (2010). Disentangling the relationship between different types of childhood maltreatment and personality disorders. J. Personal. Disord. 24, 285–295. doi: 10.1521/pedi.2010.24.3.285.

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.

Lyons-Ruth, K., & Jacobvitz, D. (2008). Attachment disorganization: Genetic factors, parenting contexts, and developmental transformation from infancy to adulthood.

Maris, H. (2022). "The associations between maternal mental health, maternal mind mindedness, and infant attachment security in a socioeconomically disadvantage population." Unpublished thesis.

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.

*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 [Eating Disorders 3260]. Journal of Counseling Psychology, 49(1), 86-100.

*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 [Psychological Disorders 3210]. Psychology of Women Quarterly, 32(3), 267-280.

*McCuaig Edge, H.J., & Lee, J.E.C (2020) The Mediating Role of Alexithymia in the Association Between Adverse Childhood Experiences and Postdeployment Mental Health in Canadian Armed Forces Personnel. Journal of Traumatic Stress, Vol 33, P1029-1038

McLaren, V., Gallagher, M., Hopwood, C. J., & Sharp, C. (2022). Hypermentalizing and Borderline Personality Disorder: A Meta-Analytic Review. *American journal of psychotherapy*, 75(1), 21–31.

McLaughlin, K., Sheridan, M., & Lambert, H. (2014). Childhood adversity and neural development: Deprivation and threat as distinct dimensions of experience. *Neuroscience and Biobehavioral Reviews*, 47, 578–591.

Melwani, S. (2022). "Childhood abuse and mentalization in adulthood: a meta-analysis." Unpublished thesis.

*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*.

*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, Vol 29, P492–499

Mullen, B. (1989). Advanced BASIC meta-analysis. Hillsdale, NJ: Erlbaum.

*Nicolas, B., Roxanne, L., Julia, G. B., Carl, L., & Maria, 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.

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

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71.

*Paivio, S.C. & McCulloch, C.R. (2004) Alexithymia as a mediator between childhood trauma and self-injurious behaviors. AbstractChild Abuse & Neglect 28 (2004) 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.

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.

Pears, K., & Fisher, P. A. (2005). Developmental, cognitive, and neuropsychological functioning in preschool-aged foster children: Associations with prior maltreatment and placement history. *Journal of Developmental & Behavioral Pediatrics*, *26*(2), 112-122.

Polonko, K. A. (2006). Exploring assumptions about child neglect in relation to the broader field of child maltreatment. Journal of health and human services administration, 260 284.

Rokita, K. I., Dauvermann, M. R., & Donohoe, G. (2018). Early life experiences and social cognition in major psychiatric disorders: A systematic review. *European psychiatry : the journal of the Association of European Psychiatrists*, *53*, 123–133.

Rothstein, H. R., Sutton, A. J., & Borenstein, M. (Eds.). (2006). *Publication bias in meta analysis: Prevention, assessment and adjustments*. John Wiley & Sons.

Scott, D. A. (2009). The landscape of child maltreatment. *Lancet (London, England)*, *373*(9658), 101-102

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.

Simonsen, C. B., Jakobsen, A. G., Grøntved, S., & Kjaersdam Telléus, G. (2020). The mentalization profile in patients with eating disorders: a systematic review and meta analysis. Nordic journal of psychiatry, 74(5), 311–322.

Sprong, M., Schothorst, P., Vos, E., Hox, J., & van Engeland, H. (2007). Theory of mind in schizophrenia: meta-analysis. The British journal of psychiatry: the journal of mental science, 191, 5–13.

Sroufe, L. A., Carlson, E. A., Levy, A. K., & Egeland, B. (1999). Implications of attachment theory for developmental psychopathology. Development and psychopathology, 11(1), 1-13.

*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.

Stagaki, M., Nolte, T., Feigenbaum, J., King-Casas, B., Lohrenz, T., Fonagy, P., ... & Personality and Mood Disorder Research Consortium. (2022). The mediating role of attachment and mentalising in the relationship between childhood maltreatment, self harm and suicidality. *Child Abuse & Neglect*, *128*, 105576.

*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.

Teicher, M. H., & Samson, J. A. (2016). Annual research review: enduring neurobiological effects of childhood abuse and neglect. *Journal of child psychology and psychiatry*, *57*(3), 241-266.

Teicher, M. H., and Samson, J. A. (2013). Childhood maltreatment and psychopathology: a case for ecophenotypic variants as clinically and neurobiologically distinct subtypes. Am. J. Psychiatr. 170, 1114–1133. doi: 10. 1176/appi.ajp.2013.12070957.

Teicher, M. H., Samson, J. A., Polcari, A., and McGreenery, C. E. (2006). Sticks, stones, and hurtful words: relative effects of various forms of childhood maltreatment. Am. J. Psychiatr. 163, 993–1000. Doi: 10.1176/ajp.2006.163.6.993.

*Terock, J., Van der Auwera, S., Janowitz, D., Homuth, G., Hannemann, A., Schmidt, C. O., Meyer zu Schwabedissen, H., Freyberger, H. J., & 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 [Psychological Disorders 3210]. Psychotherapy and Psychosomatics, 87(1), 58-61

*Terock, J., Van der Auwera, S., Janowitz, D., Wittfeld, K., Frenzel, S., Klinger-Konig, 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.

*Terock, J., Van der Auwera, S., Völzke, H., & Grabe, H. J. (2019). Alexithymer Patient. Psychotherapeut, 64(4), 263-271.

*Turgeon, J., Berube, 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.

Turner, J. C., & Oakes, P. J. (1986). The significance of the social identity concept for social psychology with reference to individualism, interactionism and social influence. *British Journal of Social Psychology*, *25*(3), 237-252.

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 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 Houwelingen, H. C., Arends, L. R., & Stijnen, T. (2002). Advanced methods in meta analysis: multivariate approach and meta-regression. *Statistics in medicine*, *21*(4), 589 624.

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

Zeanah, C. H., & Humphreys, K. L. (2018). Child abuse and neglect. *Journal of the American Academy of Child & Adolescent Psychiatry*, *57*(9), 637-644.

PART 2: EMPIRICAL PAPER

Minding the Baby: Examining the impact of a reflective home-visiting programme in promoting maternal Mind-Mindedness

Abstract

Aims: Minding the Baby® is a mentalization-based home visiting programme for young first-time mothers living in disadvantaged circumstances, as a means for supporting maternal, child and family outcomes. This study sought to build on previous testing of MTB in the UK to examine its effectiveness in relation to maternal mind-mindedness: an observational measure of parental proclivity to treat one's child as an individual with a mind, rather than a creature with needs to be satisfied.

Methods: This study utilises a longitudinal randomised controlled trial comparing MTB plus Treatment as Usual with Treatment as Usual Only and examines the impact of the intervention on maternal mind-mindedness. Eighty video-recorded interactions of mother-infant dyads were transcribed verbatim and coded for the proportion of mind-related comments used.

Results: Results supported the main hypothesis and showed that mothers in the MTB group – after about a year of receiving the intervention – were making more mind-related comments as they interacted with their infants. There was a marginally significant effect of MTB in increasing appropriate mind-related comments, but MTB was not associated with a decrease in non-attuned mind-related comments. None of the four sub-types of mind-related comments (desires, cognitions, emotions, and talking on baby's behalf) were significantly different between MTB and control group. In an additional correlation analysis, only appropriate mind-related comments were associated with parental reflective function.

Conclusions: This study offered a unique opportunity to examine the efficacy of the MTB approach in promoting maternal mind-mindedness in a sample of high-risk mothers. The study did yield evidence of impact for mothers' mind-mindedness profiles, particularly in the domain of spontaneous mentalizing of the baby, yet further empirical testing and refinement of MTB is remains warranted.

Introduction

Beginning in the late nineties, the adverse childhood experiences (ACEs) research was the first to rigorously evidence the relationship between the number of adverse childhood experiences and maladaptation across both domains of biological and psychological development. This correlation has been well established in the literature of developmental psychology over the past two decades. Not without its criticisms (McEwen & Gregerson, 2019) the seminal ACEs research pioneered by Felitti, Anda, and colleagues (1998) instigated increased attention within academic research and clinical practice to the role of early experiences in physical and mental health. Intervening as early as possible during the course of development, preventing adverse early childhood experiences and thus ameliorating or eliminating the emergence of maladaptive long-term outcomes, has become a key focus in public health policy across the globe.

One of the key approaches to decreasing adverse childhood events, or toxic relational stress, is to address the mechanisms of intergenerational trauma. For example, children living with parents who have childhood maltreatment histories are more likely to exhibit emotional and behavioural problems, which highlights the intergenerational effect of childhood trauma (Pereira, Ludmer, Gonzalez & Atkinson, 2018; Min, Singer, Minnes, Kim & Short, 2013). Informed by attachment theory, parental mentalization is hypothesized to be one of the key modifiable factors related to the parent-child interaction that can mediate the intergenerational effects of childhood adversity (Wang, 2022).

Mentalization is defined as "the capacity to think about mental states separate from, yet potentially causing, actions" (Bateman & Fonagy, 2004). Specifically, an individual's mentalizing capacity allows him/her to recognize and make sense of mental states (feelings, thoughts, intentions, and beliefs) that underlie one’s own behaviours and those of others, which in turn facilitates better interpersonal interactions (Fonagy, Gergely, Jurist, & Target, 2018). In

the parenting context, mentalization refers to parents' willingness to interpret their child's behaviours in terms of mental states and to understand that their child may experience things differently from them (Ordway, Sadler, Dixon & Slade, 2014). Meanwhile, parental mentalization also enables parents to reflect on their own beliefs, feelings, and thoughts and be aware of how their own mental states can influence and be shaped by their interactions with their child (Luyten, Nijssens, et al., 2017; Luyten, Mayes, et al., 2017). Parental mentalization is often referred to as parental (or maternal) reflective functioning.

Understandably, a parent struggling with post-traumatic reactions (e.g., vulnerability to arousal and anxiety, numbness, detachment, withdrawal, or dissociation) due to past childhood adversities will have limited capacity to remain open and curious about the child's mind. This underdeveloped capacity to appreciate one's child as someone with the motivations and developmental capacities of a baby, is thought to underpin adverse or unresponsive caregiving (Slade, 2015). Therefore, in order to interrupt the intergenerational transmission of trauma, preventative interventions should aim to 1) reduce relational trauma and maltreatment, 2) address mother's own trauma history, 3) enhance parental mentalization, 4) increase secure attachment or decrease disorganized attachment, and 5) promote harmonious interactions between caregiver and baby via reducing frightened, threatening, and dissociative parental behaviours (Hesse & Main, 2006; Slade, 2008; Slade, 2015).

Home-visiting programmes have been one of the most commonly used interventive approaches to address the needs of vulnerable/at-risk families with young children by offering relatively intensive multimodal services and support they might not otherwise access. A meta-analysis of 60 home-visiting programmes showed that in general, children of families who were enrolled in home visiting programmes "fared better" than did control group children (Sweet & Appelbaum, 2004). Rather than therapeutically addressing intergenerational trauma, parental reflective functioning and attachment, most home-visiting programmes have sought

to improve indirect influence on the child by focussing on economic, social, and mental and physical health support (Nievar, Van Egeren & Pollard, 2010).

The focus of this paper is Minding the Baby®, a mentalization-based parenting home visiting programme for high-risk mothers, infants, and their families. The following sections of this introduction will review the theoretical background of Minding the Baby (MTB), then summarize the context and the aims of the present empirical study.

Defining Minding the Baby

This section describes the underlying conceptual framework of the MTB model and briefly reviews its guiding delivery principals.

MTB was developed by Lois Sadler, Arietta Slade, Nancy Close and Linda Mayes in collaboration between the Yale Child Study Centre and the Yale School of Nursing and was first implemented in 2002 in the United States. The programme was delivered in three locations in the UK between 2014 and 2018. To understand MTB, it is important to briefly review the two main evidence-based early intervention models that MTB elaborated and built upon: Nurse-Family Partnership (NFP) (Olds, Sadler & Kitzman, 2007) and infant-parent psychotherapy (IPP) (Lieberman, Silverman & Pawl, 1999).

Nurse-Family Partnership is one of the most well-developed home visiting programmes. It is typically delivered by experienced public health nurses who conduct home visits weekly beginning in pregnancy until the child's first birthday, and then biweekly until the child is 2 years old. This programme has been widely implemented and tested in the US and consistently produced a range of health, parenting, and life-course outcomes (Kitzman et al., 2010; Olds et al., 2010; Olds et al., 2007). Nurse-Family Partnership offers a wealth of information related to infant development and mental health, as well as practical parenting skills that are often found very useful by the families. Additionally, nurses often have better

access to vulnerable families compared to social workers, who are likely to be associated with social services and the stigma of mental health. However, the Nurse-Family Partnership approach is yet to meet the complex mental health needs of families and to reliably change parenting and attachment outcomes (Sweet & Appelbaum, 2004; Howard & Brooks-Gunn, 2009). It is worth noting that, when it was implemented in the UK within a substantially different public health-care system, the benefits of adding a Nurse-Family Partnership programme to usual care proved limited (Robling et al., 2016).

As for the infant-parent psychotherapy (IPP) model, it was originally developed by Selma Fraiberg and her colleagues in 1980, and since then inspired the development of various home-visiting programmes (Slade, Mayes, & Epperson, 2002; Fraiberg, Adelson & Shapiro, 2018). This model is typically delivered by mental health professionals who visit families at home weekly for a varied length of treatment time. The infant-parent psychotherapy is a psychodynamically-informed approach that focuses on treating symptoms in the infant by treating the infant-parent relationship. It implements a combination of attachment and object-relations theory to formulate the ways in which the parent's past could interfere with relation to the baby in the present (Hopkins, 1992). It also aims to support parents emotionally and help them observe and think about the reasons for their child's behaviour (Hopkins, 1992). Despite the smaller body of evidence base compared to Nurse-Family Partnership, the empirical testing efforts of Lieberman et al. (1991) and Heinicke et al. (2000) demonstrate an increase in the children's attachment security rates as well as an improvement in the quality of mother-child interaction and relationship. However, the focus of infant-parent psychotherapy programmes is on the psychopathology manifested in the mothers or in the dyads, hence neither health nor public health outcomes of the target families are directly addressed; and as mentioned earlier, psychotherapists do not have the same access to families as nurses often do (Sadler et al., 2013).

As such, MTB was born out of the attempt to bring these two models together. The programme developers believed that both approaches are critical to provide the comprehensive care needed for the families supported; and that a genuine interdisciplinary model merging the strengths of both the nursing and infant mental health approaches will be most likely to meet the families' multiple and complex needs (Slade, Sadler, De Dios-Kenn, Webb, Currier-Ezepchick & Mayes, 2005).

The second unique component of MTB is that it draws strongly on contemporary attachment theory and emphasises the enhancement of parental mentalization. Mentalization helps the mother envision her and her baby's internal experiences in terms of mental states (Slade, 2005). Informed and guided by a large body of literature on mentalization and attachment, MTB was devised to promote secure parent-child attachment relationships through engaging and promoting the reflective intentional stance within the context of caregiving. The goals of MTB are to help young, at-risk, and first-time mothers be open and curious about their and their children's emotional experience – to keep their babies "in mind" physically, emotionally, and developmentally (Slade, 2002). This emphasis was chosen because of the emerging evidence pointing to parental reflective capacities as crucial both to healthy attachment and to a range of emotional, physical, and social developments in the mother, child, and the family (Sadler, Slade & Mayes, 2006). The programme is targeted at disadvantaged families with mothers under 25 years old and having additional and complex needs.

The model of MTB consists of four key components or process stages (Slade, 2007). The first is to establish a safe and containing relationship with the mothers and their babies, with this relationship seen as the primary catalyst for change and integration. The second is the provision of concrete services to mothers. Given the level of deprivation often experienced by the targeted families, offering meaningful support to attune to and meet children's basic needs

is key link towards development of mentalization. Slowly, the mothers start to better identify with their roles as primary caregivers, and to realize that they and their babies have bodily and psychological needs that could be identified and met. These first two stages provide the context for the next two steps: the development of the capacity to acknowledge and tolerate mental states, followed by the emergence of mentalization. The first step for home visitors is to help the mother find the language with which to identify and articulate her own internal experiences, then help her find suitable strategies to contain and cope with them. Only then can she begin to tolerate her baby's internal experiences and understand that the baby has desires and feelings that are different to hers. Visitors attempt this through various techniques, including labelling, modelling, and thinking through and rehearsing the next stages in the child's and mother's own development (Allen & Fonagy, 2006; Slade, 2007). The gradual emergence of mentalizing then becomes possible. Mothers start to understand their and their child's behaviour in terms of mental states. For example, a child's clinging behaviour before separation is understandable in terms of his *wish* for mother to stay, or his *fear* of separation. The more accurately parents read their child's mental states, the better able they are to respond sensitively to his/her behaviour.

Findings from previous MTB trials

This section summarises the current state of evidence in evaluating MTB, providing the context of the current study goal.

Evidence supporting MTB comes mainly from three trials. The first trial piloted by the programme developers (Sadler et al, 2013) provided preliminary evidence showing positive effects of MTB on both public health and attachment/parenting outcomes. The programme was associated with better paediatric health visits attendance, delayed subsequent childbearing, improved parenting at four months and higher rates of secure attachment at one year. The

subsequent randomized controlled trial conducted by the same research group (Slade et al, 2020) confirmed many of the earlier findings. For predominantly young mothers living in poverty, with high levels of childhood adversity, the MTB intervention enhanced two important protective factors: mother's mentalizing capacities and their children's attachment security.

To establish the transportability of MTB intervention to a different context and healthcare system, a third independent, clinical trial formally evaluated MTB in the UK. Within this novel setting (e.g., treatment as usual in the UK consisted of support offered by the national health system and local councils), MTB was less effective than anticipated in improving maternal sensitivity and maternal reflective functioning – yet it yielded evidence of benefits in children's behavioural problems and parental stress (Longhi, Murray, Wellsted, Hunter, MacKenzie, Taylor-Colls & Fearon, 2020). There was also some evidence of benefits for children's attachment security, albeit qualified evidence. Given that MTB was a mentalization-based intervention, the lack of evidence pertaining to maternal reflective function was particularly surprising. However, the trial was underpowered due to low level of uptake and high dropout rate, which could be explained as a reflection of the lack of embeddedness of the programme within the target communities in the UK (MTB was not fully integrated into the NHS services). The National Society for the Prevention of Cruelty to Children (NSPCC) – the charity organisation responsible for establishing MTB in the UK – could have been perceived as a child protection agency rather than a health service, potentially causing reluctance to trust and engage with the support offered.

A key question is whether MTB programme was effective in improving parental mentalising skills. Using an interview-based assessment, the trial did not find evidence that reflective function was changed during the first year of the programme. However, Reflective Function (RF) is only one of a number of ways to measure parental mentalising, and as an

interview-based measure it may be relatively insensitive to intervention-related changes. As such, the current study aims to re-evaluate the UK MTB trial to determine whether there was an intervention effect on the quality of maternal mentalizing when evaluated and measured differently – that is through the construct of mind-mindedness. Secondary data analysis was utilised to achieve this research goal.

The role of mind-mindedness

Mind-mindedness was developed based on thinking from attachment theory (Meins, 2013) and as an attempt to rethink sensitive mothering (Ainsworth et al., 1971, 1974) having been treated as the exclusive and most significant precursor of infantile security of attachment. It has been argued by Fonagy and his colleagues (1994), that responsiveness to the child's physical and emotional needs (i.e., maternal sensitivity) should be differentiated from caregivers' willingness and capacity to engage with their child at a *mental* level. Utilising a novel theoretical understanding, Fonagy et al. and Meins concurred on hypothesising that maternal behaviours that are insensitive to infant's mental state, rather than responsivity to child's emotional and physical needs, might be a better predictor of the security of attachment relationship compared to a generalised construct of sensitivity. To this end, this maternal proclivity to treat the child as an individual with a mind, rather than a creature with needs to be satisfied, was then termed by Elizabeth Meins (1997) as *mind-mindedness*.

In contrast to measures based purely on differences in maternal behaviour (e.g., maternal sensitivity), the construct of mind-mindedness is a measure of the mother's representation of her infant's mental states – a capacity that has a higher theoretical links to the processes involved in the formation of Internal Working Models (IWM: Bowlby, 1973, 1980) of attachment. This distinction between the quality of interaction between mother and baby,

and the mother's proclivity to use language to frame the interaction in mentalistic states, is best illustrated using an example (Meins, Fernyhough, Fradley & Tuckey, 2001). A typical dyadic interaction is when a mother shows her baby his/her reflection in the mirror. A less mind-minded mother's discourse during the interaction is "Who is that in there? Is that you?", whereas a more mind-minded mother could frame the interactions as "Who do you *think* this is? Do you *think* it's you?". Clearly, two mothers who may receive identical scores on this interaction in terms of responsiveness and general sensitivity could still demonstrate wide differences in their tendency to engage with their child's mental states.

Since its formal operationalization two decades ago (Meins et al. 2001), the construct of mind-mindedness has been increasingly supported by a considerable body of evidence attesting to its relevance and relation to key child development and maternal outcomes (McMahon & Bernier, 2017). For example, a meta-analytic finding showed a theoretically expected significant association, r = .24, between maternal MM and maternal sensitivity (Zeegers et al., 2017). Multiple studies suggested that mind-mindedness is a stronger predictor of attachment than the classical sensitivity measure (Meins et al., 2001, Meins et al., 2012, Meins et al., 2017). As for child cognitive outcomes, sizable research showed a strong and consistent relationship between maternal mind-mindedness as observed during interaction and child theory of mind (ToM; Laranjo, Bernier, Meins & Carlson, 2014; Kirk et al., 2015; Meins, Centifanti, Fernyhough, Fishburn, 2013; Meins et al., 2003).

Conceptually, it has been suggested that mind-mindedness is a specific child-focused component of a more global capacity for mentalizing (Rosenblum et al., 2008), and measuring it observationally (within an interactional or play context) provides a unique opportunity to capture the extent to which mothers *spontaneously* refer to mental states when interacting with their child (Meins et al., 2014, Rosenblum et al., 2008).

The assessment approach of mind-mindedness during the first year of the child's life involves observations of caregiver-infant interaction, often within a play context. Independent observers code all the instances of the caregiver making explicit mentalistic comments towards the child (Meins and Fernyhough, 2015). A mother's comments are considered mind-related when they denote the infant's mental state (e.g., intentions, emotions, cognitions, desires). Mind-related comments are then coded *appropriate* if they are accurate representations of the assumed mental states of the infant (e.g., mother saying "Oh you are super excited, aren't you?" when the infant is showing clear signs of joy and excitement). Alternatively, mind-related comments are coded as *nonattuned* if the mother's interpretation does not match the observable behaviour of the infant (e.g., mother saying to a crying baby "oh you are just faking it" when the infant is clearly upset).

Generally, the average appropriate mind-related references are 6% to 8% of parents' total comments toward their baby during play. Non-attuned comments are far less frequent and they generally make up about 1% to 2% of the parents' comments during play interactions (Arnott and Meins 2007; Kirk et al. 2015; Meins et al. 2003, 2012; Zeegers et al. 2017). Some studies even reported that non-attuned comments were produced too infrequently to be considered for analysis (e.g., Bernier et al. 2017). The rest of the comments during a typical interaction (± 90%) are not mind-related. These often pertain to the child's behaviours, perceptions, vocalisations, or to general conditions (e.g., "We have a visitor today").

The appropriate and non-attuned classifications are considered as two statistically independent categories of mind-related comments (Meins et al. 2012; Meins, 2013). Furthermore, Meta-analytic data has shown that appropriate minded comments were positively associated with sensitive behaviours ($r = 0.30$), whereas parents' production of non-attuned minded comments was not substantially related to their sensitive parenting behaviours (Zeegers

et al., 2017). Appropriate and non-attuned mind-mindedness have, therefore, been viewed as two distinct predictors of child outcomes (Meins et al. 2011). Optimal mind-mindedness is achieved when parents often produce appropriate mind-related comments and rarely non-attuned mind-related comments.

Additionally, mind-mindedness encompasses four key sub-categories of mind-related comments: references to the infants' desires and preferences, cognitions, emotions, and instances where the caregiver speaks in the first-person on the infant's behalf (Meins & Fernyhough, 2015). However, very rare are the studies that attempted to explore the relation between the caregiver's use of specific types of mind-related comment and other developmental outcomes. One recent study by Giovanelli et al. (2020), was the first attempt to explore the differential relationship between the types of MM comments and children's symbolic play over the first 18 months of development. The authors suggested that attunement to different types of internal state at different ages may be critical for facilitating children's symbolic play.

The present study builds on the original MTB-UK trial findings and utilises the video-recorded observations at 12-months of the child's age to examine how MTB may impact the mothers' tendency to see their infants as mentalizing agents - as it is manifested linguistically in real-time dyadic interactions.

The primary research questions to be investigated are, therefore:

1) In a high-risk population of young mothers, is MTB effective in enhancing mind-mindedness within the context of mother-infant interaction?

H1: Mind-mindedness will be higher in the Minding the Baby sample compared to the treatment as usual community sample

H2: Non-attuned mind-related comments will be lower in the Minding the Baby sample compared to the treatment as usual sample

2) How would MTB influence the specific subtypes of mind-related comments (infant's desires and preferences, cognitions, emotions, and the mothers' comments on infants' behalf)?

H3: there will be significant difference between subtypes of MM across the intervention (MTB) and control group

3) What is the relationship between mind-mindedness and parental reflective functioning?

H4: there will be significant correlation between MM and maternal Reflective Functioning (RF)

Method

Study Design

This study utilises a longitudinal randomised controlled trial comparing MTB plus Treatment as Usual with Treatment as Usual Only and examines the impact of the intervention on maternal mind-mindedness. The main independent variable is treatment group, and the dependent variables included the different types of maternal mind-mindedness measured at year 1 of the child's age. Key demographic characteristics were included as covariates to provide a robust testing of the hypothesis that the intervention effects are not explained by differences in mothers' age, education, marital status, or financial means. The study also examined the relationship between the two maternal mentalizing measures – reflective functioning and mind-mindedness.

Setting

The MTB home-visiting programme was implemented in the UK by the National Society for the Prevention of Cruelty to Children (NSPCC) in partnership with the programme developers at Yale University. The trial ran from April 2014 to November 2018. The current study utilised the video-recorded data obtained from the trial to examine the construct of mind-mindedness. This research project was conducted in collaboration with two other UCL Clinical Psychology doctoral students, Helen Maris and Samara Melwani. The unique contributions are outlined in Appendix 2

Participants

Minding the Baby was offered in socio-economically disadvantaged areas of three UK cities. Recruitment was done through antenatal services of three main hospitals in these sites. Suitable mothers between 20 and 28 weeks of pregnancy were approached by NHS research nurses to inform them about the study and check eligibility. MTB was also open for referrals from professionals in the community such as midwives and social workers.

Young women had to meet the following eligibility criteria to take part in the study:

Inclusion criteria:

- Women expecting their first baby **AND**
- Aged 19 or under, **OR** aged between 20 to 25 and meet one of the following:
    1. 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)
    2. not entitled to employer maternity pay
    3. live in a postcode that fell below the 20th percentile for the national Indices of Multiple Deprivation or living in sheltered accommodation.

Exclusion criteria: Expectant mothers with any of the following,

1. Psychotic illness
2. Substance abuse disorders/ chronic drug dependence
3. Profound or severe learning disabilities
4. A life-threatening illness
5. Baby is expected to be born with a life-threatening illness or profound disability
6. Would require the use of an interpreter

At their 20-week scanning appointments, the young women were provided with an information sheet and a leaflet as well as a brief explanation about the study. Participants who gave verbal consent were later contacted by researchers to arrange for an initial visit where their full written consent was obtained.

Then participants were randomly allocated to receive MTB plus Usual Care or Usual Care only. Allocation was by minimisation, through which the treatment allocated to the next participant enrolled in depends on the characteristics of those participants already enrolled. The minimisation factors were age (<= 20 years versus > 20 years), depression scores (>10 versus <=10) and site. Minimisation was weighted towards selecting the least balanced group with 80 percent probability (Wade, Pan, Eaton, Pierro & Ong, 2006). Throughout the coding and evaluation of outcome for the purposes of the current study, researchers were fully blinded to group allocation.

Sample size

The total sample size for the MTB trial was 148 at the point of entry. Participants for the current study consisted of the sample followed up at 12 months after the baby was born (N = 96). Out of these, 86 participants consented to be video recorded for assessment of study

outcomes. Unfortunately, three more participants had to be excluded at the coding stage of MM due to the fact their main spoken language while interacting with the child was not English. One more participant was excluded at the same coding stage as the recorded material did not have a visual component and was only audio (meaning that it has not been possible to determine whether the comments were appropriate or non-attuned).

Procedures

MTB UK trial

Following a manualized protocol, MTB practitioners visited the young mothers on a weekly basis from the third trimester of pregnancy until the baby was 1-year-old, and then twice a month until the child's second birthday. Practitioners alternated the visits and were flexible and approachable depending on the families' needs. Training of MTB and clinical supervision was provided by two senior practitioners who had been trained to train by the MTB developers at Yale University. As described in the introduction, both MTB practitioners emphasised the concept of mentalization in working with the families: supporting the mother to think about her baby and to reflect on her experience of becoming a parent and her past including early relationships. However, the health practitioner focused mainly on child health and development, and mother's health (e.g., family planning, nutrition, and exercise), while the social worker focused on promoting mental health as well as assessment and intervention (e.g., dyadic play and family intervention).

Mothers allocated to treatment as usual group received the standard care provided by their local community services, including general physicians, health visitors and midwives. Additionally, families may have accessed support through other services such as NHS mental

health services, family support workers, other community-based support groups. The families service use was systematically monitored at two time points throughout the trial.

Data collection

At the point of entry, an initial assessment was done in person by trained researchers in the families' homes. Near the child's first birthday, the dyads were visited by the research team to conduct an in-depth outcome assessment, during which video-recorded observations were obtained from a series of six semi-structured tasks, originally chosen to measure maternal sensitivity.

The mothers were gently instructed to engage in these tasks in the following order. The first task involved focusing on reading a book together. Secondly, the mother was asked to play with the child as they normally would, without using toys. This often involved singing nursery rhymes, peekaboo, and sensory-based play. For the third task, the mother was completing a distracting questionnaire, while the baby was left to freely explore his environment. Then another book-reading task took place, in which the content of the book involved strong attachment-related scenarios. Mothers were invited to talk to the child about what was happening in the story and how the people in the pictures might have been feeling. The fifth task involved the child playing with a difficult to manipulate toy and the mother was asked to join in after a few minutes. Lastly, a task was implemented whereby the child was not allowed to touch a set of three desirable toys after they were taken away and the mother was asked to help the child in managing his reactions to this without using toys.

The entire duration of these interactions was video recorded by the researcher. The time needed to complete all these tasks ranged between 27 minutes to 43 minutes. While acknowledging that the nature of mother-baby interaction was based on the tasks administered

for the purpose of a different outcome, they nevertheless offered a rich material to measure mind-mindedness in terms of both their length and variety of interactional context.

In the same visit, a semi-structured interview (the Parent Development interview) was also conducted and audio recorded to assess parental reflective function.

Measures

MM measure

Mind-mindedness was coded from the videotaped interactions of mothers and their babies at the families' homes. The entirety of the mothers' speech throughout the video was transcribed verbatim. All mind-related comments made directly towards the baby were identified and collated for each participant. Each of these minded comments was then classified into one of nine categories: desires and preferences, cognitions, emotions, first-person voicing, epistemic states, intentions, funny/amusing, cheeky, and clever. For a detailed description of the classification of the comments, refer to Meins and Fernyhough (2015).

However, guided by the limited literature on sub-types of minded comments (Giovanelli et al., 2020), only the first four categories described in Meins and Fernyhough's (2015) were used in the current analysis: desires and preferences (e.g., like, love, want, prefer, and hate), in brief referred to here as "desires"; cognitions (e.g., think, decide, know, remember, and believe); emotions (e.g., fed up, shy, happy, and scared); and first-person voicing (any utterance that is obviously voiced in the first-person from the infant's perspective, e.g., "No mommy thanks"; "I don't like this food mommy").

Each comment was then coded as appropriate or non-attuned (Meins and Fernyhough, 2015). A comment was classified as an appropriate mind-related comment if one or more of the following conditions were met: (1) the independent coder agreed with the mother's reading

of the baby's state of mind; (2) the mind-related comment connected the infant's activity with similar events in the past or future (e.g., "You remember this toy from grandma's house?"); (3) the mind-related comment helped to clarify how to proceed when there is a pause in the interaction (e.g. "Do you want to sing a song now?"), or the mother voiced what her infant might say if he/she could speak (e.g. "I am done with this now, thanks"). On the other hand, a comment was classified as non-attuned if (1) the coder believed that the mother misinterpreted her infant's internal state, (2) the mind-related comment referred to a past or future event that had no apparent link to the baby's ongoing activity (3) the mother asked what the infant wanted to do when they were already engaged in another activity, or commented that the infant wanted a different object as they were clearly showing preference for a specific object.

In order to control for maternal verbosity, proportional MM scores were computed by dividing the number of mind-related comments by the total number of maternal comments yielding proportional global, appropriate, and non-attuned mind-mindedness scores that were used in the study analyses. Fifteen percent of the total number of videos were coded by the three coders, blinded to any information regarding the participants' group belonging. Intraclass correlation coefficients were high (.983 to .994).

Maternal Reflective function (RF)

The Parent Development Interview–Revised (PDI) is a 20-question interview that assesses the parent's representations of their relationship with their child. The interview takes approximately 45 min to administer; the parent is asked to describe their experience of the child, their relationship with the child, their own internal experience of parenting, and the child's reactions to normal separations, routine upsets, and parental unavailability. Transcribed interviews were scored for RF. RF is scored on a scale of –1 to 9 with lower scores (–1 to 2) indicating prementalizing processes, or the inability to consider one's own or another's thoughts and feelings, and higher scores reflecting increasing abilities to understand the nature of mental

states and the relationship between internal experience and behavior (Slade, Bernbach, Grienenberger, Levy, & Locker, Reference Slade, Bernbach, Grienenberger, Levy and Locker, 2005).

Power calculation

Power analysis for this study was informed by the work of Barlow, Sleed and Midgley, N. (2021) who meta-analytically explored enhancing parental reflective functioning through early dyadic interventions. This study's total recruited sample comprised 80 mother-infant dyads. Based on six randomized controlled trials (RCTs) and a total of 521 participants, the meta-analytic average for interventions aiming to improve parental functioning and/or parent–infant interaction in Barlow and colleagues' (2021) review, was Standardized Mean Difference (SMD) = -.46. To detect such an effect at alpha = .05 with 80% power, 76 participants in each group would be required.

The G*Power 3 program was used for this calculation (Faul, Erdfelder, Lang & Buchner, 2007).

Data Analysis

Examining the data for normality

Prior to conducting analyses, the data was tested for normality using univariate approaches including inspection of skewness and kurtosis, as well as Kolmogorov-Smirnov and Shapiro-Wilk tests. After this inspection, non-parametric testing was used where appropriate. More specifically, for skewed data, Man-Whitney U test was chosen for group-comparisons while Kendall's tau-b was chosen for correlations as it has been considered the most robust among non-parametric correlational testing (Chen, 2002).

Examining the balance of intervention and control groups

Prior to hypothesis testing, the intervention group (MTB) and the control group (TAU) were compared for baseline characteristics. This is to examine potential sources of bias and ensures difference in outcome can be assumed to be due to the intervention. For categorical demographic variables, Pearson chi-square test for independence was chosen, while independent-samples t-test was used for continuous demographic variables.

Examining primary outcome association with sample characteristics

A series of nonparametric correlations (Kendall's tau-b) were conducted to examine whether the primary outcome, MM score, was associated with any of the sample's characteristics. These correlations were possible given that the sample characteristic variables were either binary categorical (maternal education and marital status), ordinal categorical (household income) or continues (maternal age). If a correlation was found to be significant for a binary categorical demographic variable (e.g. marital status), Man-Whitney U was conducted to compare differences in MM across the demographic variable's levels (e.g. single vs. cohabiting).

Hypothesis testing

H1: Mind-mindedness will be higher in the MTB sample compared to the TAU community sample.

H2: Non-attuned mind-related comments will be lower in the Minding the Baby sample compared to the treatment as usual sample.

H3: There will be sig difference between subtypes of MM across the intervention (MTB) and control group.

In order to test for these three hypotheses, two statistical analyses were conducted addressing two different purposes. The first is to describe the effect of MTB intervention, relative to treatment as usual, on mind-mindedness (global, appropriate, non-attuned) and its subtypes. The second is to infer trends (or predictions) across the two levels of the independent variable (group allocation) on the continuous outcomes (MM and subtypes scores) while controlling for other demographic variables.

To address the first purpose, Man-Whitney U tests were initially used to identify the differences between the two groups (intervention and control) with respect to the various measures of mind-mindedness. This non-parametric test was chosen due to the observation of skewness of the MM data. Mann-Whitney U allows us to statistically examine the distribution of scores for the two levels of the independent variable, and a histogram can show the distribution of MM scores for each level. If the two distributions have a different shape, the Mann-Whitney U test is used to determine whether there are differences in the distributions of the two groups. However, if the two distributions are the same shape, the Mann-Whitney U test is used to determine whether there are differences in the medians of the two groups. All other assumptions of this test, and of correlational tests, were met through the study design.

To address the second purpose, multiple regression was conducted to evaluate whether the treatment allocation group (MTB vs TAU) was a significant predictor of maternal mind-mindedness while controlling for the factors of; maternal age, maternal education level, maternal marital status, and the household income. Given that both groups were fairly balanced regarding levels of parental stress as well as degrees of social support, these two variables were excluded as covariates from the regression.

MM scores, and the subtypes, were computed as proportion of mind-related comments out of the total number of maternal comments made during the interaction observed. Maternal

education was coded according to 2 categories: up to GCSE and above GCSE. Maternal marital status was coded according to 2 levels: cohabiting and single. House hold income was coded according to 5 income brackets: <10k , >10k – 20k , >20k – 30k , >30k – 50k , 50k+. Maternal age was coded as a continues variable.

In order to test for the assumptions of independence of observation in the regression analysis, Durbin-Watson's test was carried out to test for auto-correlation of the data (if the *d* value was about 2, there is no auto-correlation). To test for linearity and homoscedasticity, scatterplots of the studentized residuals against the unstandardized predicted values were examined. Collinearity statistics also tested for multicollinearity. If the Tolerance value is less than 0.1 – which is a VIF of greater than 10 – there might be a collinearity problem (Hair et al., 2014). To check for unusual points that might affect the fit of the regression model, the mind-mindedness data was screened for the presence of outliers, high leverage points (Huber, 1981) and highly influential points (Cook & Weisberg, 1982). Finally, to examine whether the MM data meets the assumption of normality of residuals for the regression modelling, a Q-Q Plot of the studentized residuals were examined (Fox, 2019).

To answer hypothesis 4, that there will be a significant association between maternal MM and maternal RF, Kendall's tau-b correlation was conducted. This non-parametric correlational test was chosen due to the skewness of the MM data.

All analyses were conducted using the software package IBM SPSS for IOS, version 28.0 (IBM Corp, 2021).

Results

Overview

The results will be presented in five sections. The first section will detail how the data was prepared and the results of checks on the MM variables for normality of distribution and outliers. The second section presents the descriptive statistics of the sample. The third section briefly compares the MM means of the intervention group (MTB) to these of the treatment as usual group (TAU). The fourth section reports on the regression analyses to obtain coefficients of the association between the categorical independent variable (intervention) and the outcome variable (maternal mind-mindedness) while controlling for demographic variables (maternal education, maternal age, marital status, and household income). The fifth and final section reports on the correlational findings between the different types of mind-mindedness and prenatal reflective functioning of the study sample.

Distributional analysis

We examined mind-mindedness data for the assumption of normality. Skewness and kurtosis scores were between - 1.96 and + 1.96. The Kolmogorov-Smirnov test was not significant, but the Shapiro-Wilk test was borderline significant with $p = .050$. The histogram showed that the distribution of MM scores was slightly deviated from a normal distribution with more scores clustered at the lower end of the scale. This skewness was anticipated as five of the participating mothers obtained a score of zero on the MM measure. These data points were not treated as outliers as they were considered to represent meaningful information about the mothers' capacity to comment on their child's internal states. Therefore, non-parametric tests were alternatively used for all analyses of MM scores.

One missing data point was detected for maternal education (1.2% of the total sample), and four data points were missing from the household income – two from each arm of the MTB trial (5% of the total sample). These missing values were not imputed as they did not make a significant proportion of the overall scores available for these variables and appeared to be Missing Completely at Random (MCAR). Instead, we chose to exclude cases on pairwise basis, where only cases with complete data for the pair of variables being correlated are used to compute the regression coefficient.

Descriptive statistics

Examining baseline characteristics for MTB and TAU

The demographic characteristics of both groups are shown in Table 1. A series of Pearson chi-square tests for independence (with Yates continuity correction if expected count was below five) were used to check for demographic differences between the MTB and TAU groups on categorical variables. Due to the small numbers of participants from a range of different ethnic minorities these categories were collapsed for statistical reasons into two groups, White British or any ethnic minority. The chi-square tests indicated no significant differences in terms of child gender ($p = .073$), mothers' ethnicity ($p = .27$), mothers' education level ($p = .25$), and household income ($p = .47$). However, the chi-square test for independence indicated that there was a significant association between being a single-parent family and allocation group, χ^2 (4, 80) = 10.78, $p < .05$ (see Table 1).

Independent-samples t-tests were conducted to compare the two groups on the continuous variables of maternal age, as well as their scores for parenting stress and social support. There was no significant difference between the MTB and the TAU sample in terms of maternal age ($p = .78$). Also, there was no significant difference between the groups for

social support at baseline (p = .54) nor parenting stress at year one (at which mind-mindedness was measured).

In summary, the two samples appear to be balanced in terms of child's gender, parent's age, ethnicity, education level. The groups are also well matched with respect to overall family income, as well as the social support available for the young mothers, and their self-reported parenting stress. However, the young mothers in the control group sample were significantly more likely to be in single-parent families.

Table 1

Participants characteristics of MTB and TAU Groups

Variable	MTB group (N = 38)	TAU group (N = 42)
Ethnicity:		
White British	30 (78.9%)	37 (88.1%)
Asian	3 (7.9%)	1 (2.4%)
Black	1 (2.6%)	4 (9.5%)
Mix	4 (10.5%)	-
Maternal age in years		
Mean (*SD*)	21.58 (3.32)	21.42 (2.47)
Range	15.16 – 25.96	17.35 – 25.96
Level of Education:		
No Exams	2 (5.4%)	4 (9.5%)
GCSEs	15 (40.5%)	10 (23.8%)
A-levels	5 (13.5%)	5 (11.9%)
NVQ, NHD	10 (27%)	20 (47.6%)
Undergraduate	3 (8.1%)	3 (7.1%)
Postgraduate	2 (5.4%)	-
Marital status:		
Single	12 (31.6%)	28 (66.7%)

Married & living apart	3 (7.9%)	2 (4.8%)
Unmarried & cohabiting	17 (44.7%)	8 (19%)
Separated	1 (2.6%)	-
Married & co-habiting	5 (13.2%)	4 (9.5%)
Recruitment site:		
York	10 (26.3)	10 (23.8%)
Sheffield	20 (52.6)	19 (45.2%)
Glasgow	8 (21.1)	13 (31%)
Education		
Up to GCSE	17 (45.9%)	14 (33.3%)
Above GCSE	20 (54.1%)	28 (66.7%)
Child gender:		
Female	15 (39.5%)	25 (59.5%)
Male	23 (60.5%)	17 (40.5%)
Household income		
<10k	22 (61.1%)	17 (42.5%)
>10k – 20k	5 (13.9%)	10 (25%)
>20k – 30k	6 (16.7%)	8 (20%)
>30k – 50k	3 (8.3%)	4 (10%
50k+	-	1 (2.5%)
Parenting stress at year 1		
Mean (*SD*)	71.76 (18.13)	66.31 (18.13)
Social support at baseline		
Mean (*SD*)	12.18 (4.53)	12.79 (4.09)

Note. Total sample size is N = 80

Mind-Mindedness and demographics

Table 2 summarizes descriptive statistics of mind-mindedness in the total sample. The relationship was investigated between MM and each of the variables of child's gender as well as mother's age, education level, household income, ethnicity, joint/single parental status, parental stress, and social support. A series of non-parametric correlations indicated that MM

was unrelated to any of the above variables except for marital status (τb = .29, p < .05, 95% CI = [.07 - .48]).

Furthermore, a series of Man-Whitney U tests were conducted to determine if there were differences in MM between the young mothers living alone and the ones living with a partner. Distribution of MM scores for single and cohabiting mothers were similar, as assessed by visual inspection. MM score was statistically significantly higher in cohabiting mothers (*Mdn* = 7.53) than in single-parent families (*Mdn* = 4.99), U = 104.5, z = 2.55, p = .01.

Table 2

Descriptive statistics of Mind-mindedness in the entire sample

	Mean	SD	Median
Verbosity	231.35	74.61	224
MM comments	16.33	10.95	15
Global MM (%)	6.6	4.3	6.2
Appropriate MM (%)	5.5	4.1	4.9
Non-attuned MM (%)	0.4	.85	00

Note. N = 80, no missing data. Verbosity = total number of comments made by mothers towards baby. MM comments = total number of minded comments made by mothers towards baby. Global MM = Percentage of mind-related comments. Appropriate MM = Percentage of appropriate mind-related comments. Non-attuned MM = percentage of non-attuned mind-related comments.

Hypothesis testing

Comparison of MTB and TAU

A series of Man-Whitney U tests were conducted to compare the mind-mindedness scores of the MTB sample to those of the control community sample. Distribution of global MM, appropriate MM, non-attuned MM, and all subtype scores for MTB and TAU samples were unsimilar, as assessed by visual inspection.

As hypothesized, there was a significant difference in global mind-mindedness scores for the MTB group and the TAU group (Table 3). Mind-mindedness scores for MTB mothers were statistically significantly higher than for the control group mothers. The effect size was calculated using the equation ($r = \frac{|z|}{\sqrt{n}}$) and revealed a small effect (r = .24). With respect to appropriate mind-related comments, there was a near-significant difference (p = .056), with MTB mothers' scoring higher than those of control mothers. However, the second hypothesis was not supported. The non-attuned mind-related comments were, on average, higher in the MTB group but the difference was not significant (p = .13).

As for the subtypes of mind-related comments, mean values reported in Table 3 are all higher in the MTB group compared to the control. However, Cognitions, Emotions and First-person Voicing were not statistically significantly different between the groups. The Desires category of mind-related comments, showed near-significance difference (p = .06).

Table 3

Between group comparison for MM and sub-types (%)

	MTB N = 38 *M* (*SD*)	TAU N = 42 *M* (*SD*)	Man-Whitney U N = 80 *Z* (*p*)
Global MM	7.9 (4.9)	5.5 (3.3)	**-2.18 (*p* = .03)**
Appropriate	7.0 (4.6)	5.1 (3.1)	**-1.83** (*p* = .06)
Non-attuned	0.9 (1.4)	0.4 (0.6)	-1.52 (*p* = .13)
MM Desires	4 (1.4)	2.6 (0.9)	*1.92 (p* = .06)
MM Cognitions	1 (0.6)	0.5 (0.3)	*1.66 (p* = .10)
MM Emotions	0.8 (0.5)	0.6 (0.5)	*1.08 (p* = .28)
MM First-person voicing	0.2 (0.001)	0.05 (0.01)	*0.61 (p* = .76)

Note. Global, Appropriate, Non-attuned MM, MM Desires, MM Cognitions, MM Emotions, MM First-person voicing = percentage of total comments made by mother towards baby.

Regression analyses

Global MM. A multiple regression was conducted to evaluate whether the treatment allocation group (MTB vs TAU) was a significant predictor of maternal mind-mindedness while controlling for the factors of maternal age, maternal education level, maternal marital status, and the household income. Given that both groups were fairly balanced regarding levels of parental stress as well as degrees of social support, these two variables were excluded as covariates from the regression.

There was linearity of residuals as assessed by a plot of studentized residuals against the predicted values. There was no evidence of autocorrelation, as assessed by a Durbin-Watson statistic of 2. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by VIF values lower than 10. There were no studentized deleted residuals greater than ±3 standard deviations, no leverage values greater than 0.2, and values for Cook's distance above 1. The assumption of normality of residuals was met, as assessed by a Q-Q Plot.

A stepwise method of regression revealed that group allocation was the only statistically significant predictor of global MM scores ($p < .05$) and provided a stable regression model. Also, when including all variables in the regression equation, the model significantly predicted global maternal MM scores, F (5, 74) = 2.78, $p < .05$, adj. $R^2 = .11$, with group allocation being the only predictor explaining unique variation in global MM scores. This meant that 11% of the variance in global MM scores accounted for by the model, could be explained by the intervention effect whilst controlling for maternal age, education, income, and marital status. Adjusted R^2 is considered more conservative since it penalises the model for the number of predictors included. Regression coefficients and standard errors can be found in Table 4.

Table 4

Multiple regression results for global mind-mindedness

MM	*B*	*SE B*	*β*	R^2	*adj.* R^2
Model				.17	.11
Constant	.40	4.32			
Group allocation	2.70	1.02	.32*		

Maternal education	.15	.40	.043
Marital status	.23	.30	.10
Household income	.57	.46	.15
Maternal age	.14	.20	.08

Note. Model = "Enter" method in SPSS Statistics; *B* = unstandardized regression coefficient; *SE B* standard error of the coefficient; β = standardized coefficient, R^2 = coefficient of determination; *$p < .05$.

Appropriate MM. Multiple regression was conducted to test whether treatment group was a significant predictor of Appropriate MM, whilst controlling for each of maternal age, education, marital status, and income.

Initially, a stepwise method revealed that group allocation was the only statistically significant predictor of appropriate MM scores ($p < .05$) and provided a stable regression model with all assumptions met.

When including all the variables in the regression equation, the model was significant in predicting Appropriate maternal MM scores, F (5, 74) = 2.45, $p < .05$, adj. R^2= .089. This meant that the model accounted for 8.9% of the variance in appropriate MM scores. As with the previous regression, intervention group was the only predictor that significantly explained variation in appropriate MM whilst controlling for maternal age, education, income, and marital status. However, the assumption of normality of residuals was slightly violated in this model as the Shapiro-Wilk test approached significance.

Table 5

Multiple regression results for Appropriate mind-mindedness

MM	*B*	*SE B*	*β*	R^2	*adj.* R^2
Model				.15	.09
Constant	-.004	.041			
Group allocation	.022	.010	.27*		
Maternal education	.003	.004	.09		
Marital status	.002	.003	.10		
Household income	.005	.004	.15		
Maternal age	.001	.002	.09		

Note. Model = "Enter" method in SPSS Statistics; *B* = unstandardized regression coefficient; *SE B* standard error of the coefficient; *β* = standardized coefficient, R^2 = coefficient of determination; *$p < .05$.

Non-attuned MM. Similarly for non-attuned MM, multiple regression was conducted to test whether treatment group was a significant predictor while controlling for maternal age, education, marital status, and income. The stepwise method retained group allocation as the only significant predictor of non-attuned MM ($p < .05$) but the residuals of the model were highly skewed. We believe the reason for this violation is the low prevalence of non-attuned comments in many of the participants' speech (48 mothers out of 80 scoring zero for non-attuned MM). This has potentially contributed to the non-attuned scores becoming unstable/susceptible to outliers due to lack of sufficient variability in the data.

Sub-types of MM. The support for Hypothesis 1 – that global MM was higher in the MTB group compared to the TAU group – was explored further by looking at the four types of mental comments the young mothers made.

Cognitions. Stepwise regression analysis retained group allocation as a significant predictor of MM comments pertaining to the cognition of the baby, but the assumption of normality of residuals was violated for this subtype. When including all variables in the regression equation, the model was not significant ($p > .05$).

Desires & emotions. Both stepwise and forced entry methods of regression showed that none of the independent variables were able to predict the variance in the mind-related comments within the categories of desire and emotion.

First-person voicing. For this subtype, stepwise regression retained marital status as the only significant predictor of first-person voicing MM comments. However, residuals of the model were not normally distributed due to minimal data available for this subtype. The model with all predictors included was not significant ($p > .05$).

Mind-mindedness and maternal reflective function

A Kendall's tau-b correlation was run to test the relationship between maternal reflective function and maternal mind-mindedness amongst our 80 participants. There was a weak-to-moderate, positive association between maternal RF and appropriate mind-related comments, which was statistically significant, $\tau b = .2$, $p = .04$.

There was a weak, negative association between maternal RF and non-attuned MM comments, which was not statistically significant, $\tau b = -.03$, $p = .72$.

Discussion

Mentalization theory (Fonagy et al., 1995) have linked one's ability to engage higher mental functions – such as mentalizing – to lower levels of acute stress. As noted by Allen (2012): "stress is the enemy of mentalization" (p. 79). Therefore, when a parent's survival mode is triggered by threat or fear, reflective mechanisms believed to be crucial for establishing a safe and secure base for one's child are impaired. It is for this reason promoting parental mentalization is an aim of various parent-child interventions looking to improve outcomes in highly stressed communities. A variety of noncontrolled and randomized studies documented positive changes in parental mentalization due to such interventive efforts (Pajulo et al., 2012; Schechter et al., 2006; Suchman et al., 2010; Suchman et al., 2017; Sleed, Baradon, and Fonagy, 2013) – which highlighted that an emphasis on mentalization-based approaches with vulnerable mothers is particularly important.

Minding the Baby (MTB) is an intensive, mentalization-based, community home-visiting programme for first-time young mothers, who are at risk of experiencing challenges in the parent-child relationship. MTB integrates multiple well-established elements of home-

visiting programmes, with a focus on promoting young mothers' capacities to reflect on their own and their babies' mental states. As its main vehicle of delivery, MTB operated within the context of a trusting and compassionate relationship between the young mothers and the programme's highly trained practitioners. In two US-based studies, MTB showed promising results, and indeed proved effective in achieving the goals of enhancing parental reflective functioning and various child developmental outcomes (Sadler et al, 2013; Slade et al, 2019). When established and tested in the UK through a randomised controlled trial, no evidence was provided that MTB improved parental mentalization as assessed via an interview-based measure (RF-PDI) (Longhi, Murray, Wellsted, Hunter, MacKenzie, Taylor-Colls & Fearon, 2020), although it yielded–evidence for improved child outcomes, principally behavioural problems and to a lesser extent attachment security. The UK trial also found no evidence that the programme improved observed sensitivity of caregiving. The question thus arises of what changes in parental behaviour might be driving improved child outcomes. Given the focus of the intervention on mentalization, the current study examines whether MTB might be effective through its impact on mind-mindedness as manifested in the language used by mothers in real-life interactions.

Thus, the study aimed to address three research questions:

- In a high-risk population of young mothers, was MTB effective in enhancing mind-mindedness within the mother-infant interaction?
- What was, if any, the association between mind-mindedness and parental reflective functioning in this sample?
- How did MTB influence the specific types of mind-related comments (i.e., infant's desires and preferences, cognitions, emotions, and the mothers' comments on infants' behalf)?

Main findings

With regards to the first research question, results supported our hypothesis and showed that mothers in the MTB group – after about a year of receiving the intervention – were making more mind-related comments as they interacted with their infants. Additionally, the study found a marginally significant increase in appropriate mind-related comments in MTB group mothers. This effect was found to be robust even after controlling for various sociodemographic factors. Regression analyses showed that whether mothers received MTB intervention or not was a significant predictor of mind-mindedness above and beyond the variance explained by maternal age, education, income, and marital status. This regression finding was particularly meaningful on the background of descriptive analyses revealing that cohabiting mothers had higher MM scores, and that more MTB mothers were living with partners compared to the control group. This offered higher confidence that the intervention effect on MM was independent of potential cohabiting status influence. Additionally, given that mothers in both groups did not report different levels of parental stress nor varying degrees of social support, the increase in mind-related comments can be attributed to the intervention effect independently from the influence of such socioemotional factors.

The second hypothesis, however, that MTB mothers would make less non-attuned comments was not supported. This result runs contrary to a previous finding on the effectiveness of a 9-weeks mindful parenting training for a group of mothers who produced *less* non-attuned comments post-intervention (Zeegers, Potharst, Veringa-Skiba, Aktar, Goris, Bögels & Colonnesi, 2019).

In the literature pertaining to this psychological phenomenon, parental mentalization is conceptualized and measured in a variety of ways (Schiborr et al., 2013), each emphasizing a different component. The two main key approaches focus on measuring (1) complexity and (2)

spontaneity and accuracy. Complexity refers to "*the ability to process multiple perspectives and to recognize causal relations between behaviour and mental state and the parent's and the child's inner worlds*" (Slade et al., 2007) – which is conventionally measured through the Parent Development Interview (PDI) (Slade et a., 2004). Spontaneity refers to a parent's capacity to utilise reflective language in real-time interactions with their child, while accuracy is the capacity to use such a language in a manner that fits with the baby's cues (Meins, 2001). Both dimensions of spontaneity and accuracy are commonly measured using mind-mindedness observation tool (Meins & Fernyhough, 2010). The total proportion of mind-related comments in a parent's speech captures the overall degree of spontaneity of the mentalization effort, while the differentiation between appropriate and non-attuned adds the aspect of accuracy of mentalizing about one's child. In other words, *appropriate* mind-mindedness is spontaneous, accurate mentalizing, while *non-attuned* mind-mindedness is spontaneous, inaccurate mentalizing.

In light of the above, the overall picture emerging from the current study indicates that mothers who took part in the MTB programme have tended to invoke more mental states during their interaction with their 12-months-old babies. As such, MTB was effective in enhancing mothers' spontaneity of mentalizing, that is the mothers' general tendency to take interest in their infant's mental activity without direct probing (Meins, 2013). Regarding the accuracy of the mentalistic language – which is to interpret the infant's mental states in a *plausible manne*r that is in-tune with baby's cues (Meins et al., 2012), MTB yielded a trend level benefit in enhancing appropriate mentalistic speech but not in reducing non-attuned mentalistic speech.

This pattern of findings is of a particular interest when examining the association between mind-mindedness and parental reflective functioning (PRF), the measure utilised in the original UK MTB trial. The findings showed that only appropriate mind-mindedness significantly correlated with PRF ($p < .05$) while the non-attuned mind-related comments were

highly unrelated to PRF (p = .72). This was perhaps unsurprising given that, like PRF, appropriateness of mentalistic comments is the index predictive of traditional maternal sensitivity as well as security of child attachment. This finding is consistent with previous research examining the relation between mind-mindedness and PRF on mothers and their 7-months-olds (Rosenblum, McDonough, Sameroff, & Muzik, 2008). It confirmed that mothers' appropriate mind-mindedness during a play-based interaction with their babies was significantly associated with their reflective functioning during an interview (r = .39).

Considering the above, the question remains of why our study of UK MTB has documented a positive change in global and appropriate mind-mindedness (spontaneity of mentalizing) but not in non-attuned mind-mindedness (accuracy) nor in reflective functioning (complexity). One explanation might be due to the inherent differences in the approaches of capturing the complex and multidimensional construct of parental mentalization.

While acknowledging the accumulating evidence that PRF can be improved (Lo & Wong, 2022), it is important to consider the challenges of using this interview-based measure. For example, after any intervention, mothers rarely showed an increase in PRF beyond a single scale point (Slade et al., 2020). Additionally, the range of PRF for high-risk populations (higher exposure to trauma and family dysfunction) was often limited, with mothers remaining at the lower end of the RF scale even after intervention. The PRF scale was designed to measure the full range of reflective capacities, which may result in forms of *prementalizing* seen in high-risk populations to be indistinguishable and assigned the same low score (typically one or two out of nine).

Mind-mindedness, on the other hand, does not face the same limitation of categorical scoring and is indeed able to differentiate between a mother who produced zero mind-related comments during a 30-minutes interaction with her baby, and another who made about five attempts to comment on her baby's mental world during the same duration of interaction.

Additionally, mind-mindedness is the only mentalization construct that can be assessed from an actual parent–infant interaction, meaning that it is positioned at the interface between representational as well as behavioural operationalizations of parent–infant interaction (Meins, 2013). In order to produce a minded comment, a parent should be able to form a second-order representation of what the infant might be thinking or feeling. Simultaneously, these comments form part of the observable dyadic behavioural interaction. A representational interview-based measure (i.e., PRF), especially as used with impoverished and vulnerable young parents, might not be as sensitive to the modest improvements in the mothers' attempts to tune into the infant's mental activity as they interact and play with him/her.

As for the finding that non-attuned mind-mindedness was not impacted by the MTB intervention, it is crucial to highlight the fact that this type of minded comments was very minimal in the data with 60% of the sample producing 0% non-attuned MM comments. The mean proportion of non-attuned comments for the remaining participants was at 0.4% of their total speech. A percentage that is much smaller than the general rate of 1 to 2% expected from previous literature (Arnott and Meins 2007; Kirk et al. 2015; Meins et al. 2003, 2012; Zeegers et al. 2017). It was mentioned earlier that some studies found non-attuned comments too infrequent to be considered for analysis (e.g., Bernier et al. 2017). Not having enough data to represent the full spectrum of non-attuned comments across the sample might explain the lack of evidence regarding an MTB intervention effect for this type of comments. Another possible explanation for the lack of findings relates to the high-risk, disadvantaged sample of young mothers chosen as the target population. As noted, mentalization scores for similar populations was shown to hover towards the low end of the scale (although there would be, of course, exceptions). The results may, thus, suggest that low (or zero) non-attuned mind-related comments is associated with a general tendency for mother not to comment on their infant's internal states in the first place, rather than indicating an absence of misinterpreting infant's

internal states. A similar observation was made by Schacht et al. (2017) when comparing non-attuned mind-related comments between mothers with mental health difficulties and a community control sample.

An additional aim of the current investigation was to examine whether specific types of mind-related comments were promoted by the intervention. The categories examined were desires and preferences (e.g., "want", "prefer", "need", "love", "like"), cognitions ("think", "remember", "understand"), emotions ("happy", "sad", "excited"), and first person voicing during which the mother speaks on the infant's behalf ("I am busy mummy"). Results indicated a general increase in the mean values of all categories for MTB mothers. However, only the subtype of desires and preferences approached statistical significance. It is worth noting here that not all mind-related comments produced by the mothers were part of these four categories. Rather the four categories were the ones classified in the updated manual by Meins and Fernyhough (2015) as Mind-Related, while the rest (e.g., "cheeky", "funny", "clever") were considered as comments that *May or May Not be Mind-Related*, depending on the interactional context. As such, the exclusion of comments that did not fall into these discrete four categories may have reduced the power of the data to detect significant difference beyond a trend-level increase in means. This observed lack of sufficient data on the subtypes of minded comments may also explain the null regression findings when controlling for other variables in the model.

The observed increase in mean values of the four subtypes, although non-significant, could indicate that the benefits of the intervention on maternal mind-mindedness is observed across the board of the various types of minded comments. This is theoretically consistent with the model's aim to support the implicit/automatic capacity of mothers to treat and relate to their infants on a mental level.

Strengths, limitations, and future directions

One of the key strengths of present study with regards to measuring mind-mindedness is the length of the observational material coded. Four studies were found to have used mind-mindedness as one of the measured maternal outcomes for a range of interventions (Schacht et al., 2017; Larkin et al., 2019; Zeegers et al., 2017; Meynen, Colonnesi, Abrahamse, Hein, Stams & Lindauer, 2022). In all of them, the parent-baby interaction coded ranged between 3 minutes to 15 minutes long and mainly within a free-play context. As noted earlier, the length of videos coded for mind-mindedness in MTB ranged between 27 to 43 minutes. These larger segments of live interactions at the families' home may better reflect the natural quality of mothers mentalistic language, and thus enhance the generalizability of the findings.

A key limitation of the original MTB-UK trial was that recruitment proved challenging and the negative effect this had on statistical power was exacerbated by a high drop-out rate from both groups of the study. It was reported that low power may have affected the ability to detect intervention effect for child attachment security but not necessarily for maternal sensitivity. In the current study, where video recordings of the same trial were used, power calculations revealed that the study was underpowered to detect a moderate effect size of SMD = 0.47. This may explain the small size of the intervention effect found in this study for global/spontaneous mind-mindedness, as well as the lack of a positive intervention effect for non-attuned mind-mindedness and the subtypes. A key recommendation for future work is to develop effective strategies to increase participation and engagement. This could be achieved through embedding the MTB programme within trusted and well-established community organisations.

Introducing a pre-intervention test to the design would increase the internal validity of the study. Given that mind-mindedness is measured within an interactional context with the

baby, it is clearly not possible to introduce a pre-intervention measure of mind-mindedness. However, an earlier testing of mind-mindedness, at three- or six-months of the child's age, would potentially suffice for a longitudinal examination of the intervention effect on mind-mindedness.

Similarly, a key limitation of the present study is the lack of follow up at the point of discharge from the programme – around the second birthday of child. Should future research follow the current study in testing the MTB approach using mind-mindedness, it would be prudent to code data from the year-two visit as well as incorporating post-intervention follow up measures.

Clinical implications

The findings of this study add to the accumulating evidence base for mentalization-based early interventions for vulnerable young mothers and their children. Evidence shows that improving parental mental health on its own will not necessary be sufficient to improve parent-infant relationship (Forman et al., 2007), and as such effective intervention addressing parental difficulties will need to focus on elevating symptoms as well as the quality of the parent-child interaction. The present findings emphasise the potential of MTB to achieve the second goal through enhancing the mothers' capacity to tune into their babies mental states as they spontaneously and naturally interact with them. This has a significant implication in terms of encouraging the investment in, and implementation of, MTB programmes in the UK. The findings also argue for the consideration of various of measures of capturing the vital yet multifaceted psychological phenomenon of mentalization. This study showed that despite the challenges of recruitment and engagement, young mothers were better able to engage in spontaneous mentalization when playing and interacting with the child as a result of MTB – an

improvement that was not captured via the classical PDI interview set out to measure the complexity aspect of parental mentalization.

Conclusion

This study aimed to build on the original MTB-UK trial findings and utilises the video-recorded observations to examine how MTB may impact the mothers' tendency to see their infants as mentalizing agents, as it is manifested linguistically in real-time dyadic interactions. The findings presented in this paper further contribute to the evidence base on the benefits of the MTB approach, as it had been tested in a longitudinal randomised controlled trial for the first time in the UK. The study did yield evidence of impact for mothers' mind-mindedness profiles, particularly in the domain of spontaneous mentalizing of the baby. Considering the multiple disadvantages experienced by young mothers living in stressful socio-economic circumstances, advancing effective approaches to support child development, as well as mothers and families' wellbeing, remains a clinical and social priority. In this light, further empirical testing and refinement of MTB is, indeed, warranted.

References

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1971). Individual differences in strange situation behavior of one year olds. In H. R. Schaffer (Ed.), The origins of human social relations (pp. 17–52). London: Academic Press.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J.(1974). Infant–mother attachment and social development: Socialisation as a product of reciprocal responsiveness to signals. In M. P. M.Richards (Ed.), *The introduction of the child into a social world* (pp. 99 135). London: Cambridge University Press.

Allen, J. (2012). Mentalizing in the development and treatment of attachment trauma. London: Karnac.

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

Arnott, B., & Meins, E. (2007). Links between 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.

Barlow, J., Sleed, M., & Midgley, N. (2021). Enhancing parental reflective functioning through early dyadic interventions: A systematic review and meta-analysis. *Infant Mental Health Journal*, *42*(1), 21-34.

Bateman, A. W., & Fonagy, P. (2004). Mentalization-based treatment of BPD. *Journal of personality disorders*, *18*(1), 36.

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. (1973). Attachment and loss: Vol. 2. Separation: Anxiety and anger. London: Hogarth Press.

Bowlby, J. (1980). Attachment and loss: Vol. 3. Loss sadness and depression. London: Hogarth Press.

Chen, P. Y., Smithson, M., Popovich, P. M., & ter Y, C. (2002). *Correlation: Parametric and nonparametric measures* (No. 139). Sage.

Colonnesi, C., Zeegers, M. A., Majdandžić, M., van Steensel, F. J., & Bögels, S. M. (2019). Fathers' and mothers' early mind-mindedness predicts social competence and behavior problems in childhood. *Journal of Abnormal Child Psychology*, *47*(9), 1421-1435.

Cook, R. D., & Weisberg, S. (1982). *Residuals and influence in regression*. New York: Chapman and Hall.

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.

Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the Adverse Childhood Experiences (ACE) study. Am J Prev Med. 1998;14(4):245–258.

Fonagy, P., Gergely, G., Jurist, E. L., & Target, M. (2018). *Affect regulation, mentalization, and the development of the self*. Routledge.

Fonagy, P., Steele, M., Steele, H., Higgitt, A. C., & Target, M. (1994). The Emmanuel Miller Memorial Lecture 1992: The theory and practice of resilience. *Journal of Child Psychology and Psychiatry*, *35*, 231–257.

Fox, J. (2019). Regression diagnostics: An introduction. Sage publications.

Fraiberg, S. (1980). Clinical studies in infant mental health. New York: Basic Books.

Fraiberg, S., Adelson, E., & Shapiro, V. (2018). Ghosts in the nursery: a psychoanalytic approach to the problems of impaired infant–mother relationships 1. In *Parent-Infant Psychodynamics* (pp. 87-117). Routledge.

Giovanelli, C., Di Dio, C., Lombardi, E., Tagini, A., Meins, E., Marchetti, A., & Carli, L. (2020). Exploring the relation between maternal mind-mindedness and children's symbolic play: A longitudinal study from 6 to 18 months. *Infancy*, *25*(1), 67-83.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (7th ed.). Harlow, England: Pearson.

Heinicke, C., Goorsky, M., Moscov, S., Dudley, K., Gordon, J., Schneider, C., & Guthrie, D. (2000). Relationship-based intervention with at- risk mothers: Factors affecting variations in outcome. Infant Mental Health Journal, 21(3), 133–155.

Hesse, E., & Main, M. (2006). Frightened, threatening, and dissociative parental behaviour in low-risk samples: description, discussion, and interpretations. Development and psychopathology, 18(2), 309–343.

Hopkins, J. (1992). Infant-parent psychotherapy. *Journal of Child Psychotherapy*, *18*(1), 5-17.

Howard, K. S., & Brooks-Gunn, J. (2009). The role of home-visiting programmes in preventing child abuse and neglect. *The future of Children*, 119-146.

Huber, P. J., & Ronchetti, E. M. (1981). Robust statistics john wiley & sons. *New York*, *1*(1).

IBM Corp. Released 2021. IBM SPSS Statistics for Macintosh, Version 28.0. Armonk, NY: IBM Corp

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.

Kitzman, H., Olds, D., Cole, R.E., Hanks, C.A., Anson, E., Arcoleo, K.J. et al. (2010). Enduring effects of prenatal and infancy home visiting by nurses on children. Archives of Pediatric and Adolescent Medicine, 164, 412–418.

Laranjo, J., Bernier, A., Meins, E., & Carlson, S. M. (2014). The roles of maternal mind mindedness and infant security of attachment in predicting preschoolers' understanding

of visual perspective taking and false belief. *Journal of experimental child Psychology*, *125*, 48-62.

Larkin, F., Oostenbroek, J., Lee, Y., Hayward, E., & Meins, E. (2019). Proof of concept of a smartphone app to support delivery of an intervention to facilitate mothers' mind mindedness. *PLoS One*, *14*(8), e0220948.

Lieberman, A.F., Silverman, R., & Pawl, J. (1999). Infant–parent psychotherapy: Core concepts and current approaches. In C.H. Zeanah (Ed.), Handbook of infant mental health (pp. 472–485). New York: Guilford Press.

Lieberman, A.F., Weston, D.R., & Pawl, J. (1991). Preventive intervention and outcome with anxiously attached dyads. Child Development 62, 199–209.

Lo, C. K., & Wong, S. Y. (2022). The effectiveness of parenting programs in regard to improving parental reflective functioning: a meta-analysis. *Attachment & Human Development*, *24*(1), 76-92.

Longhi, E., Murray, L., Wellsted, D., Hunter, R., MacKenzie, K., Taylor-Colls, S., & Fearon, P. (2020). Minding the baby® home-visiting programme for vulnerable young mothers.

Luyten, P., Mayes, L. C., Nijssens, L., & Fonagy, P. (2017). The parental reflective functioning questionnaire: Development and preliminary validation. *PloS one*, *12*(5), e0176218.

Luyten, P., Nijssens, L., Fonagy, P., & Mayes, L. C. (2017). Parental reflective functioning: Theory, research, and clinical applications. *The Psychoanalytic Study of the Child*, *70*(1), 174-199.

Maris, H. (2022). "The associations between maternal mental health, maternal mind mindedness, and infant attachment security in a socioeconomically disadvantage population." Unpublished thesis.

McEwen, C. A., & Gregerson, S. F. (2019). A critical assessment of the adverse childhood experiences study at 20 years. *American journal of preventive medicine*, *56*(6), 790 794.

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. (1997). Security of attachment and maternal tutoring strategies: Interaction within the zone of proximal development. *British Journal of Developmental Psychology*, *15*(2), 129-144.

Meins, E. (1999). Sensitivity, security and internal working models: Bridging the transmission gap. *Attachment & human development*, *1*(3), 325-342.

Meins, E. (2013). Sensitive attunement to infants' internal states: Operationalizing the construct of mind-mindedness. *Attachment & Human Development*, *15*(5-6), 524-544.

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

Meins, E., Bureau, J. F., & Fernyhough, C. (2018). Mother–child attachment from infancy to the preschool years: Predicting security and stability. *Child Development*, *89*(3), 1022 1038.

Meins, E., Centifanti, L. C. M., 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., & Harris-Waller, J. (2014). Is mind-mindedness trait-like or a quality of close relationships? Evidence from descriptions of significant others, famous people, and works of art. *Cognition*, *130*(3), 417-427.

Meins, E., Fernyhough, C., Arnott, B., Turner, M., & Leekam, S. R. (2011). Mother-versus infant-centered correlates of maternal mind-mindedness in the first year of life. *Infancy*, *16*(2), 137-165.

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., Wainwright, R., Clark-Carter, D., Das Gupta, M., Fradley, E., & Tuckey, M. (2003). Pathways to understanding mind: Construct validity and predictive validity of maternal mind-mindedness. *Child development*, *74*(4), 1194-1211.

Melwani, S. (2022). "Maternal mind-mindedness as a predictor of child behavioural and cognitive outcomes in a socio-economically disadvantaged population." Unpublished thesis.

Min, M. O., Singer, L. T., Minnes, S., Kim, H., & Short, E. (2013). Mediating links between maternal childhood trauma and preadolescent behavioral adjustment. *Journal of interpersonal violence*, 28(4), 831-85.

Meynen, M., Colonnesi, C., Abrahamse, M. E., Hein, I., Stams, G. J. J., & Lindauer, R. J. (2022). A Cohort Study on the Effect of Parental Mind-Mindedness in Parent− Child Interaction Therapy. *International Journal of Environmental Research and Public Health*, *19*(8), 4533.

Nievar, M. A., Van Egeren, L. A., & Pollard, S. (2010). A meta-analysis of home visiting programs: Moderators of improvements in maternal behavior. *Infant mental health Journal*, *31*(5), 499-520.

Olds, D. L., Sadler, L., & Kitzman, H. (2007). Programmes for parents of infants and toddlers: recent evidence from randomized trials. Journal of child psychology and psychiatry, 48(3-4), 355-391.

Olds, D., Kitzman, H., Cole, R., Hanks, C.A., Arcoleo, K.J., Anson, E. et al. (2010). Enduring effects of prenatal and infancy home visiting by nurses on maternal life course and government spending. Archives of Pediatric and Adolescent Medicine, 164, 419–424.

Ordway, M. R., Sadler, L. S., Dixon, J., & Slade, A. (2014). Parental reflective functioning: Analysis and promotion of the concept for paediatric nursing. *Journal of clinical nursing*, *23*(23-24), 3490-3500.

Pajulo, M., Pyykkonen, N., Kalland, M., Sinkkonen, J., Helenius, H., Punamaki, R., & Suchman, N. (2012). Substance-abusing mothers in resi- dential treatment with their babies: Importance of pre- and postnatal reflective functioning. Infant Mental Health Journal, 33, 70–81.

Pereira, J., Ludmer, J. A., Gonzalez, A., & Atkinson, L. (2018). Mothers' personal and interpersonal function as potential mediators between maternal maltreatment history and child behavior problems. *Child maltreatment*, 23(2), 147-156.

Robling, M., Bekkers, M. J., Bell, K., Butler, C. C., Cannings-John, R., Channon, S., ... & Torgerson, D. (2016). Effectiveness of a nurse-led intensive home-visitation programme for first-time teenage mothers (Building Blocks): a pragmatic randomised controlled trial. *The Lancet*, *387*(10014), 146-155.

Rosenblum, K. L., McDonough, S. C., Sameroff, A. J., & Muzik, M. (2008). Reflection in thought and action: Maternal parenting reflectivity predicts mind-minded comments

and interactive behavior. *Infant Mental Health Journal: Official Publication of The World Association for Infant Mental Health*, *29*(4), 362-376.

Sadler, L. S., Slade, A., Close, N., Webb, D. L., Simpson, T., Fennie, K., & Mayes, L. C. (2013). Minding the baby: Enhancing reflectiveness to improve early health and relationship outcomes in an interdisciplinary home-visiting programme. *Infant mental health journal*, *34*(5), 391-405.

Sadler, L.S., Slade, A., & Mayes, L. (2006). Minding the baby: A mentalization-based parenting programme. In J.G. Allen & P. Fonagy (Eds.), Handbook of mentalization based treatment (pp. 271–288). Chichester, United Kingdom: Wiley.

Schacht, R., Meins, E., Fernyhough, C., Centifanti, L. C., Bureau, J. F., & Pawlby, S. (2017). Proof of concept of a mind–mindedness intervention for mothers hospitalized for severe mental illness. *Development and psychopathology*, *29*(2), 555-564.

Slade, A. (2005). Parental reflective functioning: An introduction. Attachment and Human Development, 7(3), 269–281.

Slade, A. (2007). Reflective parenting programs: Theory and development. *Psychoanalytic Inquiry*, *26*(4), 640-657.

Slade, A. (2008). Working with parents in child psychotherapy. *Mentalization: Theoretical considerations, research findings, and clinical implications*, *207*.

Slade, A. (2015, January 04) *Intervening Early: Minding the Baby® and Preventing Later Psychopathology*. [Online]. 11th annual Yale NEA BPD Conference. Retrieved from: https://www.youtube.com/watch?v=U4OuOUdJum4&t=888s

Slade, A., Holland, M. L., Ordway, M. R., Carlson, E. A., Jeon, S., Close, N., ... & Sadler, L. S. (2020). Minding the Baby®: Enhancing parental reflective functioning and infant attachment in an attachment-based, interdisciplinary home visiting program. *Development and psychopathology*, *32*(1), 123-137.

Slade, A., Mayes, L.C., & Epperson, N. (2002). Special issue: Perinatal mental health. Zero to Three, June/July 2002.

Slade, A., Sadler, L., De Dios-Kenn, C., Webb, D., Currier-Ezepchick, J., & Mayes, L. (2005). Minding the baby: A reflective parenting program. *The psychoanalytic study of the child*, *60*(1), 74-100.

Sleed, M., Baradon, T., & Fonagy, P. (2013). New beginnings for mothers and babies in prison: A cluster randomized controlled trial. Attachment and Human Development, 15, 349 367.

Suchman, N., DeCoste, C. L., McMahon, T. J., Dalton, R., Mayes, L. C., & Borelli, J. L. (2017). Mothering from the Inside Out: Results of a second randomized clinical trial testing a mentalization-based intervention for mothers in addiction treatment. Development and Psychopathology, 29, 617–636. doi:10.1017/S0954579417000220

Suchman, N., DeCoste, C., Leigh, D., & Borelli, J. (2010). Reflective functioning in mothers with drug use disorders: Implications for dyadic interactions with infants and toddlers. Attachment and Human Development, 12, 567–585.

Sweet, M. A., & Appelbaum, M. I. (2004). Is home visiting an effective strategy? A meta-analytic review of home visiting programmes for families with young children. *Child development*, *75*(5), 1435-1456.

Wade, A., Pan, H., Eaton, S., Pierro, A., & Ong, E. (2006). An investigation of minimisation criteria. *BMC medical research methodology*, *6*(1), 1-12.

Walker, T. M., Wheatcroft, R., & Camic, P. M. (2012). Mind-mindedness in parents of pre -schoolers: a comparison between clinical and community samples. *Clinical child psychology and psychiatry*, *17*(3), 318–335.

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

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

Zeegers, M. A., Potharst, E. S., Veringa-Skiba, I. K., Aktar, E., Goris, M., Bögels, S. M., & Colonnesi, C. (2019). Evaluating mindful with your baby/toddler: Observational changes in maternal sensitivity, acceptance, mind-mindedness, and dyadic synchrony. *Frontiers in psychology*, *10*, 753.

CICRITICAL APPRAISAL

This concluding chapter is an appraisal of the research I have presented so far in Part 1 of this dissertation. I will first explain the reasons that led me to choose my research topic and why it made strong resonance with my academic and clinical interests. I will then delve into some questions and dilemmas that I faced on the methodological level, especially with regards the data coding and connection with the research participants. I will be drawing on the literature and reference a few papers and books I have come to read, before finally reflecting on clinical research and its emotional impact on a researcher engaged in parallel in clinical practice.

Choosing the topic

I had always been intrigued by the rigorous research methods within psychology, especially those that rely on quantitative evidence that transcends our observable reality and individual differences. Given the scope of research opportunities generally available to clinical doctorate students, and my modest research experience prior to training, I had not thought that I would engage in a longitudinal randomised controlled trial from start to end. I therefore appreciated the opportunity to be involved in a research project evaluating an already conducted trial and to work on its secondary data.

My interest in developmental psychology goes back a few years before my doctorate. Having worked with kids on the autism spectrum in different cultural settings, I was curious to learn about and examine closely their unique neurodiversity. I keenly observed how a combination of environmental factors, including the quality of caregiving and other family influences, were crucial in determining the level of anxiety, security and ultimately the general outcomes for autistic children and their families. This pre-training engagement with the field of neurodevelopment offered me exposure to the intricate and complex interplay between

genetic and environmental factors in child development. To a certain extent, this exposure informed my decision to choose a project that investigates the differential developmental trajectories of children resulting from early interactions with the environment, especially in the context of primary relationships.

Additionally, I have always been deeply invested in working with trauma in the context of refugees. Having had first-hand account of the impact of socio-political upheaval across generations, I was drawn to this particular project as a way of gaining insight into the intergenerational transmission of trauma and its mechanisms, and crucially into the role of clinical psychology in ameliorating its impacts. In my last placement within the doctorate, I had the opportunity to complete a full year in a specialist trauma service for refugees and asylum seekers. Over the course of this year, I witnessed how traumas manifest over generations and how support systems often fall short of preventing the cycles of negative outcomes. As one paper I read for my clinical work puts it, the "prevention of intergenerational trauma transmission is the key intervention. The two contributing constructs were identified as 'resolving parental trauma' and 'actively supporting parent–infant attachment'" (Isobel, Goodyear, Furness, & Foster, 2019). Another study investigating the relation between mentalization and interpersonal functioning (Ensink et al., 2014) found that traumatic experiences significantly affect mentalistic skills, suggesting that women with histories of child abuse and neglect suffer a collapse of mentalization produced by trauma. This understanding drew me ever closer to a scientific and clinical interest through which I hope to contribute, albeit modestly, to a more meaningful response to enduring social challenges.

Finally, in choosing this project, I have had the pleasure of delving into the literature and broadening my understanding of parenting quality in relation to child development, something I am particularly drawn to and as I plan to become a parent myself. Working with attachment theory has thus proved highly relevant on a personal level. The theoretical part of

the thesis was quite enjoyable, as I found myself going on tangents in my research, watching talks and lectures by experts and indulging inside reads on child development and attachment theory. Yet it all remained strongly connected to the subject matter I was writing about. Examples worth mentioning include John Bowlby's classic *A Secure Base* (2012), Peter Fonagy's *Affect Regulation, Mentalization and the Development of the Self* (2018), and Lucy Maddox's *Blueprint: How Our Childhood Makes Us Who We Are* (2018). In addition, I found Alison Gopnic's contribution to the field quite substantial, including *How Babies Think* (2001), *The Philosophical Baby* (2009), and *The Gardener and the Carpenter* (2016). This journey through the literature has provided me with valuable insights as I engaged in the research process, which in turn grew my fascination with the work I was doing and my wish for more academic engagement with the field in the years to come.

Methodological reflection

Working with two colleagues on both the literature review and the empirical project made for a supportive environment. We were also able to consult each other on conceptual and technical questions throughout the coding of the videos, as well as to screen tens of studies for the meta-analyses. This tripartite effort allowed us to reach high reliability levels and enjoy more trust in the quality of our work. This was especially the case considering that it was the first time we conducted meta-analytical research, while none of us had received formal training in measuring mind-mindedness. Referring to Mind-Mindedness Coding Manual, as well as communication with the measure's developer when need arises, was also very helpful. Indeed, our inquiries and issues led to interesting and thought-provoking conversations pertaining to the quality of mother-baby interactions and how to "evaluate" the dyads, especially as we were training as clinicians concurrently.

All of these has enriched my own experience and observation of early attachment relationships. However, work has not been without challenges. The following sections reflect on some issues that I came across.

The coding process

Coding was particularly demanding and at times puzzlingly difficult. The strict rules of the General Data Protection Regulation (GDPR) under which the research project was operating, made for many restrictions that prolonged the data retrieval and coding of the videos we had to work on. While in and of itself an important procedure to protect participants' right to privacy, it was working under COVID-19 restrictions that made things slightly more hectic than they had to be. Working as a team, however, helped divide the workload in order to include all the data available for our respective projects.

Starting off with the process of manual transcription required a steep learning curve, and multiple rounds of trial and error. Conventionally, in handling interview-based data, researchers often use transcription software, but the video recordings we were dealing with were of poor sound quality, at times containing noise of pets, toys, or busy surroundings. In addition, the nature of the mother-baby talk was hardly compatible with speech-to-text software. This prompted us to listen very carefully with utmost focus to comprehend what was being said and type it verbatim, with tedious pausing every few seconds to repeat and decipher words and sentences. Having to attend both to behaviour and to speech, and to code for as much as possible of the mind-related comments within the mother-baby interaction, meant 2-3 hours were required to complete transcribing and coding a 30-minute video. In parallel, it was important to assess the context within which a mind-related comment was being made.

Then came the transcripts, which needed to be reviewed a couple of times. When something unintelligible was uttered, or when an ambiguous situation takes place where it was unclear whether a comment is attuned or not, my two colleagues and I had each other to consult and discuss things case by case. While I had attempted to code the mind-related comments and classify them as I was transcribing the videos, revision of transcripts was still needed to ensure that all mind-related comments were coded for. Indeed, error was spotted multiple times in the first coding stage, which led me to carefully review many transcripts, sometimes while rewatching the videos, to ensure accurate coding to the best of my abilities. Perhaps more training on MM coding could have spared us some of the mistakes and long pauses that we had to face while engaging with the material the first time around. While the coding manual did include relevant examples of such comments, I kept feeling a need to refine my work and ensure the fidelity of my classification of mind-related comments into attuned and non-attuned to the coding criteria.

At the end, the laborious process of manually transcribing the video soon became something of the past, but not without considerable pauses and key takeaways.

Scoring mind-mindedness

Coding words according to the manual, and spotting comments on the baby's mental state, was straightforward. When facing ambiguities, it was helpful to consult with the measure's developer to decide if a comment was mind-related or not. That was the easy part, however, while scoring for attunement, i.e., whether or not a comment is appropriate and in line with the baby's cues, was challenging. It required "judging" on a case-by-case basis. For example, if a mother was trying to comfort her crying baby by saying "oh you're faking it," that type of mind-related comment would be classified as non-attuned because the baby was

genuinely upset and her remark is rather ascribing an epistemic state contradictory to the baby's cues. This example, among others, made me wonder if the mother was simply attempting to tease the baby or play with him/her. Alternatively, it could be the mother's parenting character, with her comment being her idiosyncratic way of deflecting her baby's negative feelings. Another observation I made was when some mothers looked tired or overwhelmed, especially with the presence of a camera and a stranger in their house. As I coded such videos, I considered if they could be simply having a bad day in those brief snapshots of a much larger picture of their maternal lives.

Furthermore, I wondered if there were certain cultural imperatives that made for less verbalised mind-mindedness interaction, rather than direct comments on the baby's feelings, thoughts and other mental states. Indeed, many parents tend to "show their appreciation of the infant's state through non-verbal actions" which I could not code for (Shai & Belsky, 2011a; 2011b) using this measure. Sometimes I paused and reflected on the position of power I found myself in, judging the attunement of mothers' interactions in relationship with their babies. While all these observations require coding according to an empirically validated measure, it proved unsettling to conclude half an hour of monitoring a mother-baby interaction and then assign it a low score, or sometimes zero, as the observer responsible for the testing of these vulnerable dyads. In the process, the question of my position of power was sometimes overwhelming, especially given my accumulated theoretical understanding of the developmental consequences for a child deprived of reflective and sensitive parenting.

Aside from individual cases, I had to remind myself that this is a zoomed-out empirical study that uses quantitative measure to look for general patterns within large datasets. Even small conclusions drawn from narrow slices can, when scaled up, lead to informative and insightful knowledge. This means that, rather than doing away with the methodology under the

pretext of its positivism, what is needed is awareness of its limitations and coupling it with an empathic attitude that treats people as people rather than as "research subjects."

Linguistic and cultural considerations

Since the measure used in the empirical research is primarily language-based, I noticed a disparity between mothers communicating in English and those using their own mother tongues. This raises important questions about inclusivity within Western research on cultural and linguistic minorities. My colleagues and I had to make a choice between either including these videos, which would have resulted in low MM score for their mothers, or excluding them and protecting our research against such a bias. After careful consideration, the verdict was to exclude these participants. In a most ideal scenario, these videos with non-English dyads are to be transcribed by speakers of their respective languages, and perhaps then translated to English for a standardised coding. But such a linguistic intervention would entail many procedural and even theoretical difficulties. While our solution was benign and practical, it still poses the question of bias and how often practicality is exclusionary of many communities that fall outside the scope of psychological research.

In a similar vein, the measure necessarily entails cultural specificities that cannot be easily captured during the coding process. For example, words like "want," "wanna," "cheeky" and others are considerably common among white British mothers. I remained an open question if these mind-related comments are accidental or whether, on the other hand, their infrequency among non-English natives indicates lower mentalization. In other words, the final transcripts I was coding could be reflective of a combination of mentalistic skills but also culturally specific communicative habits. It can be the case that mind-mindedness, an essentially language-based measure developed based on Western population, is most suited to

study and compare the behaviours of native speakers of English but is potentially problematic when it steps out of this dominant culture. There are two major studies that investigated mind-mindedness in non-Western cultures (Hughes et al., 2017, Wang et al., 2017). Both seem to suggest that higher mind-mindedness in parents from the UK compared to parents from Hong Kong can be explained by a difference between "individualistic" and "collectivist" norms. The importance of "filial piety within Asian cultures" (Hughes et al. 2017) leads to parental socialisation that may not foster mentalistic skills. In addition, Keller (2012) notes an emphasis in "collectivist cultures" on appropriate group behaviour rather than the mental states of self and other. While these explanations may provide a useful entry point, cultural imperatives contributing to low mind-mindedness scores among parents remain significantly understudied.

Conclusion

This research has been quite demanding. While I highlighted above some of its methodological demands, I would like to note briefly its emotional impacts. Reading and researching childhood abuse and neglect naturally affects any researcher. There is rich literature on such experiences (e.g., Reed, K., & Towers, L., 2021). However, one is led to assume that this is more common among researchers engaged in qualitative studies, those for example conducting interviews and meeting face-to-face with research participants. Yet even in quantitative studies, where a researcher is thought to be working with numbers and cold data, do lead to stories, videos, detailed statistics and other highly subjective accounts. Quantitative study in clinical research is hardly distant emotionally the way it is often assumed. The emotional toll is furthered when a researcher is simultaneously working clinically with patients, many of whom are parents with histories of severe childhood trauma.

Having said that, the research has also been rewarding beyond measure. It has provided a unique opportunity to engage with developmental psychology and capitalise on my

own pre-training expertise, as well as broaden my knowledge of the literature. The technical requirements of retrieving the data and transcribing them verbatim has proved particularly difficult, and perhaps more training and consultations could have yielded faster results. Scoring the transcripts afterwards included many reflective pauses on accuracy, the methodology and human empathy that were all deeply informative. Finally, there remains a significant shortage in the literature in cross-cultural mind-mindedness studies at large, including the diverse cultures within the UK itself.

References

Ames, D. R., Knowles, E. D., Morris, M. W., Kalish, C. W., Rosati, A. D., & Gopnik, A. (2001). The social folk theorist: Insights from social and cultural psychology on the contents and contexts of folk theorizing.

Bowlby, J. (2012). *A secure base*. Routledge.

Ensink, K., Berthelot, N., Bernazzani, O., Normandin, L., & Fonagy, P. (2014). Another step closer to measuring the ghosts in the nursery: preliminary validation of the Trauma Reflective Functioning Scale. *Frontiers in psychology*, 5, 1471.

Fonagy, P., Gergely, G., Jurist, E. L., & Target, M. (2018). *Affect regulation, mentalization, and the development of the self*. Routledge.

Glopnik, A. (2009). *The philosophical baby*. London: Bodley Head.

Gopnik, A. (2016). *The gardener and the carpenter: What the new science of child development tells us about the relationship between parents and children*. Macmillan.

Gopnik, A., Meltzoff, A. N., & Kuhl, P. K. (1999). *How babies think: the science of childhood*. Weidenfeld & Nicolson.

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.

Isobel, S., Goodyear, M., Furness, T., & Foster, K. (2019). Preventing intergenerational trauma transmission: A critical interpretive synthesis. *Journal of clinical nursing*, 28(7-8), 1100-1113.

Keller, H. (2012). Autonomy and relatedness revisited: Cultural manifestations of universal human needs. *Child Development Perspectives*, 6(1), 12-18.

Maddox, L. (2018). *Blueprint: How our childhood makes us who we are*. Robinson.

Reed, K., & Towers, L. (2021). Almost confessional: Managing emotions when research breaks your heart. *Sociological Research Online*, 13607804211036719.

Shai, D., & Belsky, J. (2011). Parental embodied mentalizing: Let's be explicit about what we mean by implicit. *Child Development Perspectives*, 5(3), 187-188.

Shai, D., & Belsky, J. (2011). When words just won't do: Introducing parental embodied mentalizing. *Child Development Perspectives*, 5(3), 173-180.

Wang, L., Zhu, L., & Wang, Z. (2017). Parental mind-mindedness but not false belief understanding predicts Hong Kong children's lie-telling behavior in a temptation resistance task. *Journal of Experimental Child Psychology*, 162, 89-100.

APPENDICES

Appendix 1. Search Terms

1 Abbreviations

1 = CM = childhood maltreatment

2 = RF = mentalizing

3 = Pa = parenting

4 = AA = adult attachment

2 Search strategies across the different databases

Where possible, specify for language (English, German, Dutch), Title/Abstract and published papers

PsycInfo

Document type: *peer-reviewed journal*

1. (abus* OR neglect* OR negligence OR exploit* OR maltreat* OR mistreat* OR ill:treat* OR rape* OR incest) N5 (childhood OR history OR surviv*)
2. ("reflective functioning" OR "mentali*" OR "mind:mind*" OR "mind:related" OR mentali#ation OR insightfu#nes* OR "social cogniti*" OR "alexithymia" OR "mindedness" OR "emotion recognition" OR "theory:of:mind") N5(parent* OR mother* OR father* OR paternal OR maternal OR caregiv*)
3. ("unresolved state:of:mind" OR "unresolved:trauma" OR "unresolved:loss" OR "attachment:representation*" OR "maternal attachment" OR "paternal attachment" OR "parental attachment" OR "caregiv* attachment" OR "adult:attachment" OR “mother attachment” OR “father attachment”)

Medline/ERIC/Embase

Document type: *article* or *journal articles* or *journal article*

1. (abus* OR neglect* OR negligence OR exploit* OR maltreat* OR mistreat* OR ill:treat* OR rape* OR incest) ADJ5 (childhood OR history OR surviv*).ab
2. ("reflective functioning" OR "mentali*" OR "mind:mind*" OR "mind:related" OR mentali#ation OR insightfu#nes* OR "social cogniti*" OR "alexithymia" OR "mindedness" OR "emotion recognition" OR "theory:of:mind") ADJ5(parent* OR mother* OR father* OR paternal OR maternal OR caregiv*).ab
3. ("unresolved state:of:mind" OR "unresolved:trauma" OR "unresolved:loss" OR "attachment:representation*" OR "maternal attachment" OR "paternal attachment" OR "parental attachment" OR "caregiv* attachment" OR "adult:attachment" OR "mother attachment" OR "father attachment").ab

Pubmed

There is no option to perform adjacency searching put AND instead

Pubmed also searches Medline

Document type: *Journal Article*

1. ((abus*[Title/Abstract] OR neglect*[Title/Abstract] OR negligence[Title/Abstract] OR exploit*[Title/Abstract] OR maltreat*[Title/Abstract] OR mistreat*[Title/Abstract] OR ill:treat*[Title/Abstract] OR rape*[Title/Abstract] OR incest[Title/Abstract]) AND (childhood[Title/Abstract] OR history[Title/Abstract] OR surviv*[Title/Abstract]))
2. ("reflective functioning"[Title/Abstract] OR "mentali*"[Title/Abstract] OR "mind:mind*"[Title/Abstract] OR "mind:related"[Title/Abstract] OR mentalization[Title/Abstract] OR mentalisation[Title/Abstract] OR insightfulnes*[Title/Abstract] OR "social cogniti*"[Title/Abstract] OR "alexithymia"[Title/Abstract] OR "mindedness"[Title/Abstract] OR "emotion recognition"[Title/Abstract] OR "theory:of:mind"[Title/Abstract])

3. ("unresolved state of mind"[Title/Abstract] OR "unresolved:trauma"[Title/Abstract] OR "unresolved:loss"[Title/Abstract] OR "attachment:representation*"[Title/Abstract] OR "maternal attachment"[Title/Abstract] OR "paternal attachment"[Title/Abstract] OR "parental attachment"[Title/Abstract] OR "caregiver attachment"[Title/Abstract] OR "adult:attachment"[Title/Abstract] OR "mother attachment"[Title/Abstract] OR "father attachment"[Title/Abstract])

Web of Science

*Specify for language and type of document (article), Truncation symbol only *, # is used to combine searches, searches separately for title and abstract therefore combined searches with OR*

Document type: *Article*

1. (Ti=((abus* OR neglect* OR negligence OR exploit* OR maltreat* OR mistreat* OR ill:treat* OR rape* OR incest) near/5 (childhood OR history OR surviv*))) or (ab=((abus* OR neglect* OR negligence OR exploit* OR maltreat* OR mistreat* OR ill:treat* OR rape* OR incest) near/5 (childhood OR history OR surviv*)))
2. (Ti=(("reflective functioning" OR "mentali*" OR "mind:mind*" OR "mind:related" OR mentali*ation OR insightful*nes* OR "social cogniti*" OR "alexithymia" OR "mindedness" OR "emotion recognition" OR "theory:of:mind") near/5(parent* OR mother* OR father* OR paternal OR maternal OR caregiv*))) or (ab=(("reflective functioning" OR "mentali*" OR "mind:mind*" OR "mind:related" OR mentali*ation OR insightful*nes* OR "social cogniti*" OR "alexithymia" OR "mindedness" OR "emotion recognition" OR "theory:of:mind") near/5(parent* OR mother* OR father* OR paternal OR maternal OR caregiv*)))
3. (Ti=("unresolved state:of:mind" OR "unresolved:trauma" OR "unresolved:loss" OR "attachment:representation*" OR "maternal attachment" OR "paternal attachment" OR

"parental attachment" OR "caregiv* attachment" OR "adult:attachment" OR “mother attachment” OR “father attachment”)) or (ab=("unresolved state:of:mind" OR "unresolved:trauma" OR "unresolved:loss" OR "attachment:representation*" OR "maternal attachment" OR "paternal attachment" OR "parental attachment" OR "caregiv* attachment" OR "adult:attachment" OR “mother attachment” OR “father attachment”))

Cochrane Library

Truncation: using ? instead of #, latter is used to combine searches

Document type: no need to specify

1. (abus* OR neglect* OR negligence OR exploit* OR maltreat* OR mistreat* OR ill?treat* OR rape* OR incest) near/5 (childhood OR history OR surviv*)
2. ("reflective functioning" OR "mentali*" OR "mind?mind*" OR "mind?related" OR mentali?ation OR insightfu?nes* OR "social cogniti*" OR "alexithymia" OR "mindedness" OR "emotion recognition" OR "theory?of?mind") near/5(parent* OR mother* OR father* OR paternal OR maternal OR caregiv*)
3. ("unresolved state?of?mind" OR "unresolved?trauma" OR "unresolved?loss" OR "attachment?representation*" OR "maternal attachment" OR "paternal attachment" OR "parental attachment" OR "caregiv* attachment" OR "adult?attachment" OR “mother attachment” OR “father attachment”)

Appendix 2: Joint Project Statement

The meta-analysis and empirical research were both conducted in collaboration with Samara Melwani and Helen Maris as joint research projects. The three of us are completing a DClinPsy degree concurrently.

Guided by Prof Pasco Fearon, Prof Peter Fonagy, and a team at Leiden University, including Sabine Asdonk and Dr Lenneke Alink, we have shared the workload in the literature search, abstract screening, full-text screening, and full coding of the studies equally among the three of us. We have met frequently with our research supervisor, Prof Pasco Fearon, and at times with the broader team, in order to refine our methodology and procedures. The writing of our theses, however, was conducted independently. While Helen focused in her literature review on childhood maltreatment and mentalization in adolescence, and Samara on childhood abuse and mentalization in adulthood, my main research question for the meta-analysis was focused on the association between childhood experiences of neglect and mentalization in adulthood.

In addition, we have worked collaboratively on achieving inter-rater reliability on the mind-mindedness construct for our independent empirical studies. Prof Elizabeth Meins, as well as Prof Pasco Fearon, were consulted frequently throughout the process. We also collaborated on coding the videos, each taking on third of the total, but each of us worked independently on her analysis and the writing up. Helen focused on the association between maternal mental health, maternal mind-mindedness and infant attachment security, and Samara on the relationship between maternal mind-mindedness and child emotional and cognitive outcomes, while I worked on the effectiveness of the Minding the Baby home-visiting programme in promoting maternal mind-mindedness.