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**How do maternal psychological well-being (depression, anxiety, somatization)
and the child's temperament affect maternal mind-mindedness?**

Supervisor

Professor Paola Rigo

Co-supervisor

Dr. Bianca Filippi

Candidate: Defne Birecik

Student ID number: 2018126

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Abstract

Previous studies highlighted the role of maternal psychopathological symptoms (i.e., depression and anxiety) in difficulties in mentalizing with an infant's internal states, with negative effects on maternal sensitivity, as well as mind-mindedness – defined as the caregiver's ability to perceive the child as an individual with a mind of his or her own and intentionality. In light of this, this study hypothesizes that maternal mind-mindedness may be negatively affected by the presence of depressive, anxiety, and somatization symptoms and that, therefore, mothers who report higher scores on the Depression, Anxiety, and Somatization subscales and higher levels of parenting stress show fewer mind-related comments than mothers with lower scores. Several studies which focused on depressive and anxiety symptoms in mothers have shown mixed results (e.g. negative relation between depressive symptoms and mind-mindedness vs no significant relation between the two variables). Thus, an additional aim will be to review studies on this topic, with a focus on the type of the sample, the age of the child, the questionnaire used, and the time considered for assessment (e.g. 7 days, as in SCL-90, or 14 days), to make a comparison with the data collected, the questionnaire used, and our results. Regarding the somatization subscale, no study to date explored the influence of maternal somatization on maternal mind-mindedness, so we aim to fill this gap in the literature. In addition to the mothers' psychological profile, the role of the child's temperament will be also investigated, to observe if certain characteristics contribute to the maternal abilities.

CHAPTER 1

1. Introduction

Through past research, it has been understood that early mother-infant relationship, as well as early dyadic interactions matter greatly for child development (Meins et al., 2011). In literature, the tendency of mothers to view their children as individuals with their own opinions, emotions, and desires refers to the term mind-mindedness (Meins et al., 2003). The construct can be conceptualized into two dimensions that indexes caregivers' interaction with their offsprings: one which captures appropriate engagement, responsivity, and awareness and that results in appropriate mind-related comments, and one in the caregiver fails to indicate the infant's point of view, that results in non-attuned mind-related comments during interactions. Caretakers must first reflect on the infant's internal state to be mind-minded and utilize this presentation to guide their behavioral interactions with the offspring. If they fail to create empathy, they will engage in non-attuned comments and be unsuccessful in communicating (Meins et al., 2012). In this, mind-mindedness is a construct at the interface between representation and behavior: although the caregiver demonstrates mind-mindedness while interacting with the infant, being mind-minded depends on the caregiver's willingness or ability to represent the infant's likely internal states.

There can be various variables to investigate the lack of attunement that the caregiver engages in, such as maternal psychological well-being (depression, anxiety, somatization) (Baretto et al., 2016) and the temperament of the child (Bernier et al., 2010).

The empirical data is vague about how mood disorders affect mothers' state of mind related to their offspring: some research concludes no significant relationship between maternal mind-mindedness and mood disorders (Walker et al., 2011; Meins et al., 2013; Krink & Ramsauer, 2021), while other studies report a negative correlation (Karen Milligan, 2015; Ierardi et al., 2022b; Ierardi et al, 2022a; Pawlby et al., 2010; Bigelow et al., 2018; Mchmahon & Lok, 2006; Fishburn et al., 2017; Baretto et al., 2016). However, it is plausible that caregivers' capacity to remark on their children's cognitive and emotional status adequately will be negatively impacted by depressive symptoms (Meins et al., 2011). As depressed moms frequently exhibit negative or flattened mood states, they are less able to remark on their newborns' emotions and thoughts correctly (Ierardi et al., 2022b). Also, they are more likely to react to the child intrusively, such as by demanding much attention and

excessively touching the child . Similar correlations were discovered during the studies of anxious mothers interacting with their offspring since maternal anxiety can lead to inadequate caregiver-infant emotion regulation and mismatches due to expectations (Ierardi et al., 2022b). Anxious moms' conduct is defined as intense, frequently inappropriate reactions to their children and is generally characterized by over-reactivity in the form of loss of privacy, overprotection, and over-control (Ierardi et al., 2022b). Therefore it is possible to hypothesize that higher depression and anxiety scores can be related to appropriate mind-related comments being less frequent. Though studies are available for assessing the relationship between anxiety/depression and mind-mindedness, little search has been made to discover the possible effects of somatization. Since mothers with high somatic symptoms can be prone to depression and can face challenges giving attention to their children, one can hypothesize that higher somatic symptoms can be linked to higher non-attuned mind-mindedness comments (Dang et al., 2013). Moreover, since there is only one study available which reflects the possible contribution of somatization symptoms to the maternal MM (Baretto et al., 2016), the current study aims to contribute to the literature by finding relative evidence on the matter.

Since mind-mindedness is based on interactions, the variables related to the child, such as temperament, can affect the outcomes. Concerning infant-centered attributions, prior research does not support the idea that certain moms are more mind-minded because their children are more cognitively capable, socially involved, interactive, etc.. Despite the data representing specific infant behavior during play sessions conducted in a laboratory and standardized test results being incongruent with mind-mindedness, the general temperament can be more associated with mothers' capacity to comment appropriately. This tendency can be positively linked with infant characteristics such as activeness, the ability to focus for an extended period, and being emotionally responsive (Meins et al., 2011).

1.1 Mind-Mindedness

Over 20 years ago, Elizabeth Meins (1999) coined the term mind-mindedness inspired by Mary Ainsworth's definition of maternal sensitivity (McMahon, 2017). One of the greatest-documented antecedents of newborn attachment security is maternal sensitivity, which is defined as the mother's ability to recognize the child's cues and respond to them immediately and correctly (Ainsworth et al., 1974). According to Meins, the assessment of maternal sensitivity frequently overlooks a crucial component of the concept (Meins et al., 2008). The mother's responses are not characterized by the pace but by relevance to the

child's needs; therefore, this aspect suggests a fair amount of maternal interpretation. Hence, a sensitive mother can notice her baby's indications but also comprehend them, which necessitates understanding that children have their own goals, ideas, and wants. This detail which was missing in the definition, was later framed as the term mind-mindedness, the tendency of a mother to consider her child as a person with a mind rather than just as a creature with needs that must be met (Meins et al., 1997). The term is suggested as a prerequisite for maternal sensitivity concerning the appropriate interpretation of the offspring's cues, and infants' signs must first be read by moms as an intention (Meins et al., 2008).

Even Though the two concepts are in relation, mind-mindedness focuses on the mother's sensitivity to the offspring's frame of mind. For example, two mothers whose scores are the same for an instrument on maternal sensitivity can score differently for assessing mind-mindedness. For instance, these mothers' responses can vary when they recognize their infants' attention for a toy. The mother with a higher mind-mindedness score can comment on this realization like "Here is the toy you wanted", while a mother with a lower score can say "Here is the toy you could not reach". It is visible through each sentence that the mother is sensitive and responsive, but the more mind-minded mother shows the tendency to acknowledge an infant's mind and wants, while the less mind-minded mother reflects the physical and behavioral aspects of the child (Meins et al., 2001).

In addition to maternal sensitivity, Elizabeth Meins suggested that a mind-minded maternal language might be an extensive precursor of attachment security since this type of speech allows important aspects of sensitivity to be conveyed: creating a proper behavioral response in tune with the child's choices and needs (Meins et al., 2001). Therefore mentalizing abilities can be hypothesized as a notable predictor of attachment security but distinct from maternal sensitivity. Past studies reported data that provides that higher frequencies of mind-minded comments from parents during the interaction are associated with secure attachment of the offspring (McMahon et al., 2017). Furthermore, previous research underlines that mind-mindedness can also give a perspective on explaining one of the most critical concepts in developmental psychology, the transmission gap of attachment (Meins, 1999). John Bowlby (1969), who created the attachment theory, proposes that caregivers tend to parent their children in the same manner they were parented. This idea is conceptualized as "intergenerational transmission of attachment" and suggests that style of attachment and patterns of interactions can be transferred from one generation to another (Van IJzendoorn, 1995). However, the exact method and variables contributing to this

transmission are still debated for psychologists. Van Ijzendoorn stated in his well-known meta-analysis that only a part of the link between the attachment security of the infants and the parent's internal working model of attachment can be explained by maternal sensitivity. He then named the undiscovered part of the phenomenon as the "transmission gap" (Bernier et al., 2003). In her studies, Elizabeth Meins proposed that mind-mindedness may have the capability to bridge the transmission gap along with sensitivity (Meins, 1999). Although this proposition gained a new perspective to the debate, few studies have been conducted, and the empirical findings were insufficient to qualify as evidence. Speculations on Adult Attachment Instrument (AAI) and the assessment of interview methods being developmentally early for infants to attribute their attachment and mental process appropriately were two of the main limitations of the studies (McMahon et al., 2017)

To assess if the individual differences affecting mothers could be recognized during the infant's first months of life, Elizabeth Meins and her colleagues conducted a study (Meins et al., 2003). By observing mothers and their 6-month-old infant's free-play encounters, researchers identified five different aspects of maternal behavior that could manifest mind-mindedness. These five classes included: maternal responsiveness to change in the infant's direction of gaze, maternal responsiveness to the infant's object-directed action, imitation, encouragement of autonomy, and appropriate mind-related comments. In addition, the fifth category, "mind-related comments" predicted the security of attachment in later studies of well-known strange situation assessment. Additionally, this indicator of maternal mind-oriented language performed superior to maternal sensitivity as a sign of security (Meins et al., 2003).

One of the many other concepts concerning mind-mindedness is the infants' theory of mind abilities. For years it has been known that the development of the child's mental abilities is in line with their social surroundings and the capacity of other family members to appropriately identify and express emotions. The study by Elizabeth Meins and her colleagues highlighted that maternal mind-mindedness can predict ToM at an age in which the child has not yet developed any language skills and in the first developmental stage developed by Piaget (1936): the sensorimotor stage (Meins et al., 2002). Furthermore, the findings proposed that maternal sensitivity and infant-mother attachment security were not related to the prediction of ToM; instead, early mind-mindedness influenced the creation of the mental representation (Meins et al., 2002).

In support of many studies on MM and the concept's predictor values, it is clear that mind-mindedness is one of the core terms of developmental psychology. The term can be

seen to interact with various important concepts such as the child's ToM abilities (Meins et al., 2002), prediction of attachment security (Meins et al., 2001) as well as handling the 'transmission gap' (Meins, 1999). Therefore it can be advantageous to study antecedentes of maternal mind-mindedness since it is an important variable for child development and can allow us to identify risk factors on which psychologists can build their interventions on. However, rather than how MM affects certain aspects of development, this study will review and analyze how different variables can affect maternal mentalizing abilities.

CHAPTER 2

2.1 Maternal Psychological Wellbeing

Past research has questioned how the individual differences of the mother contributed to maternal mind-mindedness ability. Socioeconomic status, cultural background, adoption, parental attachment styles, and many other factors were inspiration sources for fellow researchers (McMahon et al., 2017). Maternal psychological wellbeing is an additional aspect which could relate to the plausible origins of mind-mindedness (Meins et al., 2011). Since mind-mindedness is a notion based on the mothers' ability to mentalize and be attentive, specific psychological disruptions can influence the caregiver's capacity and the quality of interactions (Meins et al., 2011). Therefore, maternal psychopathology can be linked to less attuned mind-minded comments and higher levels of non-attuned comments. This study will focus on three types of disorders mothers can face: depression, anxiety, and somatization.

2.1.1 Depression

Depression, also known as major depressive disorder, is a mental health disorder that influences how a person feels, thinks, and behaves (American Psychiatric Association, 2013). It can create sadness, loss of motivation in the situations which were previously enjoyed, and disruptions in daily life and relationships (American Psychiatric Association, 2013). Symptoms of depression are known to be common among mothers, specifically postpartum depression has a yearly prevalence rate of approximately 15 to 20% (Anokye, 2018).

Considering the symptoms of depression, many researchers hypothesized that depressed mothers would display behavioral deficits such as failing to be attentive, inability to respond effectively, and showing insufficient involvement in the interactions between their offspring (Campbell, Cohn, & Meyers, 1995; Field et al., 1990; Goodman & Brumley, 1990). Goodman and Brumley (1990) proposed that depressed mothers would be unavailable to fulfill their child's emotional needs and withdraw from the interactions to a level that could result in being less sensitive (Goodman & Brumley, 1990). Additional symptoms of depression can be rumination as well as anxiety, and these signs can also result in mothers being less responsive and attentive to the offspring's needs. Since anxiety and obsessive thinking may result in mother's being annoyed, this can cause a lack of tolerance and increased negative emotion in the caregiver's half (Lovejoy et al., 2000). Previous studies

which focused on parenting problems highlighted that mothers who had depression had a harder time adjusting to the parental roles compared to nondepressed mothers (Weissman & Paykel, 1974; Weissman, Paykel, & Klerman, 1971). Depressed mothers reported the challenges as decreased emotional interest, impaired communication, alienation, increased aggression, and acrimony (Weissman et al., 1972). Other studies investigating maternal responsiveness concluded that mothers facing depression were less sensitive to their children's behavior, communicating less adequately, had lower synchrony with the offspring and were having few positive encounters with their kids (Cohn, Campbell, Matias, & Hopkins, 1990; Field, Healy, Goldstein, & Guthertz, 1990; Goodman & Brumley, 1990).

In line with these empirical findings, a possible determining factor of maternal mind-mindedness is caregivers' psychological well-being. Specifically, it is possible to hypothesize that depressive symptoms that mothers face can have crucial effects on the caregivers' potential to interpret efficiently their offspring's mental and emotional levels (Meins et al., 2011). Trying to understand the infant's internal states and engaging in mind-minded discourse when interacting with them is likely to be hindered by depression's core symptoms, such as social withdrawal, impaired concentration, fatigue, and irritability (Pawlby et al., 2010). Even though depression does not have a proven impact on the order and the use of mother's language skills, Murray, Kempton, Woolgar, and Hooper (1993) proposed in their study that depressed mothers had a lower tendency to discuss the challenges faced by the infant and to give the infant agency over their actions (Pawlby et al., 2010).

Studies investigating the relationship between mind-mindedness and maternal depression had mixed results (McMahon et al., 2017). In the study by Karen Milligan (2015) to explore the relationship between mind-mindedness and maternal attachment, 76 mothers completed Edinburgh Postnatal Depression Scale (EPDS) when their infants were 5 months old, and at 6 months old they had a testing session to assess MM. Later on, results revealed that the maternal depression score was not directly related to the mind-mindedness score. Nevertheless, the following analysis proposed that the correlations between depression, emotion, and cognitive mind-mindedness scores were compelling only in the positive context for words reflecting emotion ($r = .22, p=.05$) and the negative context for cognitive words ($r = -.24, p=.04$) (Karen Milligan, 2015).

A similar study investigating the parental mentalizing abilities associations with various variables conducted among 3-month-olds found that parental embodied mentalizing (PEM) score, which reflects the implicit level of mentalizing, was negatively correlated to

maternal depression. Moreover, they concluded that higher maternal depression scores were linked with problems in embodied mentalizing (Ierardi et al., 2022b).

While searching for psychopathological risk factors for maternal mind-mindedness, Ierardi and colleagues found out that 25% of the 98 adolescent and young mothers had depression which was assessed through The Edinburgh Postnatal Depression Scale (EPDS). Although it is not strong evidence, the data collected when the infants were 3 months old showed that depression and MM attuned comments were negatively correlated, while depression and MM non-attuned comments were positively correlated (Ierardi et al, 2022a).

In the study conducted among 50 mothers with severe mental disorders who were admitted to the hospital, the depression dimension was assessed by a consultant perinatal psychiatrist (G.S.) based on ICD-10 diagnoses. On admission, depressive moms seemed to be less likely to adequately report on their infants' mental condition as compared to healthy controls. In addition, post-hoc tests proved the initial finding. Although the caregivers had lower numbers of mind-related comments they showed no differences among non-attuned comments. No significant difference was found between the admission and the discharge of the mother with depression. As a result, this study empirically supported the relation between depressive symptoms and maternal mentalizing abilities (Pawlby et al., 2010).

To investigate the longitudinal relations between maternal depressive symptoms and maternal mind-mindedness, researchers telephoned and administered the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) to the mothers and later followed the mother-infant dyads through the age of 6 weeks, 4 months and 12 months. At 4 months, the dyad was videotaped in a laboratory setting during a free-play interaction, and mothers completed the depression scale for the second time. At 12 months old, only 53 of the 87 dyads returned and completed the Strange Situation procedure (Ainsworth et al., 1974, 1978; Solomon, 1986, 1990), along with completing the depression scale for the third time. The results indicated that women at risk for depression at the baby age of 6 weeks were less properly mind-minded throughout their encounters with their babies at 4 months. However, there was no change in non-attuned mind-mindedness, even though mothers' risk for depression had decreased by this point. At the evaluation during the 4-month stage, the result of the caregivers with a risk of depression did not differ from the low-risk group in attuned or non-attuned mind-mindedness. Moreover, researchers supported their first hypothesis by proving that the possibly depressed mothers of 6-week-olds showed less appropriate mind-mindedness when interviewed again during the 4 months stage (Bigelow et al., 2018).

Lastly, in the study by Lok and McMahon mothers' depression was measured with the Centre for Epidemiological Studies' Depression scale (CES-D; Radloff, 1977), and MM was assessed using Meins et al. (1998) single-question measure: 'Can you describe (child) for me?'. In the sample of 89 dyads, depressed mothers were rated as less sensitive, more intrusive and hostile. Following, they were engaging in less mind-minded communication, which resulted in the conclusion of a modest association between depressive symptomatology and MM (McMahon & Lok, 2006).

Even though multiple studies showed a noticeable or little correlation, some studies report depression and maternal mind-mindedness as unrelated (Walker et al., 2011; Elizabeth Meins et al., 2013; Krink et al., 2021). A between-group design (n=49) was used by Walker and colleagues (2011) to explore whether mind-mindedness differed between parents of a clinical group of preschool children and parents of a community comparison group, and how mind-mindedness related to parental depression and other variables. Compared to the community group, the clinical group had a much lower total percentage of mental remarks and, thus, mind-mindedness. Although overall ratings of depression and other variables were noticeably higher in the clinical group compared to the community group, in neither sample did mind-mindedness prove to be linked to depression (Walker et al., 2011).

Elizabeth Meins, who coined the term mind-mindedness, also searched its relation with maternal depressive symptoms, perceived social support, sensitivity, child language ability, and child gender in a low socioeconomic status (SES) sample of 171 children and their mothers. The study showed small effects of depressive mood assessed by the Beck Depression Inventory (BDI; Beck et al. 1961) on MM, which resulted in no significant finding to support the hypothesis. Moreover, authors suggested that maternal mentalization was independent of mother-centered factors (Meins et al., 2013).

Lastly, Stephanie Krink's and Brigitte Ramsauer's study was conducted at the University Medical Center Hamburg-Eppendorf (UKE) among 50 mothers and their offspring between 3-10 months old. Along with other variables, mothers' postpartum depression was assessed by the SCL-90-R (SCL-90-R; Franke, 2002). However, no significant results were found that reflected a relation between depressive symptoms and mind-mindedness (Krink & Ramsauer, 2021).

Through literature analysis, it is visible that researchers did not find a common ground to base the possible depressive symptoms and their effects on maternal mind-mindedness. In our research, we hypothesize that depressive symptoms will be negatively related to the

maternal MM score due to past publications on depressed mother conduct and moderate data from previously analyzed studies.

2.1.2 Anxiety

Anxiety is a mental health condition characterized by excessive and uncontrollable worry, restlessness, irritability, lack of concentration, and being easily tired (American Psychology Association, 2013). It is known to be more prevalent and chronic than depressive disorders (Kessler, Keller, & Wittchen, 2001; Kessler et al., 2005). However, the effects of maternal anxiety during the early years of the offspring's life were the interest of very few studies (Beebe et al., 2011; Feldman, Greenbaum, Mayes, & Erlich, 1997; Murray et al., 2008; Stein et al., 2012).

The studies' results shed light to understanding some common characteristics of anxious mothers. Caregivers who are dealing with anxiety are known to be more controlling (Stein et al., 2012), exhibit fearful reactions (Murray et al., 2008), display less positive emotions (Nicol-Harper, Harvey, & Stein, 2007; Stein et al., 2012), and act more invasively (Feldman et al., 1997; Weinberg & Tronick, 1998; Wijnroks, 1999). Correspondingly, anxious mothers tend to be less in tune (Murray, Cooper, Creswell, Schofield, & Sack, 2007) and possibly fail to pursue the infant's lead (Stein et al., 2012) or be more sensitive (McLeod, Wood, & Weisz, 2007; Nicol-Harper et al., 2007; Stein et al., 2012).

Moreover, Field and her colleagues' study has shown that mothers with depression who also have high levels of trait anxiety exhibited fewer positive emotions, such as smiling and more vocalizing, compared to depressed mothers with low anxiety (Field et al. 2005). Another study hypothesized that anxiety could be a more significant predictor, compared to depression, for impaired mother-infant emotion regulation (Riva Crugnola et al. 2016).

Considering the empirical findings on parenting styles of mothers with anxiety, it is possible to hypothesize that anxious mothers will engage in less mind-minded comments. However, a limited number of studies research the possible relation. One of the studies featuring maternal mentalizing abilities and anxiety symptoms was conducted by Elena Ierardi and colleagues (2022) among 81 mother-infant dyads. Maternal anxiety was measured with the State-Trait Anxiety Form Y scale (STAI-Y; Spielberger et al., 2012 for Italian version) at three months postpartum, and mother infant dyads were asked to interact for five minutes in a laboratory like they would in a home setting. The study proposed that higher state anxiety scores are linked to difficulty in comprehending an infant's mental states, reading their body movements, as well as changing one's own body motions to match those

of the infant. While anxiety was not significantly associated with attuned MM comments, both trait and state anxiety were correlated with non-attuned MM comments (Ierardi et al., 2022b).

In a similar study again conducted by Ierardi and colleagues (2022), anxiety was assessed through the State-Trait Anxiety Scale (STAI-Y) among 98 adolescent mothers aged between 14 to 21 years old recruited from San Paolo Hospital of Milan when the infants were 3 months old. They compiled the questionnaires to assess risk variables for parenting, such as anxiety, and were asked to participate in a 5-minutes free-play session to measure for MM. The results showed little association between state anxiety and non-attuned and attuned comments (Ierardi et al., 2022a).

In a sample of 50 mothers with psychiatric diagnoses of mood disorders or personality disorders, mentalizing abilities were assessed. Anxiety was one of the aspects which the researchers measured with SCL-90-R, along with checking maternal mind-mindedness through free-play, diaper-changing, and book-sharing episodes. The result showed that postpartum anxiety was positively associated with attuned mind-related comments with a small size of 0.11 correlation (Krink & Ramsauer, 2021).

Lastly, when investigating mind-mindedness in the families of looked after children Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) was used in the second study. In a sample of 36 adoptive and 114 biological parents, it was concluded that mental description scores were negatively correlated to anxiety scores (Fishburn et al., 2017).

Although there are not many studies investigating the relation between anxiety and MM, available studies show inconsistent results. The current study hypothesizes that anxiety symptoms will be negatively related to the maternal MM score, in line with the previous findings of MM and anxious mother conduct.

2.1.3 Somatization

The term somatization is claimed to be first introduced by Stekel (1924) to refer to a theoretical process of neurosis giving rise to a bodily disorder (Hinsie, 1960). In the current research, it is used to define the experience and communication of emotional distress expressed through somatic symptoms rather than cognitive state, along with attributing symptoms to disease even in the absence of the organic signs (Lipowski, 1987). As a reference to mental illness, somatic symptom disorder, formerly known as somatoform disorder (American Psychology Association, 1994), is defined as one experiencing somatic symptoms which can cause distress and disruption of daily life as well as having exaggerated

thoughts, emotions, or behaviors related to the somatic symptoms or related health worries (American Psychology Association, 2013).

Based on the research, it is not necessary to have a bodily illness or an injury to experience a somatic symptom; somatization can occur due to psychological distress and needs (Lipowski, 1987). Since people experiencing somatic symptoms often ask for medical consultation, the doctor first rules out any pathological possibility by conducting a necessary evaluation, and then he or she should conduct a psychosocial inquiry to investigate plausible reasons behind the symptom along with making a psychiatric diagnostic assessment (Lipowski, 1987).

The typical complaints of patients suffering from somatizations include pain in one or more parts of the body, fatigue, shortness of breath, palpitations, dizziness, and dyspepsia (Lipowski, 1987). In addition, some patients experience a single symptom, such as fatigue or back pain, lack of motor/sensory function, as well as some difference or deformation in their physical appearance. As Sydenham (1682) discovered almost 400 years ago, the symptoms of the patients can be experienced in any part of the body and can mimic many somatic diseases (London Sydenham Society, 1850).

Given its characteristics, higher somatization levels can be linked to reduced quality of life with difficulty in daily life as well as difficulties in child caring, similar to the challenges faced by depressed mothers (Dang et al., 2013). In addition, in the study conducted by Dang and colleagues the results showed that mothers experiencing somatization were also likely to have a major depressive disorder. Therefore it is plausible to speculate that somatization can be a variable that can tend to influence parenting, as well as MM, similar to depressive symptoms.

Only one paper considers somatic symptoms while searching for parental MM. In Barreto and colleagues' study, 76 mothers and fathers completed the Portuguese version of the Brief Symptom Inventory (BSI; Derogatis, 1993; Portuguese version, Canavarro, 1999), a questionnaire that assess symptoms of somatization as well as other psychopathological variables such as depression, anxiety, obsessive-compulsive and so on. However, the study did not specifically analyze the relationship between somatization and maternal mentalizing abilities (Baretto et al., 2016).

Since there is no previous research on somatization and maternal mentalizing abilities, it is not possible to suspect any effect based on evidence. However, considering the possible relation between depressive symptoms and somatization along with psychological distress it

brings to a patient, the current study hypothesizes that somatization scores of the mothers will be negatively related to the maternal MM score.

2.1.4 Maternal Parenting Stress

Many factors, child-centered and peripheral causes, can influence parental stress. These components can range from stress related to traumatic events, such as early experiences of child neglect and abuse, to environmental stress during the perinatal period such as exposure to violence, marital conflicts, and living in poverty, etc. (Deater-Deckard, 2004; Kim et al., 2021). However, a big part of the stress is more specifically associated with childbirth and parenting, such as perceived difficulties with children, in the relationship with children, and in the quality of their parenting (Abidin, 1995). When felt at high levels, stressed parents can engage in lower levels of positive emotion as well as holding a negative attitude toward the offspring's behavior (Middlebrook & Forehand, 1985). Given this relation, it is possible to hypothesize that stress will negatively be a component negatively affecting maternal mentalizing abilities.

Several studies investigated the relation between these two variables. As mentioned in previous chapters, while researching possible psychopathological and psychosocial risk factors for mentalization Ierardi and colleagues also assessed parenting stress using the Parenting Stress Index-Short Form (PSI/SF; Abidin, 1995). Although the results were not statistically significant, higher parental stress and attuned comments were positively correlated, while higher levels of stress and non-attuned comments were negatively correlated (Ierardi et al, 2022a).

In a group of 49 parents which contained both community and clinical samples, The Parenting Stress Index—Short Form (PSI/SF; Abidin, 1995) was used to measure parental stress. Despite not finding a strong correlation between parenting stress and MM in the community sample, a high negative correlation (-0.49) was found in the clinical sample. In addition, the subscales were also investigated. While a strong association was found between MM and the subscale of parent distress (-0.46) as well as between MM and the subscale of difficult parent-child interaction (-0.54), no significant correlation was found for the subscale of child difficulty (Walker et al., 2011).

While conducting a cross-sectional study consisting of 110 3-month-olds infants (preterm = 54; full-term = 56) and their mothers, MM and parenting stress were investigated using the Parenting Stress Index Short Form (PSI/SF; Abidin, 1995). Findings showed that

higher levels of parenting stress in the Difficult Child subscale were associated with greater use of non-attuned mind-related comments in preterm infants' mothers (Suttora et al., 2020).

Lastly, In McMahon and Meins (2012) study, The Parenting Stress Index (PSI, Short Form; Abidin, 1995) was compiled by 86 mothers when their children were 4 years old. In line with the prediction of researchers, the result indicated that parenting stress was negatively correlated with scores for total number of mind-related comments and attuned comments (McMahon & Meins, 2012).

Therefore, given the results found by previous studies and the known effect of stress on the relationship between caregiver and offspring, the current study hypothesizes that mothers with higher scores of parenting stress will be less mind-minded.

CHAPTER 3

3. Temperament

The fundamental component of personality known as temperament is considered to be biologically determined and to manifest in childhood (American Psychology Association, 2015). It comprises traits such as energy level, emotional reactivity, attitude, mood, reaction pace, behavioral inhibition, and motivation to experiment (Rothbart, 1986). Researchers found that this multidimensional component tends to establish and differentiate through time due to the changes in underlying systems with the contribution of development, experience, and heredity (Rothbart, Derryberry, & Hershey, 2000). Moreover, temperamental characteristics contribute to parents' perceptions of their offspring (Papousek & von Hofacker, 1998). It was previously hypothesized that it could be an influential factor for parental mind-mindedness (Meins et al., 2011).

3.1 Temperament and Mind-Mindedness

In previous studies, Elizabeth Meins and colleagues found that concurrent infants (Meins et al., 2001) and children's scores on standardized ability scales in different years of childhood (Meins et al., 2001; Meins et al., 2002) were not related to maternal mind-mindedness. In her later studies, the researcher concluded that this evidence was insufficient to claim that mind-mindedness is independent of the offspring's characteristics (Meins et al., 2011). Therefore, it was possible to consider that a mother's mentalizing abilities would be positively correlated to the infant's positive temperamental characteristics, such as being active, showing emotional feedback, and being attentive.

In one study (Meins et al., 2011), Meins and colleagues investigated maternal MM correlates in 41 infant-mother dyads, and temperament was assessed through the Infant Behavior Questionnaire (IBQ) (Rothbart, 1981) when infants were 7 months. As a result, the study did not find any relation between the 6 dimensions of temperament and MM. However, in the discussion, the authors attributed the research's null findings to the study's limitations, such as the small sample size and the use of a maternal self-report instrument. Moreover, it was suggested that if future research uses observational measures rather than self-reports, the findings would be stronger (Meins et al., 2011).

In another study focusing on the antecedents of maternal mind-mindedness, the Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979) was used to measure infant temperament in 106 mother-infant dyads. Researchers found that mothers of children perceived as less difficult had higher attuned MM scores (Demers et al., 2010).

Barreto and colleagues' study, mentioned in the previous chapter, also assessed the temperamental dimension along with maternal psychopathology. Both fathers and mothers of 76 families completed Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001; Portuguese version, Franklin, Soares, Sampaio, Santos, & Veríssimo, 2003) and participated in Visual Jokes Task (Corcoran, Cahill, & Frith, 1997) which measured MM by presenting the parents to 10 black and white pictures (five physical jokes and five mental jokes) and asking them to why they thought the image was funny. Although the measured effects were small to moderate, three of the six subscales of temperament (i.e., extraversion, effortful control, and negative affectivity) showed a positive association with maternal MM, while they were negatively correlated with paternal MM (Barreto et al., 2016).

Keeping in mind the previously found limited evidence on MM and temperament as well as the research about how child characteristics can affect maternal understanding of the offspring, the current study will hypothesize temperamental characteristics, such as low effortful control and negative affect, will be associated with less mind-minded comments while extroversion (surgency) will be positively correlated to attuned MM comments.

CHAPTER 4

4.1 Current Study

In line with the empirical findings on both maternal psychological well-being and child temperament, the current study aims to test the following hypothesis: (i) attuned maternal mind-minded comments and depression, anxiety, and somatization subscales will be negatively correlated; (ii) non-attuned maternal mind-minded comments and depression, anxiety, somatization subscales will be positively correlated; (iii) higher scores of total and subscales of parenting stress will be negatively correlated with attuned comments and positively correlated with non-attuned comments; (iiii) difficult temperamental characteristics of the children (effortful control, negative affectivity) will be negatively correlated with attuned MM comments while surgency will be positively correlated to attuned MM comments.

4.2 Method

4.2.1 Participants

Participants consisted of 29 Italian mothers with a mean age of 32.83 (SD=4.05) and their 4-month-old infants who participated in the SOMA project done by the Department of Developmental Psychology and Socialization of the University of Padova. The families came from mid/low, on average, and mid/high economic backgrounds, and all of the dyads were living together. More information on the socio-demographic variables of the participants were shown in Table 1.

Table 1

Sociodemographic characteristics of the participants

<i>Age of the mother</i> Mean (SD; Range)	32.83 (4.05; 25-43)
<i>Relationship duration</i> Mean (SD; Range)	8.36 (4.08; 2-18)
<i>Number of stressful life events</i> Mean (SD; Range)	3.31 (2.7; 0-12)
<i>Gestational age</i> Mean (SD; Range)	39.31 (1.35; 36-41)
<i>Nationality</i>	

Italian	29(100%)
Other	0
<i>Education</i>	
Elementary school	0
Middle school diploma	0
High school diploma	6 (20.7%)
Bachelor's degree	11 (37.9%)
Master's degree	10 (34.5%)
Doctoral or postgraduate degree	2 (6.9%)
Other	0
<i>Employment status</i>	
Maternity/home leave	23 (79.3%)
Work away from home	4 (13.8%)
Smart working	2 (6.9%)
<i>Socioeconomic status</i>	
Low	0
Mid/low	8 (27.6%)
On average	14 (48.3%)
Mid/high	7 (24.1%)
High	0
<i>Gender of the child</i>	
Female	12
Male	17
<i>Conception</i>	
No difficulty	21 (72.4%)
IVF	2 (6.9%)
Difficulties in conception	3 (10.3%)
Abortion threats	3 (10.3%)
<i>Type of delivery</i>	
Natural	17 (50.6%)
Induced	6 (20.7%)
Cesarean Section	6 (20.7%)
<i>Living together</i>	
Yes	29 (100%)
<i>Past Mental disorder</i>	
Yes	3 (10.3%)
<i>Planned pregnancy</i>	
Yes	25 (86.2%)
<i>Past abortion</i>	
Yes	2 (6.9%)
<i>Primipara</i>	
Yes	19 (65.5%)
<i>Complications during delivery or at birth</i>	

Yes	13 (65.5%)
<i>Child's physical health concerns</i>	
Yes	7 (24.1%)
<i>Colic</i>	
Yes	11 (37.9%)

4.2.2 Procedure

For assessing maternal-related variables, such as psychological well-being and parenting stress, SCL-90-R (SCL-90-R; Franke, 2002), and PSI-SF (PSI/SF; Abidin, 1995) questionnaires were completed by mothers. As for the child's temperament, caregivers compiled the IBQ-R VSF (IBQ-R VSF; Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014) report. In addition, mothers-infant dyads engaged in 20-min free-play tasks and interacted in Still-Face Paradigm (SFP; Tronick et al., 1978) while being video-recorded to assess their maternal mind-mindedness scores. For the current study, only the still-face task was analyzed in data which consisted of 2 minutes pre-still face and 2 minutes reunion phase.

4.2.3 Measurements

Symptom Checklist-90-R

The Symptom Checklist-90-R (SCL-90-R; Derogatis, 1994) is a commonly preferred 90-item, self-administered questionnaire that aims to measure the severity of psychopathological symptoms. Items are rated on a 5-point Likert scale ranging from “Not at all” (0) to “Extremely” (4). The anxiety, depression, and somatization scales of the SCL-90-R were used in the current study to assess the severity of the symptoms. Concerning the validity of the measurement, satisfactory construct and convergent validity of the SCL-90-R scales have been previously documented (Franke, 2002).

Parenting Stress Index-Short Form

The Parenting Stress Index—Short Form (PSI-SF; Abidin, 1995) is a 36-items self-report tool used to measure stress regarding the parenting of a particular child. Each item is rated on a 5-point Likert scale ranging from “strongly agree” to “strongly disagree”. As a result, the report gives a total score of perceived general parenting stress, and three subscales: parent distress, child difficulty, and parent-child interaction. The psychometric features of the PSI are reliable and valid (Abidin, 1997).

Infant Behavior Questionnaire Revised-Very Short Form

The Infant Behavior Questionnaire Revised-Very Short Form (IBQ-R VSF; Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014) is a measure of infant temperament used to assess positive affectivity/surgency (PAS), negative emotionality (NEG), and orienting and regulatory capacity (ORC). To investigate these different characteristics, the report consisted of 37 items that asked the mother to rate how often their infant had shown a specific behavior in a given situation during the past week by giving a score between 1 (“Never”) and 7 (“Always”). The form has sufficient reliability scores as found by the previous studies (Putnam et al., 2014).

Maternal Mind-mindedness

For assessing MM, mother-infant dyads were filmed where they had a 15-min free-play session. Mothers were asked to engage in playful activities with their infants, as they would typically do at home. In addition to the play session, dyads participated in the Still-Face Paradigm (SFP; Tronick et al., 1978), in which they had to participate in a structured sequence of interactions where the caregiver alternates between engaging with the infant in a normal, responsive manner and then suddenly adopting a "still face" expression, showing no emotional or responsive behavior. Later on, through watching the videos of the session, maternal mind-mindedness was coded using the procedures listed by Meins and colleagues (Meins & Fernyhough 2012; Meins et al. 2001). The researcher evaluated the speech as a mind-related comment if it encompassed wishes, desires, mental states (such as thoughts, knowledge, and interests), mental processes (such as recognition, remembering, and decision-making), emotions, and attempts to influence beliefs (like joking or teasing). These comments were later on categorized as either attuned or non-attuned. To determine if it was an attuned comment, the criteria established by Meins and colleagues (Meins & Fernyhough 2012; Meins et al. 2001) were followed. A comment was considered attuned if: (a) the coder believed that the mother accurately understood her infant's mental state; (b) it linked the infant's present status with relevant previous or following events; (c) it suggested a new activity following a stabilization in the interaction. While, a comment was classified as non-attuned if: (a) the coder found a discrepancy between the mother's understanding and the infant's actual thoughts; (b) the comment referred to a previous or following event with no association to the infant's current state; (c) the mother asked the offspring about their preferences or expressed that the infant desired or favored a different object or activity, even

though the child was already actively involved in an activity or displaying a distinct preference for a specific object; (d) the intended meaning or target of the mother's comment was unclear.

4.3 Results

Descriptive and correlational analyses were conducted for assessing the results of the data, using the Jasp software. Mean, standard deviation and min-max scores were calculated for all the continuous variables while numerosity and frequencies were used to analyze the categorical data such as the socio-demographic variables of the families. Furthermore, the Shapiro-Wilk normality test was calculated for each measurement to control the normality distribution of the scores.

Table 2
Descriptive Statistics of variables of interest

	Mean (SD)	Minimum score	Maximum scores	Shapiro-Wilk test (p-value)
Depression	0.97 (0.55)	0.005	2.62	0.937 (0.082)
Anxiety	0.48 (0.46)	0.005	1.705	0.823 (< .001)*
Somatization	0.7 (0.55)	0.09	2.51	0.867 (0.002)*
Parental Distress	30.4 (7.92)	17	51	0.964 (0.42)
Parent-Child Dysfunctional Interaction	18.62 (4.07)	12	27	0.947 (0.156)
Difficult Child	24.35 (8.28)	12	42	0.946 (0.140)
Total Stress	73.35 (15.54)	49	112	0.946 (0.411)
Surgency	4.52 (0.79)	2.86	6	0.976 (0.715)
Negative Affect	3.94 (1.05)	1.83	6.73	0.96 (0.335)
Effortful Control	5.67 (0.66)	4.45	6.75	0.963 (0.39)
Verbosity	85.17 (22.99)	22	127	0.935 (0.075)
Mind Related Comments (n)	5.86 (3.79)	0	14	0.913 (0.02)
Mind Related Comments (%)	6.96 (4.46)	0	16.9	0.940(0.103)

MM Attuned Comments(n)	3.83 (3.25)	0	10	0.911 (0.019)
MM Attuned Comments(%)	4.53 (2.93)	0	12.3	0.911 (0.018)
MM Non-Attuned Comments (n)	2.07 (2.54)	0	12	0.752 (< .001)*
MM Non-Attuned Comments(%)	2.48 (2.93)	0	11.3	0.817 (< .001)*

As a result of the Shapiro-Wilk test, it was found that the subscales of anxiety, somatization, and total number and percentage of MM non-attuned comments had abnormal distribution. Therefore, Spearman's Rho was used to assess the correlations of these variables. The rest of the correlations were computed by Pearson's R.

For measuring correlations between variables of interests and maternal MM scores, the total scores (the sum of pre and post still face comments) were used since no statistically significant differences emerged from the result of t-test conducted between the two phases, neither in terms of frequency of mind-related comments nor in terms of attuned or non-attuned comments.

Table 3
Correlations for subscales of SCL-90 and Maternal MM

	Depression	Anxiety	Somatization
Verbosity	0.029	-0.063	-0.061
Mind Related Comments (%)	-0.136	-0.040	-0.127
MM Attuned Comments (%)	-0.306	-0.157	-0.266
MM Non-Attuned Comments (%)	0.168	0.155	0.168

To assess correlations of Anxiety, Somatization, MM Non-Attuned Comment variables, Spearman's Rho was used. Other variables were processed by Pearson's R correlation. *p<0.05 **p<0.01 ***p<0.001

No significant correlation has been found between SCL-90 subscales and MM dimensions, as their p values were above 0.05.

Table 4

Correlations for subscales and total score of PSI-SF and Maternal MM

	Parental Distress	Parent-Child Dysfunctional Interaction	Difficult Child	Total Stress
Verbosity	-0.328	-0.165	-0.084	-0.255
Mind Related Comments (%)	-0.034	0.226	-0.256	-0.06
MM Attuned Comments (%)	-0.159	0.138	-0.238	-0.171
MM Non-Attuned Comments(%)	0.120	0.148	-0.107	0.101

To assess correlations of Non-Attuned Comment variables, Spearman's Rho was used. Other variables were processed by Pearson's R correlation. *p<0.05 **p<0.01 ***p<0.001

Similarly to table 3, all of the correlations between stress-related scales and MM dimensions had a p value greater than 0.05 so the results found are concluded to be statistically insignificant.

Table 5
Correlations for subscales of IBQ and Maternal MM

	Surgency	Negative Affect	Effortful Control
Verbosity	0.2	-0.064	0.298
Mind Related Comments (%)	0.223	-0.581***	-0.139
MM Attuned Comments (%)	0.243	-0.368	-0.145
MM Non-Attuned Comments (%)	-0.018	-0.445	0.066

To assess correlations of MM Non-Attuned Comment variables, Spearman's Rho was used. Other variables were processed by Pearson's R correlation. *p<0.05 **p<0.01 ***p<0.001

The only statistically significant correlation found in this study was between negative affect and the percentage of mind related comments with $r = -.581$, $p = .001$.

CHAPTER 5

5. Discussion

The current study aimed to contribute to the literature in order to shed light on the mixed empirical findings on factors affecting maternal MM such as the psychological well-being of the mother and the child's temperamental characteristics. Additionally, since the impact of somatization was not investigated previously, one of the intentions of the study was to find an association that would result in the contribution of this subscale in further research. After the detailed literature review on all the variables of interest, the following hypotheses were formed to test in the current study.

Although the first two hypotheses were seeking a negative association between attuned maternal MM score as well as a positive association between non-attuned maternal MM score with depression, anxiety, and somatization subscales, no significant correlations were found to support it. Although the measured correlations could be considered as high, since none of the p-values were smaller than 0.05, they were regarded as insignificant. Even though the findings did not support the initial hypothesis of this study, they were supporting the previous studies which reported no significant correlations between mind-mindedness and depression scores (Walker et al., 2011; Elizabeth Meins et al., 2013; Krink et al, 2021).

Regarding maternal parenting stress, similar to the first two hypotheses, no relationship was found between higher scores of total and subscales of stress and neither attuned nor non-attuned comments. The only study which reported a non-significant correlation between the two variables was the study of Ierardi and colleagues (2022a). However, different from our findings, researchers found that higher parental stress and attuned comments were positively correlated, while higher levels of stress and non-attuned comments were negatively correlated. In the current study, the results were the opposite, and total parenting stress and attuned MM comments had a correlation of -0.17 while non-attuned comments had a correlation of 0.10.

The only significant correlation of this study was observed related to the fourth hypothesis. Even though no relationship between negative affect or effortful control and MM was found, surgency was found to be significantly correlated to the percentage of mind-related comments with $r = -.581$, $p = .00$. However, this kind of correlation was not

reported in any papers which were previously analyzed, so a further analysis might be needed to interpret this evidence appropriately.

A possible limitation of this is the participants number, which resulted in finding only one significant data. 29 mother-infant dyads are a small sample size compared to the studies which were reviewed. The smallest sample size among the analyzed studies of this research belonged to Elizabeth Meins (2011) in the study about infant-centered characteristics of maternal MM conducted among 41 mother-infant dyads. Similarly, the researcher did not find any evidence to support the study's hypothesis. Moreover, the second limitation of this could be caused by using a self-report measure for temperament rather than assessing with observational measures like Meins suggested in the previously mentioned study (Meins et al., 2011). Since the perception of the mother on child characteristics could be influenced by many factors, it has a possibility to reflect bias on the collection of data and therefore manipulate the findings.

In conclusion, the current study contributed to the literature by supporting the already proposed hypothesis of maternal mind-mindedness being independent of mothers' psychological well-being. Although one statistically significant correlation was found concerning infant-centered characteristics, further research should be conducted in order to appropriately understand and implicate the finding.

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