THE ASSOCIATION BETWEEN MATERNAL MIND-MINDEDNESS AT 14 MONTHS AND TODDLERS' EMOTION REGULATION AT 24 MONTHS: THE MODERATING ROLES OF TODDLER SEX AND TEMPERAMENT

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Human Development and Family Studies—Doctor of Philosophy

2021

ABSTRACT

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Relatively little research has examined associations between maternal mind-mindedness and emotion regulation among toddlers from low-income families. This study investigated the relation between maternal mind-mindedness and toddlers' emotion regulation and the roles of toddler sex and temperament in this association. Data were collected for 139 mother–toddler dyads (mothers M_{age} = 22.34 years, *SD* = 4.97; 78.5 % White; toddlers 50.7% girls) from low-income families when the toddlers were 14 months and 24 months old. Maternal mind-mindedness was coded from observation of mother-toddler play tasks and reflected mothers' appropriate or non-attuned mind-related comments. Research staff rated toddlers' emotion regulation during a standardized task in the home. Structural equation models showed that maternal appropriate mind-related comments at 14 months were significantly associated with toddlers' emotion regulation at 24 months after controlling for maternal sensitivity. The moderating effect was significant for boys. Temperament did not moderate the relation between mind-mindedness and emotion regulation. The study's findings suggested that toddlers' emotion regulation may be supported by maternal appropriate mind-related comments on toddlers' mental states.

This dissertation is a dedication to my husband, Sungkook, for his love, encouragement, and listening ears; my parents, Oukhee and Yoonoh, and sister Been, for their support and belief in me; and my precious baby, Asher Seojune, for broadening my world.

Thank my Lord for making the impossible possible.

ACKNOWLEDGEMENTS

First and foremost, I want to thank my advisor, Dr. Holly Brophy-Herb, for her unwavering support and willingness to always lend a helping hand whenever it was needed during my doctoral studies. Her guidance and expertise not only shaped this dissertation but also inspired me to become a better scholar. Her understanding and patience, especially during those difficult times when I felt completely lost, overwhelmed, and exhausted, encouraged me to keep pushing forward and grow. I will forever be most grateful that she accepted me as her advisee.

This dissertation also would not have come to fruition without the rich input and assistance provided by my committee members, Drs. Claire Vallotton, Deborah Johnson, and Nicole Talge. Each one of you challenged me and strengthened me. You gave me a new perspective on research and provided me with the tools and opportunities to become a more thoughtful scholar. Thank you so much!

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CHAPTER 1

INTRODUCTION

In this chapter, a broad overview of the current study with the key concepts and the theoretical contexts is presented. The key concepts are more thoroughly addressed in Chapter 2.

Emotion Regulation and Its Development During Toddlerhood

Over the past few decades, there has been a burgeoning literature on toddlers' developing emotion regulation skills. Toddlerhood is a particularly salient time to investigate emotion regulation as rapidly emerging cognitive, linguistic, and motor skills contribute to the toddlers' growing capacity for self-regulation (Bridgett, Burt, Edwards, & Deater-Deckard, 2015), including emotion regulation. Emotion regulation refers to the ability to intrinsically and extrinsically monitor, evaluate, and modify emotional reactions in emotion-eliciting situations to accomplish one's goals (Cole, Martin, Dennis, 2004; Eisenberg, Cumberland & Spinrad, 1998; Thompson, 1994). During toddlerhood, a range of emotion regulation skills, such as intentional attention shifting from emotional stimuli (i.e., distraction) and comfort-seeking (i.e., physical bids to parents for support), are acquired (Calkins, 2007; Grolnick, Bridges, & Connell, 1996). The development of effective emotion regulation skills is empirically related to social competence (Spinrad et al., 2006), positive peer relations (Blair & Raver, 2015; Keane & Calkins, 2004), optimal cognitive development (Eisenberg, Valiente, & Eggum, 2010), and greater academic achievement (Graziano et al., 2007; Ursache, Blair, & Raver, 2012). Conversely, poor emotion regulation is a risk factor for poorer social interactions (Eisenberg, Fabes, Guthrie, & Reiser, 2002; Contreras et al., 2000), externalizing behaviors (Blandon, Calkins, & Keane, 2010; Halligan et al., 2013; Mullin & Hinshaw, 2007), and psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Maliken & Katz, 2013).

Parental Contribution to Emotion Regulation

Young children learn how to regulate their emotions through ongoing interactions with their direct social environments (Thompson, 1994; Spinrad, Stifter, Donelan-McCall & Turner, 2004). During infancy and toddlerhood, parents represent the center of the environment, and infants' and young toddlers' (e.g., under 18 months) emotions are mainly managed by their parents (Kopp, 1989; Taipale, 2016), although independent emotion regulation skills are present, such as self-soothing (e.g., thumb sucking) and redirecting attention (e.g., looking away) (Rothbart & Derryberry, 1981). In infancy, infants utilize behavioral cues such as reflexive signaling (e.g., crying) to induce parents' assistance to regulate their emotions (Taipale, 2016; Weinberg & Tronick, 1994). Within the sensitive and responsive caregiving environment, infants begin to learn how to regulate their emotions and their learning processes continue through toddlerhood and preschool years as their parents model and build the framework for regulation strategies (Cassidy 1994; Eisenberg, Cumberland et al. 2001; Raikes & Thompson 2006). Particularly during toddlerhood, toddlers' efforts to regulate emotions become more sophisticated and mature due to developmental advances in cognition (including language) and motor skills (Kopp, 1982; 1989). With those advances during toddlerhood, emotion regulation begins to transition from parent-dependent regulation to a mixture of parent-dependent and independent regulation, and, finally, to more active independent regulation (Grolnick et al., 1996; Cole, Martin & Dennis, 2004; Calkins, Dedmon, et al., 2002).

As emotion regulation typically develops in the context of parent-child interactions, parenting behaviors have been empirically linked to the development of emotion regulation (Morris, Criss, et al., 2017; Morris, Silk, et al., 2007). For example, positive parenting behaviors, such as sensitivity (Halligan et al., 2013), expression of positive affect (Cumberland-Li et al., 2003; Eisenberg, Cumberland, Spinrad, Fabes, et al., 2001) and emotion-related socialization

(Garner, 2006; see review in Zeman, Cassano, Perry-Parish, & Stegall, 2006) promote adaptive emotion regulation. In contrast, intrusive parenting (Cabrera, Shannon, & Tamis-LeMonda, 2007; Stevenson & Crnic, 2013) and parents' expression of negative emotions (Morris, Criss, et al., 2017), increase the risk of emotion regulation deficit. Fostering effective emotion regulation may be more crucial for children growing up in poverty (Buckner, Mezzacappa, & Beardslee, 2009; Raver, 2004), as parenting may be more challenging for the parents in impoverished home environments given the stresses and lack of resources that place their toddlers at greater risk for less optimal emotion regulation. Emotion regulation, and more broadly self-regulation, have been considered as protective factors for children from impoverished families (see review in Palacios-Barrios & Hanson, 2019). Indeed, Lengua (2002) found that self-regulation altered the relation between environmental risks, including poverty, and adjustment problems (i.e., depression, delinquent, and aggressive behaviors) in school-aged children. Evan and Fuller-Rowell (2013) reported that childhood poverty had a less harmful influence on levels of the working memory of 9-year-old children who had greater self-regulatory ability. Given the aforementioned evidence for the importance of emotion regulation in children from low-income families, one of the aims of this study was to investigate the predictors of toddlers' emotion regulation, including parental mind-mindedness and toddler characteristics (e.g., sex and temperament), within low-income families who were eligible to receive Early Head Start services that represented an economically oppressed population. Identifying predictors of emotion regulation may have important implications for understanding individual differences in the development of toddlers' emotion regulation in low-income families.

Parental Emotion Socialization and Emotion Regulation

The emotion socialization model (Eisenberg, Cumberland, & Spinrad, 1998) provides a theoretical framework for understanding parents' influences on emotion regulation development.

The model highlights the following parental emotion-related socialization behaviors: parents' emotion expression, parents' responses to their child's emotional experiences, and the parents' discussion of appropriate emotions. These emotion-related parenting behaviors serve as models for children and communicate to children information about the identification, expression, and regulation of emotions as well as messages about what emotions are valued and accepted in the family and what the goals of emotions are (Eisenberg, Cumberland, & Spinrad, 1998; Morris et al., 2007). Of these parental emotion-related socialization behaviors, the parents' reaction to children's emotions has been recognized as an important contributor to children's emotion regulation (Morris et al., 2007). Generally, parents can be supportive or non-supportive of children's emotions, particularly in reaction to negative emotions such as anger and frustration (Morris et al., 2007). Theoretically, supportive parental reactions may help children reduce their own emotional arousal to manageable levels, learn about emotion management by giving children the opportunity to understand their emotions and teaching children how to respond to those emotions in appropriate ways, and promote emotion regulation (Eisenberg, 1996; Fabes, Leonard, Kupanoff, & Martin, 2001; Yagmurlu & Altan, 2010). Indeed, empirical findings have reported that when parents react positively and supportively to their children's expression of negative emotions (e.g., comforting, expression of sympathy, and labeling the situation), the children's emotional arousal levels are decreased and better regulated (Brophy-Herb, Stansbury, Bockneck, & Horodynski, 2012; Eisenberg, Fabes, et al., 1994; Lougheed, Hollestein, Lictwarck-Aschoff, & Granic, 2015). In contrast, parental non-supportive responses (e.g., angry or punitive behaviors) lead to problems controlling their emotions (Frick & Morris, 2004).

More specifically, a more skilled individual (i.e., a parent) facilitates a child's regulatory skill development by modeling regulatory behaviors and verbally prompting children to regulate

their emotions during parent-child interactions (e.g., comments that encourage and acknowledge a child's emotions; Vygotsky, 1978). Young children vicariously learn by observing their parents' behaviors (Bandura, 1977; Bandura & Walters, 1963). For instance, when parents engage in mutual regulation with the children and model adequate emotion regulation strategies, those children observe the emotions that their parents display and the ways that parents regulate their own emotions, and further imitate the actions, or reactions, that have optimal emotional and social consequences (Bandura, 1977; Bandura & Walters, 1963; Morris et al., 2007; Moilanen et al., 2010). That is, children can learn to socialize their own emotions through parents-children interactions and the ways that parents respond to children's emotions impact the ways that children regulate their emotions through observations and imitations (Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002). In addition, Vygotsky (1978) postulated that the parents' verbal prompting during the interactions is internalized by the child, and the words used by parents become the basis of schemas for self-regulating behaviors (Lincoln, Russell, Donohue, & Racine, 2017; Kopp, 1982; Vallotton & Ayoub, 2011). There is evidence from previous studies that parents can help their children's development of emotion regulation by verbally facilitating their children's regulatory strategies. Those studies have found that parental responses, particularly linked to emotion management (such as emotion talk and emotion coaching – validating the child's emotions and offering a scaffold to manage emotions) are associated with better emotion regulation (Ellis, Alisic, Reiss, Dishion, & Fisher, 2014; Leventon, Merrill, & Bauer, 2019; Shipman et al., 2007); fewer behavior problems (Shortt, Stoolmiller, Smith-Shine, Eddy, & Sheeber, 2010); and better emotion understanding (Laible 2004).

Parental contribution to children's emotion regulation is particularly significant for children in their early years since parents play a key role in managing children's emotional

arousal. As young children frequently turn to their parents, their parents' reactions to emotions are more essential to the development of emotion regulation (Eisenberg et al., 2010). Parental mind-mindedness, the parents' tendency to attribute mental states to their children (Meins, 1997), has recently been put forward (Zeegers, Colonnesi, Stams, & Meins, 2017; Zeegers, de Vente, Nikolić, Majdandžić, Bögels, & Colonnesi, 2018) as a crucial facilitator of young children's social-emotional development. In this dissertation, I focused on maternal mind-mindedness observed during parent-toddler interactions, as those interactions may support the child's developing emotion regulation. A brief overview of maternal mind-mindedness and its links with toddler's emotion regulation is provided in the following section.

Maternal Mind-mindedness and Toddlers' Emotion Regulation

According to Meins (1997), mind-mindedness refers to parents' tendency to consider their young children's mental states. It has been operationalized as parents' tendency (a) to use spontaneous mind-related comments on children's mental states including desires, thoughts, and emotions, during parent-child interactions (Meins et al., 2012; Meins, Fernyhough, Fradley, & Tuckey, 2001); (b) to focus on mental state references when given an invitation to describe their children (Meins, Fernyhough, Russell, & Clark-Carter, 1998). In this current study, maternal mind-mindedness was assessed during mother-toddler play interactions and reflected mothers' appropriate or non-attuned mind-related comments. Therefore, I utilized the first operationalization of mind-mindedness, parental use of mind-related comments on children's mental states when interacting with them in earlier years of life. Appropriate and non-attuned mind-related comments index two dimensions of mind-mindedness (Meins et al., 2002; 2012). While appropriate mind-related comments reflect accurate interpretations of children's mental states (e.g., "Do you want to read the book now?" while a child is pointing to the book), non-attuned mind-related comments indicate misinterpretations of children's mental states (Meins,

2013). Importantly, appropriate and non-attuned mind-related comments are not on a continuum reflecting high or low values of one construct. Thus, a parent can make both appropriate and non-attuned mind-related comments during interactions with their young children. For instance, parents who are tuned in to their children's mental states are often able to accurately interpret the mental states and make appropriate mind-related comments. However, there are often ruptures and repairs occurring in parent-child interactions and, hence, parents might inaccurately interpret the children's mental state (and, therefore, make non-attuned comments) and then repair the misinterpretation (characterized by appropriate comments).

To date, very little is known about links between maternal mind-mindedness and toddlers' emotion regulation despite theoretical and emerging empirical support (Bernier et al., 2010; McMahon & Newey, 2018; Zeegers et al., 2018). I posited that maternal mind-mindedness articulating toddlers' mental states may be influential for the development of toddlers' emotion regulation. That is, exposure to mothers' appropriate mind-related comments in everyday interactions from the very early years may result in young children having more opportunities to learn how to regulate their emotions. Briefly speaking, toddlers may start learning about emotion regulation skills by observing their mind-minded mothers for information about how to respond in emotionally arousing situations. Mind-minded mothers may model emotion regulation skills through their appropriately attuned mind-related comments. For instance, when a toddler is upset, the mother comments on the toddler's sadness (e.g., "Oh, you are sad because your toy is broken") using a soothing voice; this may regulate the toddler's level of emotional arousal and now the toddler has the experience of moving from a higher to a lower state of emotional arousal. Conversely, when a mother is not mind-minded and misinterprets the toddler's mental states (e.g., "Oh, you are mad that you can't play with your friend," while the toddler is sad

about her broken toy), the toddler may not experience recovery from emotional arousal and may not have the same opportunities to develop regulatory skills as toddlers whose mothers are mind-minded. The experience, particularly hearing the mothers' appropriate mind-related comment, may further contribute to the toddlers' own understanding of mental states (Luyten et al., 2020; McMahon & Bernier, 2017), as well as the language of mental states related to emotion regulation (Lundy & Fyfe, 2016). Extant literature related to the association between maternal mind-mind-mindedness and toddlers' emotion regulation and a more in-depth discussion, including its potential pathways and mechanisms for this association, are provided in Chapter 2.

Moderating Role of Toddler Characteristics in the Relation between Parental Mind-mindedness and Toddler's Emotion Regulation

Parental mind-mindedness is beneficial for toddlers' social-emotional development, but mind-mindedness may affect toddlers' outcomes differently based on toddler characteristics. In the current study, I sought to investigate two toddler characteristics, sex and temperament that may moderate the relation between maternal mind-mindedness and toddlers' emotion regulation.

Sex

In the parenting literature, some researchers posit that the sex differences in children's social-emotional outcomes, often favoring girls (e.g., for a meta-analysis, see Fabes and Eisenberg, 1998; Abdi, 2010), exist because boys and girls are socialized differently (Brophy-Herb et al., 2019; Fivush, Brotman, Buckner, & Goodman, 2000; Spruijt, Dekker, Ziermans, & Swaab, 2019). However, the relations between parenting and sex differences are unclear yet as parenting literature regarding the role of child sex in moderating parental emotion socialization practices yields mixed results. Albeit inconsistent, previous studies have provided some hints that toddler's biological sex may moderate the association between maternal mind-mindedness and toddler's emotion regulation. For example, some research suggests that girls may be more

sensitive to the parental emotion socialization practice as compared to boys (Denham, Bassett, & Wyatt, 2010), whereas others argue that boys may be more sensitive to parental positive emotion behaviors (Tung et al., 2012). A more in-depth literature review is discussed in Chapter 2. Many researchers postulate that sex differences in social-emotional outcomes may exist due to the ways in which parents socialize their children or due to the different impacts of parent's socialization for boys and girls.

Sex differences in parental emotion socialization in very early childhood may account for later sex differences in child social emotional development (see Barnett & Scaramella, 2013). However, most previous studies investigate sex differences in parental emotion socialization practice with preschool-aged and older children, and relatively few studies have demonstrated parental differential emotion socialization practices in toddlerhood. Thus, investigating sex as a moderating factor in the relation between maternal mind-mind-mindedness and toddler's emotion regulation would fill the gap in the literature. The current study is akin to the studies discussed by Denham, Bassett, and Wyatt (2010). I expected that girls might benefit more than boys from maternal-appropriate interpretations and articulations of their mental states, as socialization support and thus more maternal-appropriate mind-related comments for girls may be related to better emotion regulation. Also, boys will be more negatively impacted by maternal misinterpretations of their mental states than girls, and thus, more maternal non-attuned comments for boys may be related to less emotion regulation.

Temperament

There is growing interest in temperament as an indicator of biological sensitivity to environmental stimuli. Belsky's (2005) differential susceptibility hypothesis suggests that some children are more adversely affected by stressors, but at the same time, they may benefit the most

from environmental support as compared to their peers who are less sensitive to environmental characteristics. Boyce and Ellis (2005) interpreted the hypothesis as individual differences in biological sensitivity to early environmental stimuli. Negative emotionality, a key interest of this study, is derived from temperamental dimensions and reflects a tendency to be easily and intensely aroused or prone to negatively exhibit valence emotions such as anger, irritability, sadness, and fear (Buss & Plomin, 1984; Putnam, Ellis, & Rothbart, 2001; Rothbart, Sheese, & Conradt, 2009). In addition, negative emotionality, as a marker of differential susceptibility, represents a predisposition to susceptibility to both positive and negative aspects of the environment (Belsky & Pluess, 2009).

Although no study, to my knowledge, has applied the differential susceptibility hypothesis in mind-mindedness literature from which to draw, the larger parenting literature offers some guidance. Bradley and Corwyn (2008) revealed that children in first grade with difficult temperaments displayed more externalizing behaviors when their mothers were less sensitive; contrarily, children demonstrated fewer externalizing behaviors when their mothers were more sensitive, suggesting a susceptibility of difficult temperament to parenting behaviors. Within the differential susceptibility hypothesis, this study tests whether toddlers' negative emotionality moderates the associations between maternal mind-mindedness and toddler's emotion regulation. Although there are possibilities that toddlers with difficult temperaments may draw out their mothers' appropriate mind-minded comments more than toddlers with less difficult temperaments, I expected that toddlers with more negative emotionality would have better emotion regulation than toddlers with less negative emotionality when mothers use more appropriate mind-related comments; I anticipated that toddlers with more negative emotionality would have less emotion regulation than toddlers with less negative emotionality when mothers'

use more non-attuned mind-related comments. The moderating role of toddlers' characteristics including sex and temperament is more intensively discussed in Chapter 2. In addition, notwithstanding mixed evidence, some studies have informed the role of three-way-interactions between child temperament, sex, and parenting with respect to child outcomes (Gordon, 1983; Miner & Clarke-Stewart, 2008; Ramchandani, van IJzendoorn, & Bakermans-Kranenburg, 2010). The possibility of three-way-interaction effects between temperament, sex, and maternal mind-mindedness is investigated in Chapter 2.

Purpose Statement

The purpose of this study is to examine the role of maternal mind-mindedness in toddlers' emotion regulation in a sample of families eligible for Early Head Start. Specifically, this longitudinal study focused on early to mid-toddlerhood from 14 to 24 months to broaden the existing understanding of how parents' mind-mindedness influences emotion regulation. In addition, because the stressors associated with socioeconomic disadvantage are linked to a greater risk for toddlers' developmental outcomes (Bradley & Corwyn, 2002; Conger & Donnellan, 2007), early mind-minded interactions may serve as a developmental asset among toddlers in poverty. Therefore, examining links between parental mind-mindedness and toddlers' emotion regulation among parent-toddler dyads in economically oppressed samples is especially relevant to prevention and intervention programs (i.e., Early Head Start) and parenting education programs. Finally, investigating the moderating role of toddler characteristics (e.g., sex and temperament) will inform researchers working to understand individual differences in relations between maternal mind-mindedness and toddlers' emotion regulation. This can consequently offer researchers and practitioners/teachers a greater understanding of who may be the most sensitive to variations in parenting behaviors and important insights into who may require additional support in promoting the development of emotion regulation in toddlerhood.

CHAPTER 2

LITERATURE REVIEW

The literature review begins with a definition of mind-mindedness, followed by an extensive review of the empirical literature on the relation between mind-mindedness and toddler's emotion regulation. This chapter continues with discussions of the moderating role that toddlers' sex and temperament may play in the association between maternal mind-mindedness and toddlers' emotion regulation. The chapter concludes by identifying study research questions and hypotheses.

Mind-mindedness

As originally proposed by Meins (1997), the concept of mind-mindedness refers to a parent's tendency to treat their child as an individual with a mind of his/her own. She stated, "Some mothers show a greater tendency to treat their children as mental agents, taking into account their comments, actions, and perspective" (Meins, 1997, p.108). Mind-minded parents are, therefore, able to identify their child's mental states, such as emotions and cognitions, accurately interpret the intentions underlying the child's behaviors, and utilize this information to guide their interactions with the child (Meins, 1997). Meins (2013) posited that mind-mindedness is the construct that is at the interface of representations and behavior since mind-mindedness requires that parents must first accurately represent what the child is thinking and feeling and then verbalize this representation during parent-child interactions. Although most parents have the basic capacity to represent their children's mental states, they vary in their spontaneous use of this capacity when interpreting and commenting on their children's mental states during the interaction – this is called the competence-performance gap (Meins et al., 2006, Meins, Centifanti, et al., 2013). It refers to a gap between having the capacity to mentalize and

the tendency to use it in everyday real-life contexts (Meins et al., 2006; Meins, Centifanti, et al., 2013).

Mind-mindedness has been operationalized as either a parent's tendency to comment appropriately on their child's mental states during parent-child interaction especially in the first year of life (interactional mind-mindedness; e.g., "You really like the toy," after the child spends considerable time playing with it) or a tendency to describe a child's mental characteristics when given an invitation to describe a child (representational mind-mindedness; e.g., He's always aware of other people's feelings) for children after infancy (Meins & Fernyhough, 2015). The current study utilizes the aforementioned first operationalization of mind-mindedness, the parental tendency to make appropriate comments that reflect what might be going on in child's mind and to attribute meaning to their children's utterances and behaviors (i.e., interactional mind-mindedness). Interactional mind-mindedness is thought to be particularly salient to very young children (e.g., infants and toddlers) who have limited verbal skills. Accurately describing children's internal mental states allows young children to see the connection between experience, behavior, and mental states, and, eventually to understand their own mental states (See also Crucianelli, Wheatley, Filippetti, Jenkinson, Kirk, & Fotopoulou, 2019). Most of Meins' work (1997; 1999; 2013) has focused on pre-verbal infants. However, some researchers include toddlers (e.g., Colonnesi et al., 2019) as young children in early toddlerhood have not yet fully developed the verbal or motor skills to verbally or non-verbally communicate their mental states. Thus, the current study focusing on toddlers is empirically and theoretically supported.

Meins' and colleagues' earlier work (2001) focused on parents' accurate interpretation of the infant's mental states (operationalized as "appropriate" mind-related comments). Their later study (2012) prompted the additional examination of the parent's misinterpretation of the

infant's mental states (operationalized as "non-attuned" mind-related comments). Whereas appropriate mind-minded comments are defined as comments which reflect the accurate interpretation of the infant's mental states underlying his/her behaviors, non-attuned mind-minded comments reflect inaccurate interpretations of child's mental states (e.g., "you are bored" while the child is playing with a toy). Mind-mindedness is best characterized as a multidimensional construct as appropriate mind-related comments and non-attuned mind-related comments independently contribute to child developmental outcomes such as attachment security (Meins et al., 2012). Particularly, Meins et al. (2003) postulate that mother's tendency to make appropriate mind-related comments during the mother-child interaction may be one essential feature of an interactive style that underlines awareness of the child's mental states.

Parental Mind-mindedness and Sensitivity

Parental mind-mindedness has been studied relative to parental sensitivity during parent-child interactions (Laranjo, Bernier, Meins, & Carlson, 2014; Meins et al., 2001) since the concept of mind-mindedness developed from the work of Ainsworth and colleagues on sensitivity and infant attachment (Ainsworth, Bell, & Stayton, & Schaffer, 1971; Ainsworth, Bell, & Stayton, 1974). According to Ainsworth (1978), parental sensitivity was defined as a parent's ability to use information from interpretation of their child's signals/cues that were implicit in the child's external behaviors to respond to the child promptly and appropriately. Although parental sensitivity has been an important precursor of child secure attachment, some research found that parental sensitivity did not adequately account for the parent-child attachment; there was only a modest effect size (r = .24; De Wolff & Van IJzendoorn, 1997; Van IJzendoorn, 1995). This led to the supposition that "sensitivity cannot be considered to be the exclusive and most important factor in the development of attachment" (De Wolff & Van IJzendoorn, 1997, p.585). Some researchers questioned whether other aspects of the mother-

child relationship, besides parental sensitivity, explain the parent-child attachment security (Fonagy et al.,1994; Meins, 1997). Fonagy, Steele, and Steele (1991) found that security of infant attachment with their parents was predicted by the parent's capacity to understand mental states. Although they acknowledged that sensitivity is still a significant contributor to attachment security, they also proposed that there is a vital synergy between the attachment process and a parent's understanding of child mental states and hypothesized that this capacity also contributes to attachment security. There are some constructs similarly focusing on the parental tendency to understand child mental states utilizing different methods, such as reflective functioning (Fonagy, Steele, Steele, Moran, & Higgitt, 1991), insightfulness (Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002), and mind-mindedness (Meins, 1997). Of among these constructs, mind-mindedness is the key interest of this study. Meins (1997) intended to refine and complement the measurement of sensitivity and proposed that the concept of mind-mindedness. Parental mind-mindedness and parental sensitivity both reflect the parent's ability to take a child's view. However, mind-mindedness reflects the more cognitive components of sensitivity, namely the caregiver's tendency to comments on child's mental states as distinct from parental responses to the child's behaviors indicating physical and emotional needs in general. Specifically, parental sensitivity is operationalized through the parent's responsive behaviors based on a child's physical/emotional needs, signals, and cues (Ainsworth, Bell, Stayton, & Schaffer, 1971; Ainsworth, Bell, & Stayton, 1974), whereas parental mind-mindedness operates through mind-minded linguistic behaviors which are indicative of attunement to child mental states (e.g., child's desires, thoughts, and intensions). As such, mind-mindedness particularly emphasizes parents' recognition of their children's mental states that are more intrinsic rather than extrinsic and is manifested as the parents' verbal tool to engage with

the children at a mental level (Mein, 1999). For instance, a sensitive mother might be able to recognize her toddler's frustration and provide comfort (i.e., hug and kiss) or might say "Oh, you are tired of playing with the puzzles; let's read a book then" while the toddler is frustrated because the toddler struggles to put a puzzle piece in place. However, a mind-minded mother might recognize not only the toddler's frustration, but also the toddler's desires, thoughts, and intentions, and would say "You want to put that puzzle piece in place." instead.

Many researchers have shown that mind-mindedness independently effected child outcomes after accounting for maternal sensitivity (Bernier et al., 2010, 2017; Meins et al., 2002, 2012; Meins, Centifanti, et al., 2013). However, they also recognize that the two constructs are in some respects related with each other. For instance, Meins, Fernyhough, Fradley, and Turkey (2001) found that maternal responses to infant behaviors (i.e. maternal responsiveness to change in infants' direction of gaze; maternal responsiveness to infant's object-direct actions) and maternal appropriate mind-related comments were positively related to maternal sensitivity, indicating that sensitivity and mind-mindedness were tapping into similar aspects of parental responsiveness, although the moderate coefficient (r_s = .40) indicated that these two constructs were not equivalent. In the same study, only appropriate mind-minded comments were significantly associated with security of attachment at 12 months, considering the appropriate mind-related comments were found to be a better independent predictor of attachment security than maternal sensitivity. Moreover, Laranjo et al. (2008) reported that maternal sensitivity (measured through the Maternal Behavior Q-sort; Pederson, Moran, Sitko, Campbell, Ghesquire, & Acton, 1990) mediated the association between mind-mindedness and infant attachment, suggesting mind-mindedness may be a pre-requisite for sensitivity (Laranjo, Bernier, & Meins, 2008; Zeegers et al., 2017). As the aforesaid studies acknowledged the fact that two constructs

are in some respects confounded, in this study, I controlled for sensitivity (assessed separately and in a different task than mind-mindedness was assessed) to examine specific contribution of mind-mindedness over and above sensitivity.

Parental Mind-mindedness and Child Subsequent Outcomes

There is a proliferation of literature on the beneficial influence on parental mind-mindedness on child developmental outcomes, including attachment security (Laranjo, Bernier, & Meins, 2008), language ability (Meins, Fernyhough, Arnott, Leekam, & de Rosnay, 2013), and theory of mind (Kirk et al., 2015; Laranjo, Bernier, Meins, & Carlson, 2010, 2014; Lundy, 2003). As noted, mind-mindedness has been associated with child secure attachment (Arnott & Meins, 2007; Dermers et al., 2010a; Dermers et al., 2010b; Laranjo et al., 2008; Meins et al., 1998, 2001, 2012). For instance, Meins et al. (2001) found that children whose mothers demonstrated greater proportion of appropriate mind-related comments during parent-child play at 6 months were more likely securely attached to their mothers. Lundy (2003) reported that more frequent mind-related comments were positively related to secure attachment scores on Attachment Q-set (AQS; Waters, 1987). According to Meins et al. (2012), maternal appropriate mind-related comments significantly predicted unique variance in infant attachment security independently of maternal sensitivity and secure-infants' mothers demonstrated more appropriate mind-related comments compared to avoidant-infants' mothers. Meins et al. (2018) reported that non-attuned mind-related comments at 8 months were associated with insecure attachment at 44 months and 51 months. Mind-mindedness may allow parents to see what is behind children's behaviors, which informs how parents respond to their children, increasing the likelihood that the parents meet that children's needs, and, subsequently, children's attachment security (see also Ordway et al., 2015). As such, mind-mindedness might fully meet the child's needs while sensitive response might not fully meet the child's needs because appropriate mind-minded comments are more

aligned and more directly responsive to the children's mental states/needs that are underlying behaviors rather than responses to the behaviors alone.

A growing body of research has investigated the link between parental mind-mindedness and children's mentalizing ability, theory of mind (Davis et al., 2014; Dore & Lillard, 2014; Kirk et al., 2015; Laranjo, Bernier, Meins, & Carlson, 2010, 2014; Lundy, 2013; Lundy & Fyfe, 2016; Meins & Fernyhough, 1999; Meins, Fernyhough, et al., 2013; Meins et al., 1998, 2002, 2006; Shacht et al., 2013; Licata, Kristen, & Sodian, 2016). For example, mothers' appropriate mind-related comments during play contexts (with and without toys) at 1 year of age were positively associated with early manifestations of theory of mind at 2 years (Laranjo, Bernier, Meins, & Carlson, 2010). Laranjo and colleagues (2014) replicated previous studies and found that mothers' appropriate mind-related comments during free play at 12 months of age were significantly associated with children's theory of mind at 2 and 4 years old. Similarly, children whose mothers described their children with more mentalistic terms when they were 3 years old outperformed their peers on theory of mind tasks at 5 years (Lundy, 2013; Lundy & Fyfe, 2016). Meins et al. (2002) found that mothers' appropriate mind-related comments during free play at 6-months of age were positively correlated with children's theory of mind at 45 and 48 months. Meins et al. (2003) also found that mothers' appropriate mind-related comments at 6 months of age were positively related to children's understanding of ongoing mental activities and processes (e.g., stream of consciousness understanding) at 55 months, whereas maternal sensitivity showed no association with children's later understanding of mind. Kirk et al. (2015) also found that only maternal appropriate mind-related comments up to 4 years and earlier (not non-attuned mind-related comments) did not predict child theory of mind at 5 and 6 years of age. Mothers' mind-mindedness, particularly, the use of appropriate mind-related comments during

early childhood may provide a linguistic scaffold within which children can begin to be aware of their own mental states by using them as a source of information in regard to their emotions than general early child–mother interaction (see also Meins et al., 2003).

Mind-mindedness has been also associated with child language (Bernier et al., 2017; Laranjo & Bernier, 2013; Lundy & Fyfe, 2016; Meins, Fernyhough et al., 2013; Zammit & Akinson, 2017). For instance, Lundy and Fyfe (2016) found that when mothers scored higher for mind-mindedness with preschool-aged children, those children used more mental state language during a problem-solving task. Laranjo and Bernier (2013) reported that appropriate mind-mindedness comments at 12 months were linked to more advanced expressive vocabulary at 2 years. In some studies, child language was considered as a possible mediator between parental mind-mindedness and child developmental outcomes. For instance, Bernier and colleagues (2017) found that appropriate mind-mindedness comments in infancy predicted greater expressive vocabulary and effortful control in toddlerhood and later cognitive school readiness in kindergarten. As mind-related comments occur within parent-child interaction, particularly parent-child discourse, children whose parents recognize, interpret, and comment on children's mental states are more likely to be advantaged in their language development. Although the importance of mind-mindedness on child developmental outcomes has been recognized, comparatively little attention has been given to the link between mind-mindedness and child emotion regulation.

The Contribution of Parental Mind-mindedness to Toddlers' Emotion Regulation

Given that very young toddlers have very limited verbal skills, the parent's tendency to interpret the toddler's mental states through close observation of the toddler's behaviors and the surrounding context is particularly significant for developing emotion regulation skills. Some researchers have suggested that mind-minded parents serve as an external regulator of their

children's emotions by articulating their mental states (Bernier et al., 2017; Fernyhough, 2008). For example, the toddler cries over her broken toy. The mother comments on her toddler's expression of sadness about the broken toy, "Oh, you are sad because your toy is broken, and you want this toy fixed," with a warm voice. At this moment, the mother's appropriate mind-related comments on her toddler's mental states, as external regulatory support, may allow the infant to regulate the internal arousal and, further, to learn that the arousal and negative effect can be tolerated and regulated. In this regard, Barish (2018) highlighted that when children feel heard and understood, children can regulate their emotions – it helps children to reduce the intensity of their emotions and to develop an increasing capacity to regulate their emotions. Moreover, toddlers' observation of their mothers articulating mental states may implicitly teach them how to manage the experience of emotions. Many researchers point out that mind-minded mothers may self-regulate their own emotional arousals in order to effectively articulate toddlers' mental states, especially in the face of toddlers' high levels of emotional arousal (Ensink, Normandin, Plamondon, Berthelot & Fonagy, 2016; Rutherford, Wallace, Laurent, & Mayes, 2015). Accordingly, mind-minded parents are modeling emotion regulation and regulatory processes, which lay the foundation for children's developing emotion regulation. Contrarily, mothers' continuous misinterpretations of or lack of attunement to toddlers' mental states may hinder toddlers' access to the emotional scaffolding and support that mind-minded mothers would likely provide, as misreading the toddlers' intentions (e.g., "Oh, you are mad that you can't play with your friend," while the toddler is sad about her broken toy) may be dysregulating for toddlers, and, thus, this interferes with learning to regulate emotional arousal for toddlers. In addition, parental mind-mindedness may contribute to toddlers' own understanding of mental states, including their understanding of the language of mental states (e.g., words that label

emotions, desires, etc.) that are related to emotion regulation – these possible potential pathways will be discussed shortly.

Despite the aforementioned theoretical support, to date, only a few recent studies have addressed links between mind-mindedness and emotion regulation. Zeegers and colleagues (2018) found mother's appropriate mind-related comments during free play interactions at 4 and 12 months were associated with the child's higher heart rate variability (HRV) and higher proportions of non-attuned mind-related comments at 4 months were linked to lower HRV at 12 months, a physiological marker of emotion regulation capacity. McMahon and Newey (2018) reported that mothers' more non-attuned mind-related comments during initial free play were related to children's dysregulated responses (e.g., screaming, crying) in later stressful interactive contexts (still-face episodes) and lower emotional recovery during reunion episodes. In addition, previous studies suggested that mind-mindedness may promote antecedent emotion regulation, such as effortful control, executive function, impulse control, and working memory (Eisenberg et al., 2010; Spinrad et al., 2007). For instance, Bernier and colleagues (2010 & 2012) found that maternal appropriate mind-related comments at child aged 12 months were significantly related to a child's working memory at 18 months and impulse control and conflict (i.e., dimensions of executive functioning) at 26 months and impulse control (i.e., one dimension of executive functioning) at 3 years. Additionally, Bernier and colleagues (2017) replicated these findings with a larger sample of 204 mother and child dyads and found positive links between maternal mind-mindedness at 1 year and effortful control at 3 and 4 years. In the same study, they found the longitudinal indirect effects of appropriate mind-related comments during infancy on kindergarteners' school readiness through serial mediators such as toddlers' expressive vocabulary at 2 years and effortful control at 3 and 4 years. Furthermore, Gagné Bernier and

McMahon (2018) investigated the links between paternal mind-mindedness and inhibitory control (measured utilizing a delay task) and rule-compatible conduct (i.e., children's willingness to comply with rules). They found that paternal appropriate mind-related comments at 18 months predicted better inhibitory control at 3 years (Gagne et al., 2018). Related lines of research provide more evidence. Maternal mentalization-related behaviors including use of mental state words, use of emotion bridging (e.g., linking child's emotions and behaviors), and representational mind-mindedness (e.g., mental descriptions of child) during book-share tasks at 18 months were related to effortful control (Senehi, Brophy-Herb, & Vallotton, 2018) and ability to delay gratification 6 months later (Brophy-Herb, Stansbury, Bocknek, & Horodynski, 2012). Taken all together, these findings provide evidence that parent's understanding of toddlers' mental states during real time ongoing interactions, as evident in parent's attributions is associated with emotion regulation abilities.

Potential Pathways from Mind-Mindedness to Emotion Regulation

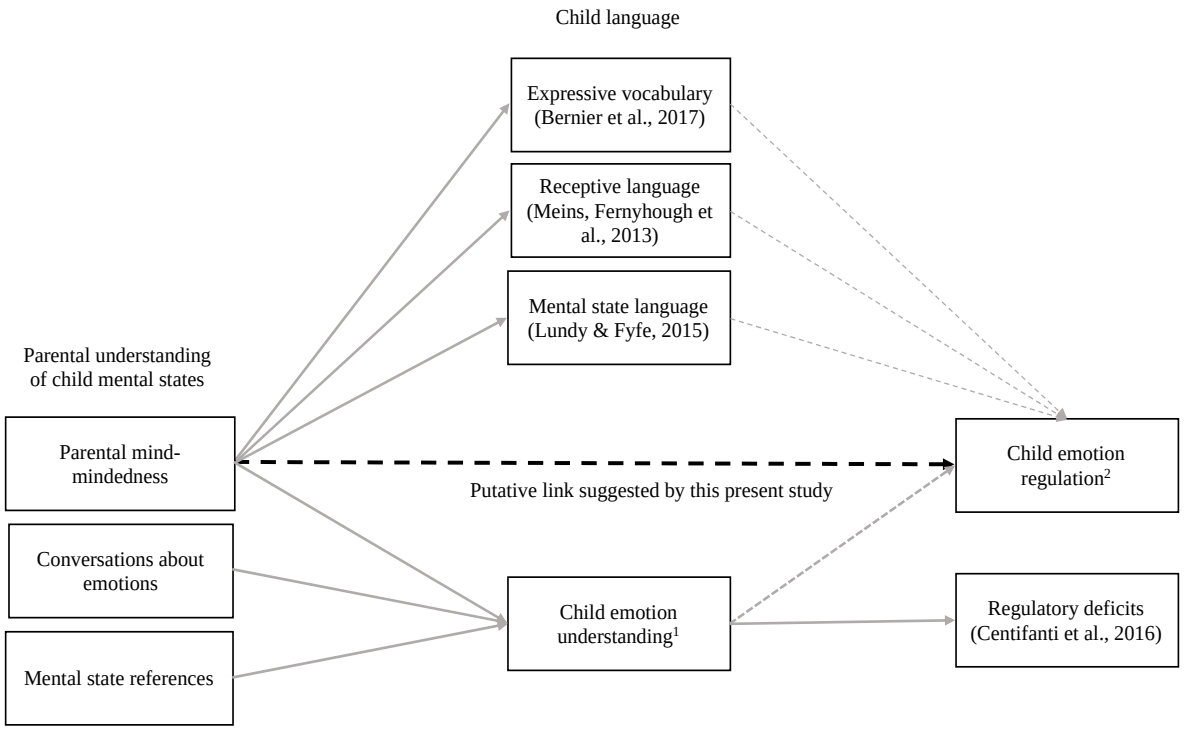
Parents' mind-mindedness may promote their children's capacity to regulate emotions through multiple pathways (summarized in Figure 1). One of the most elucidative pathways related to the links between maternal mind-mindedness and child emotion regulation is through child emotion understanding (Luyten et al., 2020; McMahon & Bernier, 2017). Meins et al. (2001) posited that parental accurate interpretation of children's mental states and subsequent communication with their children about the mental states may provide opportunities for the children to recognize her/himself as mental agents, and such understandings may be a fundamental mechanism of influence on children's understanding of mental states (Meins et al., 2001). Indeed, several studies have found that parent-child conversations about emotions are associated with children's emotion understanding (Denham, et al., 1994; Denham, Zoller, &

Couchoud, 1994; Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991), suggesting that those children who are given opportunities to engage in conversations about emotions with parents end up with a more accurate and comprehensive understanding of emotions (see Harris, 2008). In addition, exposure to mental state language during infancy promotes toddler's emotion understanding (Centifanti et al., 2016; Taumoepeau & Ruffman, 2008; Symons, Fossum, & Collins, 2006). Further, emotion understanding is negatively associated with regulatory deficits including externalizing problems, conduct problems, and impulsivity in preschoolers (Centifanti et al., 2016). These studies indicate that parents' early mind-related comments may influence children's developing sense of emotion recognition and thus may exert a link to the emotion regulation capacity.

Another potential pathway may be via the child's language. Parental mind-mindedness can promote children's expressive vocabulary (maternal report; Bernier et al., 2017), receptive language (Meins, Fernyhough, et al., 2013), and mental state language (Lundy & Fyfe, 2016). Advanced capacity for children's own use of language allows the child to recognize and express emotions and other mental states (see Taumoepeau & Ruffman, 2008). In turn, children's larger emotion vocabulary and greater use of emotion language can promote the acquisition of self-regulation and emotion regulation skills (Eisenberg et al., 2005). Children who talk more about emotions are more skilled at emotion understanding (Raikes & Thompson, 2006) and this can also offer young children a powerful tool to regulate their emotions (Laible, 2007; Laible & Thompson, 1998).

Although links between mind-mindedness and child emotion regulation are beginning to emerge, a role for mind-mindedness in aspects of child emotion regulation is still relatively

limited with emerging calls in the literature to investigate these links (see Bernier et al., 2017). Thus, this study offers empirical value in its potential contributions to the extant literature.



[1] Brown & Dunn, 1991; Centifanti et al., 2016; Denham, et al., 1992; Denham, Zoller, & Couchoud, 1994; Dunn, et al., 1991; Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Laible, 2004; Luyten et al., 2020; McMahon & Bernier, 2017; Taumoepeau & Ruffman 2008; Symons, Fossum, & Collins, 2006

[2] Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986; Laible, 2007; Laible & Thompson, 1998; Raikes & Thompson, 2008

Figure 1. Empirically supported and hypothesized pathways from mind-mindedness to emotion regulation

Note. Bold grey lines: evidence-based paths; Grey dashed lines: potential paths illustrated for heuristic interest but not yet tested in the empirical literature; Bold black dashed lines: the hypothesized path examined in the current study; The purpose of this figure: to succinctly summarize the theoretical and empirical literature to date as a context for the current study

Child Sex as a Moderator in the Relation Between Maternal Mind-mindedness and Toddler's Emotion Regulation

There are quite robust sex differences, often favoring girls, in child social-emotional outcomes, such as emotion understanding (Hall, 1978), emotion knowledge (Brown & Dunn, 1996; Denham et al., 2015; Lytton & Romney, 1991), emotion talk (Cervantes & Callanan, 1998; Hughes & Dunn, 2002; O'Kearney & Dadds, 2004), and self-regulation (Knight, Guthrie, Page, & Fabes, 2002; Rimm-Kaufman et al., 2009). Notably, increasing evidence suggests that sex differences in social-emotional development, including self-regulation and the use of regulatory strategies, begin to emerge in early childhood. For example, some literature, albeit inconsistent, found that boys had more difficulty regulating physiologically during a frustration task, showed fewer regulatory behaviors (Calkins et al., 2002), and were less engaged in self-comforting behaviors than girls (Brazelton, Koslowski, & Main, 1974). Also, a number of studies have shown that even from infancy, girls tend to be more able to distinguish and interpret facial expressions and facial emotions (for a meta-analysis, see McClure, 2000) and understand emotions (Dunham et al., 2015). As children mature, sex differences in social-emotional development are even more noticeable: girls use more emotion language than boys (O'Kearney & Dadds, 2004) and show greater differentiation and diversity in explanations of anger versus sadness (Hughes & Dunn, 2002) during the preschool period. Also, boys tend to be more easily aroused, less able to manage their emotions, and show more aggression than girls (see meta-analysis by Knight et al., 2002). Findings from previous research have suggested that the sex differences are likely due to variations in how boys and girls are socialized differently regarding emotions (Brophy-Herb et al., 2019; Chaplin, Cole, & Zahn-Waxler, 2005; Fivush, Brotman, Buckner, & Goodman, 2000; Spruijt, Dekker, Ziermans, & Swaab, 2019).

The role of child's sex in moderating the relations between parental emotion socialization practices and child emotion-related outcomes shows mixed findings, suggesting the need for further research. Some studies suggest that girls may be more sensitive/susceptible to the effects of parental emotion socialization practices in promoting emotional competence (Denham, Bassett, & Wyatt, 2010; Holly et al., 2019). Preschool-aged girls whose mothers talked more about positive emotion less frequently used avoidant emotion regulation strategies, but not boys (Denham, Bassett, & Wyatt, 2010). Other studies assert that boys may be more sensitive/susceptible to the effects of parental emotion socialization practices in advancing social-emotional outcomes (Calkins et al., 2002; Denham et al., 1994; Martin & Green, 2005; McFadyen-Ketchum et al., 1996). For example, Martin and Green (2005) found that maternal emotion-talk was positively associated with boys' but not girls' emotion understanding in 3-year-olds. On the negative end, if mothers practice more negative aspects of parenting, this may contribute to boys' worse emotion-related outcomes. For example, Denham et al. (1994) found that mothers' negative reactions to their children's emotions were particularly detrimental to preschool boys' but not girls' emotion understanding in later preschool years (15 months later). Likewise, low levels of maternal sensitivity were positively associated with trajectories of externalizing problems for boys aged 2 to 9 but not for girls (Miner & Clarke-Stewart, 2008). Also, maternal coercion and lack of affection predicted high levels of aggression in kindergarten boys (McFadyen-Ketchum et al., 1996).

In this dissertation, I hypothesized that girls would benefit more than boys from more appropriate mind-related comments relative to their emotion regulation. And boys would be more negatively impacted by non-attuned mind-related comments than girls, and thus more maternal non-attuned comments for boys may be related to less emotion regulation. Previous

studies show that mothers tend to be more expressive and more positively expressive toward girls than toward boys (Fogel, Toda, & Kawai, 1988; Malatesta, Culver, Tesman, & Shepard, 1989) and talk about emotions more with girls than with boys (Dunn et al., 1987; Kuebli et al., 1995), even as early as 16-18 months of age when mothers begin talking about emotions with their children (Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986). The differential parental emotion socialization of girls and boys may be one of the possible sources of influence on sex differences in social-emotional outcomes. Also, parents, as socialization agents, may respond to their children in ways that support children's needs and cues. Indeed, some research reported that girls tend to be more likely to seek parents' support through proximity and comport seeking. For example, toddler girls were more likely to seek support from and maintain proximity to their mothers than boys in fear eliciting situations (Kiel & Buss, 2006). In the same study, the authors explained that mothers were more likely to be accurate in predicting their daughters' fear than sons' fear due to a history of girls' comfort seeking and maintaining proximity. Altogether, I thus expect girls more socialized to be more attuned to emotional content in their mothers' communication than boys; therefore, they are more likely to benefit from the support that maternal mind-mindedness provides relative to emotion regulation. Specifically, toddler girls may be more sensitive to mothers' appropriate mind-related comments, and these comments may work as external regulatory support for toddler girls to help regulate their negative emotions. Furthermore, exposure to mothers' appropriate mind-related comments from early childhood allows them to learn that those negative emotions can be regulated. Meanwhile, boys may be more sensitive to their negative environment. For example, mothers' negative reactions to children's emotions were detrimental to boys' but not girls' later emotion understanding in preschool years (Denham, Zoller, & Couchoud, 1994; McFadyen-Ketchun, Bates, Dodge, &

Pettit, 1996), suggesting boys may be more sensitive to negative parenting behaviors. Likewise, it is possible that boys may be more sensitive to maternal misinterpretations of their mental states and, thus, more non-attuned mind-related comments for boys may be related to worse emotion regulation.

As most mind-mindedness literature has considered sex as a covariate, research is needed to better understand the effects of sex on mind-mindedness and child social-emotional development. In addition, since research on sex differences in parental emotion socialization in toddlerhood is comparatively limited, this study will be a great contribution to the scholarship in the field.

Child Temperament as a Moderator in the Relation Between Maternal Mind-mindedness and Toddler's Emotion Regulation

Sharp and Fonagy (2008) postulate that the parent's tendency to engage in mentalization, understanding ongoing mental states, may be related to child characteristics, most notably child temperament. Most temperament theorists have agreed upon temperament as "individual differences in behavioral style relating to affect, activity, and attention that are visible from early childhood" (Rothbart & Bates, 2006; Sanson, Hemphill, & Smart, 2004). In addition, there are three overarching dimensions such as negative emotionality, surgency, and regulation/control (Gartstein & Rothbart, 2003). As noted previously, negative emotionality, the focus of the current study, has been defined as one component of temperament that reflects a tendency to be easily and intensely aroused or prone to negatively exhibit valence emotions such as anger, irritability, sadness, and fear (Buss & Plomin, 1984; Putnam, Ellis, & Rothbart, 2001; Rothbart, Sheese, & Conradt, 2009). Negative emotionality, particularly, has drawn much attention from researchers as a moderating factor between the environment and individual's developmental outcomes. According to Belsky and Pluess (2009), negative emotionality represents a

predisposition to susceptibility to environmental influences (both positive and negative) and may cause worse outcomes under negative environment but better outcomes under positive environment. In the same vein, some children may be more susceptible to both positive and negative aspects of mind-mindedness, which in turn may lead to either better or worse developmental outcomes (i.e., emotion regulation). Thus, children with negative emotionality, indicating greater environmental susceptibility, may benefit the most when their mothers are mind-minded, yet may be adversely affected when their mothers are not mind-minded.

Although scant studies have examined maternal mind-mindedness and its relation to children's emotion regulation, particularly for those who may be more susceptible to environmental influence due to high negative emotionality, some mind-mindedness literature has reported, albeit inconsistently, associations between maternal mind-mindedness and child temperament. For instance, Demer et al. (2010a) found that children's difficult temperament in the first 12 months was related to fewer maternal mind-related comments at 18 months. Meins et al. (2011) reported non-significant associations between maternal mind-related comments at age 3 and 7 months and temperament at age 7 months, suggesting a better understanding of this relation is needed. Despite the fact that no studies to date have examined the differential susceptibility hypothesis with maternal mind-mindedness and its impact on toddler's emotion regulation, there is some evidence from the parenting literature to suggest that toddlers with a high negative emotionality may benefit more or less from maternal mind-mindedness. Much more research has been done on the parenting literature with evidence that child temperament moderates parental sensitivity and supportiveness on a child's ability to regulate their emotions. For example, when mothers were insensitive to their children's cues and needs, their children with high negative emotionality showed poorer regulation skills, but when maternal sensitivity

was high, those children showed the best regulation outcomes (Kim & Kochanska, 2012; Pluess & Belsky, 2010). Bradley and Corwyn (2008) found that children with difficult temperaments had the lowest levels of externalizing behaviors in first grade when their mothers exhibited high sensitivity, whereas children with difficult temperaments had the highest levels of externalizing behaviors when their mothers exhibited low sensitivity. Moreover, children with negative emotional reactivity showed greater use of regulatory skills (e.g., verbal distraction) when mothers provided high levels of positive emotion socialization strategies, such as physical soothing, during a frustrating situation, but showed less use of regulatory skills when mothers provided low levels of positive emotion socialization strategies (Mirabile, Scaramella, Sohr-Preston, & Robinson, 2009). In addition, Dunsmore, Booker, Ollendick, and Greene (2016) found that when children with higher emotion negativity, those with mothers in higher emotion coaching had lower externalizing symptomatic behaviors (such as defiance and hostility) but had higher externalizing symptomatic behaviors when mothers had lower emotion coaching in clinical samples. Similarly, within Belsky's hypothesis, temperamentally difficult toddlers from low-income families may show better emotion regulation skills when mothers are mind-minded but may show worse emotion regulation skills when mothers are not mind-minded. In regard to maternal non-attuned mind-related comments, Meins (2013) found that non-attuned mind-related comments were positively related to insecure attachment. Crucianelli et al. (2019) found that non-attuned mind-related comments were associated with touch that was not contingent on the children's arousal and thus discouraged an affectionate tactile response from the children. Colonnesi et al. (2019) found that mothers' frequent use of non-attuned comments at 12 and 30 months predicted children's externalizing behavior at 4.5 years. Hence, research to date suggests

that non-attuned comments may reflect a rupture in the parent-child interactions and could lay a foundation for problems in parent-child interactions (see also Colonnesi et al., 2019).

In this study, I hypothesized that toddlers with greater negative emotionality would have significantly better emotion regulation than toddlers with less negative emotionality when mothers use higher levels of appropriate mind-related comments. Moreover, toddlers with greater negative emotionality would have significantly worse emotion regulation than toddlers with less negative emotionality when mothers use higher levels of non-attuned mind-related comments.

Furthermore, some limited studies have examined the associations between child sex, temperament, and parenting in regard to child developmental outcomes. Yet, these studies showed mixed findings. For example, Miner and Clarke-Stewart (2008) failed to find that child temperament, sex, and less sensitive parenting relate to behavior problems for both boys and girls. Contrarily, Gordon (1983) found that difficult girls with controlling mothers tended to exhibit more positive affect, while temperamentally difficult girls with noncontrolling mothers showed more negative affect. Also, Ramchandani, van IJzendoorn, & Bakermans-Kranenburg (2010) addressed that girls with reactive temperaments were more sensitive to father involvement, showing significantly fewer problem behaviors and more prosocial behaviors when fathers were more involved, and more problem behaviors and fewer prosocial behaviors with less father involvement. These findings at least suggest a possibility of the interaction between toddler sex, temperament, and maternal mind-mindedness. However, three-way interactions (temperament by sex by maternal mind-mindedness) were not investigated as there is not enough power to detect the effect. Power analysis is reported in Chapter 3.

Present study

The present study has three primary goals. The first goal was to determine whether maternal mind-mindedness at 14 months predicts toddlers' observed emotion regulation at 24 months. As scant evidence was available in the previous mind-mindedness literature, this study will provide empirical support for the relation between maternal mind-mindedness and toddler's emotion regulation. The second goal was to determine whether the relation between maternal mind-mindedness and toddler's emotion regulation is moderated by sex. Finally, specifically applying a differential susceptibility frame, the third goal was to test toddler temperament (negative emotionality) as moderating the effects of maternal mind-mindedness on toddlers' emotion regulation. Note that I am not applying a differential susceptibility frame to the question of toddler sex as a moderator because the empirical literature does not support sex as a biological marker of environmental sensitivity. To explore the answer to each research question, I included "sub" research questions differentiating appropriate and non-attuned mind-related comments. In summary, when examining the role of mind-mindedness in child emotion regulation, researchers must consider the contribution that toddler sex and temperament play in characterizing which toddlers will be most influenced by maternal appropriate mind-minded comments (see Figure 2). All models will control for maternal verbosity and maternal sensitivity to better identify the contributions of maternal mind-mindedness to toddlers' emotion regulation. Also, temperament may be related to sex, thereby covarying with sex.

Research questions

1. Does maternal mind-mindedness predict toddler's emotion regulation?
    1.1. Maternal appropriate mind-related comments at 14 months will positively predict toddler's emotion regulation at 24 months.

1.2. Maternal non-attuned mind-related comments at 14 months will negatively predict toddler's emotion regulation at 24 months.

2. Does toddler sex moderate the relation between maternal mind-mindedness at 14 months and toddler's emotion regulation at 24 months?

   2.1. Toddler girls will have significantly better emotion regulation (as in higher scores) at 24 months compared to boys when mothers use high levels of appropriate mind-related comments at 14 months.

   2.2. Toddler boys will have significantly worse emotion regulation (as in lower scores) at 24 months compared to girls when mothers use high levels of non-attuned mind-related comments at 14 months.

3. Does child temperament (negative emotionality) moderate associations between maternal mind-mindedness at 14 months and toddlers' emotion regulation at 24 months?

   3.1. Toddlers with greater negative emotionality will have significantly better emotion regulation (as in higher scores) at 24 months than toddlers with less negative emotionality when mothers use higher levels of appropriate mind-related comments at 14 months.

   3.2. Toddlers with greater negative emotionality will have significantly worse emotion regulation (as in lower scores) than toddlers with less negative emotionality when mothers use more non-attuned mind-related comments at 14 months.

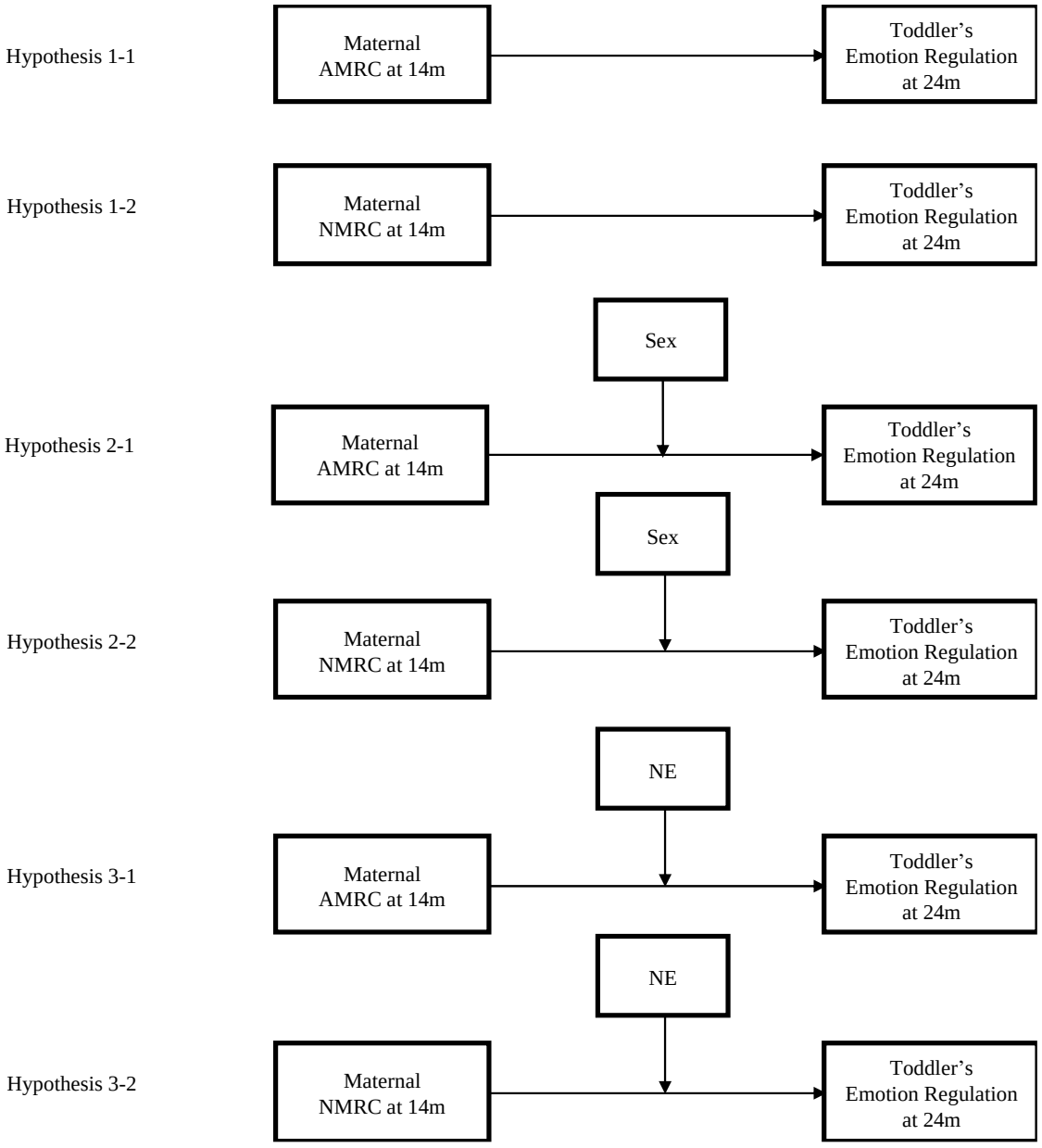


Figure 2. Proposed conceptual models

Note. MM_AMC: Mind-Mindedness_Appropriate Mind-related Comments; MM_NMC: Mind-Mindedness_Non-attuned Mind-related Comments; PSD: Posterior Standard Deviations; NE: Negative Emotionality

Table 1. Table for conceptual and operational definitions of variables

Key Variables	Conceptual Definitions	Operational Definitions
Maternal mind-mindedness	Parent's tendency to treat their child as an individual with a mind of his or her own (Meins, 1997).	The proportion of appropriate and non-attuned mind-related comments out of the total comments
Toddler's emotion regulation	The process of modulating the occurrence, duration, and intensity of internal states of feeling (both positive and negative) and emotion-related physiological processes (Morris et al., 2017)	Sum of the items on the examiner-rated Emotion Regulation scale of the Bayley Scales of Infant Development, 2nd ed. (BSID-II; Bayley, 1993). It assesses negative affect, frustration with the tasks, and ability to transition between tasks and test materials during a standardized assessment.
Temperament (negative emotionality)	Constitutionally based individual differences in behavioral style relating to affect, activity, and attention that are visible from early childhood (Rothbart & Bates, 2006; Sanson, Hemphill, & Smart, 2004) Negative emotionality is focus of this study and is one component of temperament that reflects individual differences in environmental sensitivity (Boyce & Ellis, 2005) and a tendency to be easily and intensely aroused or prone to exhibit negatively valence emotions (Buss & Plomin, 1984; Putnam, Ellis, & Rothbart, 2001; Rothbart, Sheese, & Conradt, 2009).	Sum of the items on parent-reported Negative Emotionality Subscale of the Emotionality, Activity, Sociability, and Impulsivity Temperament Survey (EASI, Buss & Plomin, 1984). It measures the child's tendency to be quickly or intensely emotional or upset.

CHAPTER 3

METHOD

Participants and Study Design

In the current study, the data were collected as part of the Early Head Start Research and Evaluation Project (EHSREP; Love et al., 2005). The EHSREP population is a representative sample of primarily economically vulnerable families whose annual incomes were less the federal poverty threshold. To be eligible for enrollment in the EHSREP, families not only had to earn less than the program's income guidelines, but also had to agree to random assignment and to have a child aged under 12 months. After programs determined that families met program eligibility guidelines, families were randomly assigned to the program (n = 1,513) or control group (n = 1,488). Control group families could not receive Early Head Start services, but they could access other services in the community. A total of 3,001 families were recruited from the 17 research sites across the United States. Data were collected at child age 14 months, 24 months, 36 months, 60 months, and when children were 10 years old.

EHSREP Subsample for the Current Study

Given the interest in maternal mind-mindedness measured via mother-toddler free play, the current study utilizes the data obtained at the 14-month and 24-month assessments with available video data from one Midwestern site (from the national study). The current sample consisted of 139 toddlers and their mothers. All demographic characteristics are reported in Table 2. Mothers primarily identified as White (78.5%, n=95) or African American/Black (15.7%, n=19, were single and held a high school degree (35.9%, n=42) or did not complete high school (37.6%, n=44) 45.8% (n=55) Annual reported income at baseline ranged from $0 to $30,000, with an average of $9,222.31. Family socioeconomic adversity was calculated as a sum score of the presence of five risk indicators, including single parenting, welfare receipt, teen

pregnancy, high-school dropout, and unemployment and ranged from 0-5 (M = 2.73, SD = 1.09). 59.2% (n=65) were having more than 3 risk indicators. Sixty-seven mothers (50.8 %) were randomized to receive Early Head Start services in the EHSRE study.

Table 2. Demographic characteristics of the current sample (n = 139)

Demographic	**M (*SD*) or *n* (%)**
Child characteristics	
Child sex	
Male	67 (49.3%)
Female	69 (50.7%)
Maternal characteristics	
Maternal age (at the enrollment)	22.34 (4.97)
Maternal race/ethnicity	
Non-Hispanic White	95 (78.5%)
Non-Hispanic Black	19 (15.7%)
Hispanic, any race	3 (2.5%)
Other	4 (3.3%)
Maternal education	
Less than high school	44 (37.3%)
High school diploma or GED	42 (35.6%)
Some college	29 (24.6%)
2-y college degree	2 (1.7%)
4-y college degree or more	1 (0.8%)
Maternal marital status	
Single	55 (45.8%)
Married	26 (21.7%)
Separated	5 (4.2%)
Divorced	12 (10.0%)
Cohabitating	22 (18.3%)
Maternal employment status	
Employed	33 (28.0)
School	15 (12.7)
Unemployed	40 (33.9)
Other	30 (25.4)
Program participation	67 (48.2%)
Maternal risk	2.73 (1.09)
Gross income	9222.31(31057.07)

A series of comparison tests were conducted on the included sample (n = 139) and excluded sample (n = 2862) to find differences in participants' characteristics (See Tables 3 and 4). No statistically significant differences were found between the included and excluded

samples on demographic characteristics (i.e., child sex, maternal education status, employment status, program participation, cumulative demographic risk, and gross income) and study variables (i.e., child temperament, emotion regulation, maternal sensitivity, and depressive symptoms). Thus, the current sample (*n*=139) was broadly representative of the larger sample except for maternal race/ethnicity, which is acknowledged in the final chapter.

Table 3. Comparison of demographic characteristics between included and excluded samples

Characteristics	**Included Sample (*n* = 139)**	**Excluded Sample (*n* = 2,862)**	
		***n* (%)**	**Chi-Squared (*df*)**
Child characteristics			
Child sex			
Male	70 (50.4%)	1440 (51.1%)	0.28 (1), $p = 0.87$
Female	69 (49.6%)	1379 (48.9%)	
Maternal characteristics			
Maternal race/ethnicity			
Non-Hispanic White	98 (78.4%)	993 (35.4%)	98.07 (3), $p = 0.00^{***}$
Non-Hispanic Black	20 (16.0%)	994 (35.4%)	
Hispanic, any race	3 (2.4%)	690 (24.6%)	
Other	4 (3.2%)	131 (4.7%)	
Maternal employment status			
Employed	33 (23.2%)	644 (23.2%)	4.71 (2), $p = 0.09$
School	17 (13.9%)	613 (22.1%)	
Unemployed	72 (59.0%)	1518 (54.7%)	
Maternal education			
Highschool	90 (74.4%)	2107 (76.4%)	0.26 (1), $p = 0.61$
College	31 (25.6%)	651 (23.6%)	
Program participation			
Treatment group	68 (48.9%)	1432 (50.5%)	0.20 (1), $p = 0.89$
Control group	71 (51.1%)	1406 (49.5%)	
Maternal risk			
Low risk	46 (40.7%)	1087 (42.4%)	0.13 (1), $p = 0.72$
High risk[1]	67 (59.3%)	1474 (57.6%)	
Gross income			
Under $2,7500 (median)	0 (0.0 %)	50 (6.0%)	3.10 (1), $p = 0.08$
Above $2,7500	49 (100.0%)	790 (94.0%)	

Note. [1]High risk: more than 3 risk factors $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 4. Comparison of study variables (available in both samples) for included and excluded samples

Variables	Included Sample (*n* = 139)	Excluded Sample (*n* = 2,862)	
	Mean (SD)		T-test (df)
Toddlers' ER[1]	3.58 (0.75)	3.64 (0.80)	*t* (1910) = 0.93, *p* =0.36
Toddlers' NE[2]	3.01 (0.88)	2.96 (0.95)	*t* (134) = 1.08, *p* = 0.28
Maternal sensitivity	2.18 (3.45)	1.76 (3.66)	*t* (109) = -0.75, *p* = 0.46
Maternal DS[3]	9.82 (10.52)	13.14 (16.48)	*t* (134) = -1.02, *p* = 0.31

Note. [1]ER: Emotion Regulation; [2]NE: Negative Emotionality; [3]DS: Depressive Symptoms
*$p < .05$, **$p < .01$, ***$p < .001$

Positionality Statement

The purpose of a positionality statement is to transparently discuss about my identities, which are likely to have influenced the shaping and execution of the current study.

I am an Asian, middle-class, cisgender, non-disabled female who self-identifies as a child developmentalist, helping our communities better support children and their parents. In my research career, I am interested in how child developmental outcomes vary according to parents' characteristics, such as temperamental fit with a child, culture – specifically cultural differences in parenting practices, and parental mentalization capacity, particularly mind-mindedness, which is the topic I am focusing on in the current study. In this study, I am focusing on associations between parental mind-mindedness and toddlers' emotion regulation and the moderating roles of temperament and sex. My positionality presents both insights and limitations. I was born and raised in South Korea, where self-identity of 'one–blood' racial homogeneity remained a deep-rooted source of pride. After I moved to the United States in 2011, I have had entirely different experiences as an ethnic/racial minority. Experiencing the environmental differences between an ethnically homogeneous nation in Asia and a diverse nation like the United States gives me unique insight into the importance of diversity and the ability to approach my research with sensitivity to other cultures. However, I acknowledge that my understandings are also limited to

my own background. For example, it's important to consider the influence of my positionality in relation to the coding process as well as to the interpreting the results. My coding team consisted of five undergraduate students who were White. Although the team reviewed all coding to finalize the decisions through the weekly meetings, my cultural background and subjective perceptions, in addition to the coders' own bias, may still lead to prejudices and stereotypes in the process of data coding and interpretation. In addition, the mind-mindedness coding scheme developed in Western culture may have cultural biases and most mind-mindedness research to date has been conducted with White families, as was the case in the current study as well.

Measures

Maternal Mind-mindedness

Maternal mind-mindedness was assessed at 14 months from videotaped mother-child semi-structured "three-bag" free-play interactions (Ware, Brady, O'Brien, & Berlin, 1998). During the 10-minute-mother-child interactions, mothers were instructed to play with their children with the three bags of toys that were invited to play with their children so as to evoke maternal natural parenting behaviors. To measure maternal mind-mindedness, the mother-toddler interactions were transcribed verbatim and coded using procedures outlined in the Mind-Minded Coding Manual, Version 2.2 (Meins & Fernyhough, 2015) by five trained undergraduate coders. First, the transcripts were thoroughly reviewed by the coders, and mind-mindedness comments were identified if the mother (a) used mental state terms to comment on what the toddler was thinking and feeling, or (b) used any utterance that was meant to be a dialogue said by the toddler.

Second, the mind-mindedness comments were then coded as "Appropriate" or "Non-attuned" while watching the videotaped interactions between mothers and toddlers. If the coders

agreed with the mother's recognition of the toddlers' mental states (e.g., the mother says, "You want to play with the ball" while the toddler is reaching toward the ball), it should be coded as "Appropriate mind-related comments." However, if the coders disagreed with the mother's recognition of the toddlers' mental states (e.g., the mother says, "You are bored" while the toddler is actively playing with the ball), it should be coded as "non-attuned mind-related comments." As recommended by Meins and Fernyhough (2015), the proportion of appropriate and non-attuned mind-related comments out of the total comments was used in the analysis. Coders were trained by the first author until they attained a reliability set at Krippendorph's alpha (Kalpha) and Intro-class correlation (ICC) of 0.8. A randomly selected 29% (*n*=36) of the mother-child interactions were independently coded by two coders as an additional indicator of ongoing reliability. Interrater reliability was assessed with Kalpha and ICC, which resulted in 0.91-1 and 0.96-1 in range, respectively. Both appropriate mind-related comments and non-attuned mind-related comments had excellent reliability.

Toddler's Emotion Regulation

The behavior rating scales of the Bayley Scales of Infant Development, 2nd ed. (BSID-II; Bayley, 1993) were used to measure toddlers' emotion regulation during the Bayley Mental Development Index (MDI) assessment at 24 months. The Emotion Regulation scale measures negative affect, frustration with the tasks, and the ability to transition between tasks and test materials. It consists of seven items (i.e., hypersensitivity to test materials and stimuli, adaptation to change in test materials, attention to task, persistence in attempting to complete tasks, frustration with inability to complete tasks, orientation to examiner, and cooperation). After interacting with the toddler during the administration of the Bayley MDI, each item was rated by the examiners on a 5-point scale, ranging from not at all (1) to all the time (5), with higher scores

indicating better levels of emotional regulation. This scale has been used in numerous studies as an indicator of children's self-regulatory competence (e.g., Chazan-Cohen et al., 2007; Vogel et al., 2006). The Cronbach's alpha for this subscale in the current sample was 0.81.

Child temperament

Child temperament was assessed at 14 months by the parent-reported Emotionality subscale of the Emotionality, Activity, Sociability, and Impulsivity Temperament Survey (EASI; Buss & Plomin, 1984). The Negative Emotionality Subscale measures the child's tendency to be quickly upset or intensely emotional. Negative emotionality was assessed by the mean score of 5 items (i.e., Cries easily; Tends to be somewhat emotional; Often fusses and cries; Gets upset easily; and Reacts intensely when upset). Each item was rated on a 5-point Likert scale (from 1 = uncharacteristic to 5 = characteristic). Buss and Plomin (1975) reported that test-retest reliabilities ranged from .75 to .91 across scales, with an average of .82, and the Cronbach's alpha for this subscale in the current sample was 0.76.

Covariates

Maternal Sensitivity. Maternal sensitivity was included as a covariate. It was assessed at 14 months during the High-chair task (McHale, Jean, O'Neal, Lee, and Berlin, 1997) using the coding scheme developed by Fuligni and Brooks-Gunn (2013). Fuligni and Brooks-Gunn (2013) adopted the coding schemes from the National Institute of Child Health and Human Development Study of Early Child Care 15-, 24-, and 36-month ratings of Mother-Child Interaction Rating Scales for the Three Boxes Procedure (Ware, Brady, O'Brien, & Berlin, 2000) and the Manual for Coding Free play-Parenting Styles from the Newark Observational Study of the Teenage Parent Demonstration and the Baltimore study (Britto & Brooks-Gunn, 2001; Brooks-Gunn, Liaw, Michael, & Zamsky, 1992; Chase-Lansdale, 1997). The High-chair task

employs an element of the Strange Situation Procedure (SSP, Ainsworth et al., 1978), a frequently used context for observation of maternal sensitivity as child distress is particularly important to the concepts of sensitivity (Bowlby, 1969). In the High-chair task, the toddler was placed in a high-chair in front of the mother for 4 minutes while the mother completed a questionnaire. The mother was instructed to interact with her toddler in whatever way she thought appropriate. Maternal sensitivity focused on maternal affect, attention, and responsiveness to children's emotional and behavioral signals. Items were rated on a 7-point Likert scale (from 1= very low to 7= very high). High scores indicated that the mother was very child-centered and responsive to the child's needs/cues throughout the interaction, whereas low scores indicated that the mother was adult-centered or unresponsive to the child's needs/cues (Fuligni & Brooks-Gunn, 2013). Data on inter-rater agreements between individual coders are not available (also see O'Neal, Weston, Brooks-Gunn, Berlin, & Atapattu, 2017).

Maternal depressive symptoms. Maternal depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CESD; Ross et al., 1984). This questionnaire comprises 20 items scored on a 4-point response scale (0 = hardly ever or never to 3 = most of the time). Mothers self-reported their depressive symptoms when their children were 14 months old. Mothers were asked about the frequency of depressive symptoms in the past 2 weeks. Symptoms include poor appetite, restless sleep, loneliness, sadness, and lack of energy. The depressive symptom scores were averaged to create a composite score. The Cronbach's alpha for this subscale in the current sample was 0.77.

Statistical Analyses

Statistical analyses were conducted using SPSS 22.0 (IBM SPSS Statistics for Macintosh, Version 22.0; IBM Corp., Armonk, NY, USA) and Mplus 8.0 (Muthen & Muthen, 2013). Chi-square tests were used to test for significant group mean differences on categorical variables

(e.g., toddler sex); one-way analysis of variances (ANOVAs) with post hoc tests were used to test for group mean differences on continuous variables (e.g., gross income, socioeconomic adversity, etc.) using SPSS 22.0. Descriptive analyses were conducted to examine differences in primary demographic variables across the measures of maternal mind-mindedness, toddler's emotion regulation, and child temperament, in addition to bivariate correlations between the study variables using SPSS 22.0. Chi-square tests and one-way analysis of variances (ANOVAs) were used to test for significant group mean differences on categorical variables (e.g., child sex) as well as continuous variables using SPSS 22.0.

Path model analyses were conducted to examine all the hypotheses of the current study through Mplus 8.0 (Muthen & Muthen, 2013). To test Hypothesis 1, maternal mind-mindedness was regressed on toddler's emotion regulation. To test Hypothesis 2 and 3, the interaction terms were entered into the main regression analyses to determine whether there is evidence of sex and temperament moderation for the relationship between maternal mind-mindedness and toddler's emotion regulation. Models controlled for relevant covariates including maternal verbosity, sensitivity, and depressive symptoms. All covariate and predictor variables were standardized, and interaction terms were calculated by multiplying the variable in the term. Simple slope tests were used for statistically significant interactions to examine the moderation effects of maternal mind-mindedness on toddlers' emotion regulation at different levels of the moderator. Given the relatively small sample size, Bayesian estimation of model fit was utilized to increase statistical power and to produce more accurate estimates (Lee & Song, 2004). Bayesian analysis allows us to use posterior predictive p-value (PPP) to evaluate the model fit (Muthen & Asparouhov, 2012). PPP values within the 0.05 – 0.95 range indicate an acceptable model fit.

Furthermore, to test for a moderating effect of temperament within a differential susceptibility framework (Hypothesis 3), according to the recommendations for testing for differential susceptibility (Preacher, Curran, & Bauer, 2006; Roisman et al., 2012), the region of significance was calculated. The region identifies the range of predictor values below and above which the regression lines for the two groups, higher negative emotionality and lower negative emotionality, wherein the relation between the independent variables (maternal appropriate mind-related comments and non-attuned mind-related comments) and the dependent variable (emotion regulation) is statistically significant. As suggested by Roisman et al. (2012), the distance of 2 SD from the mean of each predictor (i.e., appropriate mind-related comments and non-attuned mind-related comments) was used as the range of interest for evaluating differential susceptibility effects. When differential susceptibility is warranted, these lines were expected to differ significantly both at low values (M–2 SD) of the predictors ('for worse') and at high values (M+ 2 SD) of the predictors ('for better').

Power analysis

Power analyses using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) served to validate the adequacy of the sample size used in this study. Values greater than 0.80 and an alpha of .05. were suggested by Cohen (1992) for adequate power. As suggested, power was set at .80 with an alpha level of .05. As a result, to detect two-way interactions, for a medium effect size, the required sample size is n = 135. Additionally, a sample of 144 would be needed to detect a three-way interaction, and thus, the sample size of the current study (n =139) may not have the required power to detect small but potentially meaningful effects. Hence, to enhance the power of our statistical analyses, the three-way interaction was not included in the final model.

CHAPTER 4

RESULTS

This study tested the association between maternal mind-mindedness (including appropriate mind-related comments and non-attuned mind-related comments) and toddlers' emotion regulation. I also intended to explore whether the association was moderated by toddler sex and temperament (i.e., negative emotionality). The first research question for the present study was as follows: Does maternal mind-mindedness at 14 months predict toddlers' emotion regulation at 24 months? The hypotheses were that while maternal appropriate mind-related comments at 14 months would positively predict toddlers' emotion regulation, maternal non-attuned mind-related comments at 14 months would negatively predict toddlers' emotion regulation. The second research question for the present study was as follows: Does toddler sex moderate the relation between maternal mind-mindedness at 14 months and toddler's emotion regulation at 24 months? The hypothesis for the second research question was that toddler girls would have significantly better emotion regulation (as in higher scores) at 24 months as well as boys when mothers use high levels of appropriate mind-related comments at 14 months and will have significantly worse emotion regulation as well as boys when mothers use fewer appropriate mind-related comments. The final research question for the present study was: Does child temperament (negative emotionality) moderate associations between maternal mind-mindedness at 14 months and toddlers' emotion regulation at 24 months? The hypothesis was that toddlers with greater negative emotionality would have significantly better emotion regulation (i.e., higher scores) at 24 months than toddlers with less negative emotionality when mothers use higher levels of appropriate mind-related comments at 14 months and would have significantly worse emotion regulation (i.e., lower scores) than toddlers with less negative emotionality when mothers use more non-attuned mind-related comments at 14 months.

Preliminary Analyses

Potential differences in study variables associated with toddler sex were investigated (see Table 5), and no statistically significant differences were found.

Table 6 shows bivariate correlations between study variables. Maternal appropriate mind-related comments (AMC) were positively related to toddlers' emotion regulation ($r = 0.21$, $p < .05$) but negatively related to toddlers' negative emotionality. There are significant positive correlations between maternal depressive symptoms and toddlers' negative emotionality ($r = 0.21$, $p < .05$). Maternal appropriate mind-related comments were positively correlated with both maternal non-attuned mind-related comments ($r = 0.54$, $p < .01$) and maternal verbosity (i.e., total comments; $r = .52$, $p < .01$). Maternal demographic characteristics such as race, education, program participation initially identified as covariates, were not significantly associated with toddlers' emotion regulation in preliminary models; hence, they were excluded in the final models to preserve model parsimony.

Table 5. Difference test between boys and girls on study variables

	Boys (*n*= 67)	Girls (*n*= 69)	Test statistic
	M (*SD*)		
Maternal MM-AMC[1]	3.76 (3.83)	3.16 (3.14)	t (120) = 0.96, p = .34
Maternal MM-NMC[2]	2.17 (2.39)	2.02 (2.11)	t (120) = 0.38, p = .71
Toddlers' ER[3]	3.46 (0.75)	3.61 (0.75)	t (117) = -1.06, p = .29
Toddlers' NE[4]	3.11 (0.95)	2.94 (0.90)	t (134) = 1.08, p = .28
Maternal sensitivity	3.28 (1.58)	3.48 (1.38)	t (109) = -0.75, p = .46
Maternal depressive symptoms	15.49 (11.23)	17.39 (10.53)	t (134) = -1.02, p = .31

Note. [1]MM_AMC: Mind-Mindedness_Appropriate Mind-related Comments; [2]MM_NMC: Mind-Mindedness_Non-attuned Mind-related Comments; [3]ER: Emotion Regulation; [4]NE: Negative Emotionality

Table 6. Correlations among study variables

Variable	M (SD) or *n* (%)	1	2	3	4	5	6	7	8	9
1. Maternal MM-AMC[1]	.03 (.03)	–								
2. Maternal MM-NMC[2]	.02 (.02)	.39**	–							
3. Toddlers' ER[3]	3.53 (0.75)	.12*	.21*	–						
4. Toddlers' sex	67 (49.3)	-.05	.75	.10	–					
5. Toddlers' NE[4]	3.02 (0.93)	-.05	.78	-.10	-.09	–				
6. Maternal sensitivity	4.44 (1.27)	.00	.14	.20	.07	-.23*	–			
7. Maternal DS[5]	16.45 (10.88)	.00	-.14	-.16	.09	.21*	-.13	–		
8. Maternal EL[6]	44 (31.7)	.10	.06	-.06	-.12	-.10	.19	-.21*	–	
9. Program Participation	67 (48.2)	-.02	-.02	-.01	-.02	-.00	.00	-.05	-.04	–

Note. Reference category: female (for sex); the highest level of education (for educational level); program group (for program participation) [1]MM_AMC: Mind-Mindedness_Appropriate Mind-related Comments; [2]MM_NMC: Mind-Mindedness_Non-attuned Mind-related Comments; [3]ER: Emotion Regulation; [4]NE: Negative Emotionality; [5]DS: Depressive Symptoms; [6]EL: Educational Level

*$p<.05$. **$p<.01$ ***$p<.001$

Primary Analyses

Research Question 1

The first hypothesis was that maternal mind-mindedness would be significantly related to toddlers' emotion regulation at 24 months. The results of the path analyses are shown in Table 7. Model fit statistics demonstrated a good fit to the data (PPP = 0.39). The model explained approximately 56% of the variance in toddlers' emotion regulation at 24 months. Above and beyond covariates, maternal appropriate mind-related comments at 14 months were significantly related to toddlers' emotion regulation at 24 months (β = 0.21; 95% CI: 0.10 to 0.41). Maternal non-attuned mind-related comments at 14 months were not significantly associated with toddlers' emotion regulation at 24 months.

Research Question 2

Table 7 also presents the estimated coefficients for the moderation model of associations among maternal mind-mindedness, toddler sex, and toddlers' emotion regulation. Model fit statistics demonstrated a good fit to the data (PPP = 0.34), with 38% explained variance (r^2). As shown in Table 7, maternal appropriate mind-related comments at 14 months and toddlers' sex have a significant interaction effect on toddlers' emotion regulation at 24 months (β=-9.63, 95% CI: -18.9 to -0.29). To further illustrate the moderating effect of sex on the relation between maternal mind-mindedness and emotion regulation, I conducted a simple slopes test, and a significant two-way interaction was plotted in Figure 3. Simple slopes test indicated that maternal appropriate mind-related comments at 14 months were related to greater emotion regulation for boys (β = 7.08, p = .02; 95% CI: 0.55 to 13.51). Maternal non-attuned mind-related comments at 14 months were not significantly associated with toddlers' emotion regulation at 24 months and there were no significant moderation effects.

Research Question 3

As shown in Table 8, contrary to the hypothesis, toddlers' negative emotionality did not moderate the association between maternal appropriate mind-related comments at 14 months, nor maternal non-attuned mind-related comments at 14 months. Post hoc tests were therefore not conducted.

Table 7. Unstandardized parameter estimates associated with toddler's emotion regulation (Toddler's Sex)

	Dependent Variable: Emotion regulation							
	MM_AMC[1]				**MM_NMC[2]**			
Model Path	***β***	***PSD[3]***	**LL**	**UL**	***β***	***PSD***	**LL**	**UL**
Covariates								
Maternal sensitivity	.07	.05	-.03	.18	.07	.05	-.03	.18
Maternal DS	-.02	.01	**-.03**	**-.00**	-.01	.04	-.13	.04
Maternal educational level	-.06	.04	-.14	.02	-.05	.04	-.13	.04
Program participation	-.16	.15	-.46	.14	-.12	.16	-.43	.18
Main Predictors								
Maternal MM	7.08	3.30	**.55**	**13.51**	10.44	6.41	-2.43	22.68
Toddlers' sex	.14	.16	-.16	.44	.12	.16	-.19	.43
Interactions								
MM × sex	-9.63	4.70	**-18.9**	**-.29**	-10.4	7.75	-26.4	5.11

Note. [1]MM_AMC: Mind-Mindedness_Appropriate Mind-related Comments; [2]MM_NMC: Mind-Mindedness_Non-attuned Mind-related Comments; [3]PSD: Posterior Standard Deviations; Bolded estimates represent statistical significance.

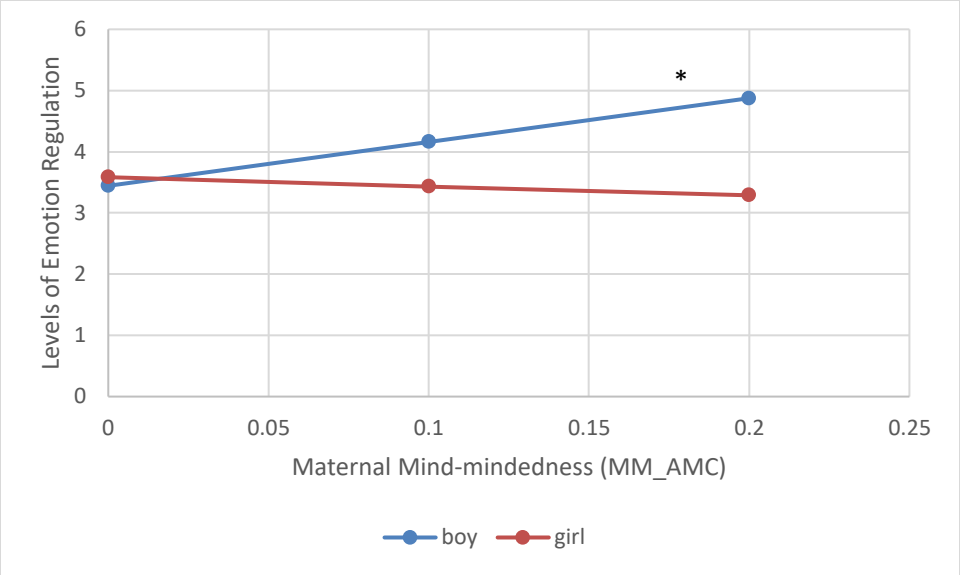


Figure 3. Moderating effects of toddlers' sex on the association between maternal appropriate mind-related comments and toddlers' emotion regulation
Note. MM_AMC: Mind-Mindedness_Appropriate Mind-related Comments

Table 8. Unstandardized parameter estimates associated with toddler's emotion regulation (Toddler's Temperament)

	Dependent Variable: Emotion regulation							
	MM_AMC[1]				**MM_NMC[2]**			
Model Path	***β***	***PSD*[3]**	**LL**	**UL**	***β***	***PSD***	**LL**	**UL**
Covariates								
Maternal sensitivity	.09	.05	-.01	.20	.09	.06	-.02	.20
Maternal DS	-.02	.01	**-.03**	**-.00**	-.01	.01	-.03	.00
Maternal educational level	-.06	.05	-.15	.03	-.06	.05	-.15	.04
Program participation	-.13	.16	-.44	.18	-.12	.16	-.44	.19
Main Predictors								
Maternal MM	1.44	7.85	-14.5	16.31	3.02	4.20	-4.85	11.52
Toddlers' NE[4]	.02	.09	-.17	.19	-.01	.10	-.19	.19
Interactions								
MM × NE	.29	2.51	-4.43	5.46	.40	.89	-1.37	2.23

Note. [1]MM_AMC: Mind-Mindedness_Appropriate Mind-related Comments; [2]MM_NMC: Mind-Mindedness_Non-attuned Mind-related Comments; [3]PSD: Posterior Standard Deviations; [4]NE: Negative Emotionality; Bolded estimates represent statistical significance.

CHAPTER 5

DISCUSSION

Given the importance of emotion regulation, particularly among children from low-income families, the purposes of the current study were to examine (1) if maternal mind-mindedness could predict toddlers' emotion regulation, (2) whether toddler sex moderates the link between maternal mind-mindedness and emotion regulation, (3) whether toddler temperament moderates the link between maternal mind-mindedness and emotion regulation. The results are discussed separately for appropriate and non-attune mind-related comments. First, maternal appropriate mind-related comments were significantly positively associated with toddlers' emotion regulation whereas maternal non-attuned comments were not significantly associated with toddlers' emotion regulation. Second, the results showed that sex moderated the relation between maternal appropriate mind-related comments and toddlers' emotion regulation, but not the relation between maternal non-attuned comments and toddlers' emotion regulation. Lastly, contrary to assumptions that toddler temperament would moderate the relation between maternal mind-mindedness and toddlers' emotion regulation, no statistically significant moderating effect was found. A closer examination and discussion of the current results are presented below.

Relation Between Maternal Mind-mindedness and Emotion Regulation

This study first sought to determine whether maternal mind-mindedness early in toddlerhood at 14 months promotes toddlers' later emotion regulation at 24 months by utilizing a sample of families eligible for Early Head Start. The current study showed partially consistent results with the previous studies. For example, the positive association between maternal appropriate mind-related comments and toddlers' emotion regulation in the current study corroborates the findings of McMahon & Newey (2018) and Zeegers et al. (2018). This

significant link implies that mothers shape their toddlers' emotion regulation development from early childhood (Eisenberg, Cumberland, & Spinrad, 1998). In particular, toddlers of mothers who are more mind-minded, not only experience themselves as mental agents but experience articulating their mental states through mothers' use of appropriate mind-related comments in play interactions (e.g., "Oh, you are sad because your toy is broken, and you want this toy fixed"). This may allow toddlers to learn that strong emotions (i.e., negative affect and internal arousal) can be regulated and to learn how to regulate those strong emotions. Thus, exposure to appropriate mind-related comments from earlier years may build the foundation for toddlers' developing emotion regulation. However, the current study has been unable to demonstrate the negative association between maternal non-attuned mind-related comments and toddlers' emotion regulation, as put forward by McMahon & Newey (2018) and Zeegers et al. (2018). In fact, this study indicates that maternal non-attuned comments were not significantly associated with toddlers' emotion regulation. The null finding of non-attuned mind-related comments may be explained by two reasons: First, it may be related to small variations in maternal non-attuned mind-related comments. The range (the simplest measure of variation) of non-attuned comments in the current study was from 0 to 9, which was a comparatively narrower range than that typically obtained by previous researchers—for example, from 0 to 28 comments (Meins et al., 2011). As such, these relatively small variations could make it difficult to test the influence of non-attuned mind-related comments. However, it should be noted that maternal mind-mindedness in the current study was not only observed in shorter duration of play tasks (10 minutes) than in Meins et al.'s study (20 minutes; 2011) but also focused on toddlers. Much of the mind-mindedness literature has focused on pre-verbal infants, although some researchers include toddlers, such as Colonnesi et al., 2019; parents of pre-verbal infants may find it more

difficult to interpret mental states than parents of toddlers. As a result of toddlers' emerging developmental skills including cognitive, linguistic, and motor skills, there may be fewer chances of mothers making misinterpretations with toddlers than infants. Thus, the narrow range of non-attuned mind-related comments along with the null finding in the current study may reflect the differences in maternal mind-mindedness with toddlers rather than with infants. Second, non-attuned mind-related comments may not be serious hindrances and interferences to the development of toddlers' emotion regulation. While the result shows that maternal non-attuned mind-related comments did not have a significant impact on emotion regulation, the preliminary analysis revealed that the correlation between non-attuned mind-related comments and emotion regulation was in the positive direction but was quite small and did not reach significance ($r = .15$, $p = .115$). In line with discussions from Zeegers et al. (2018), a possible interpretation is that non-attuned mind-related comments may be indicative of "subtle" failures of attunement that are different from negative parenting, such as hostile or coercive parenting behaviors. Furthermore, Wan and Green (2009) highlighted that a lack of fine-grained attunement could be present among any parents. It should be reiterated that appropriate and non-attuned mind-related comments are not on a continuum. Parents who are tuned in to their toddlers' mental states and make more appropriate comments may still occasionally inaccurately interpret their toddlers' mental states. Moreover, there is even a possibility that a parent makes high levels of appropriate mind-related comments and high levels of non-attuned mind-related comments. Although mostly from studies in clinical settings, some researchers posit that high ruptures (i.e., making high levels of non-attuned mind-related comments) and high repairs (i.e., making high levels of appropriate comments) are considered as a feature of successful relationships (Safran, Muran, & Eubanks-Carter, 2011) and, hence, parents (maybe depending on

parents' characteristics such as mental health, i.e., parental stress) might inaccurately interpret the children's mental state and then repair the misinterpretation. Moreover, generally speaking, non-attuned comments are less frequently included and discussed in studies of mind-mindedness (Cheng, Lu, Archer, & Wang, 2018; Reese, Meins, Fernyhough, & Centifanti, 2019); future study, examining both appropriate and non-attuned mind-related comments as related to toddlers' emotion regulation, would give further clearer explanation and insights into the co-occurrence of appropriate and non-attuned mind-related comments.

In addition, the current results reveal that maternal appropriate mind-related comments predicted toddlers' emotion regulation after controlling for maternal sensitivity. This suggests that maternal appropriate mind-related comments are significant and unique facilitators of toddlers' emotion regulation over and above maternal sensitivity. Controlling for sensitivity has been a common way to test the specific contributions of mind-mindedness in previous studies (Bernier et al., 2017; Centifanti, Meins, & Fernyhough, 2016). Furthermore, in the current study, I utilized maternal sensitivity in a different context (i.e., stressful context) from maternal mind-mindedness in order to fully explore the two constructs in different settings. The current result corroborates several previous studies. For example, Bernier et al.'s (2010) study found that child executive functioning at 18 months was relatively weakly related to maternal sensitivity as compared to maternal appropriate mind-related comments. A recent study of Chinese children revealed that maternal appropriate mind-related comments at 9 months predicted executive functioning when children were 2-3 years old while maternal sensitivity was not predictive (Cheng, Lu, Archer, & Wang, 2018). Also, according to Longbardi et al. (2018), appropriate mind-related comments facilitated toddlers' linguistic skills and acquisition of a mental-state lexicon above and beyond other types of sensitive maternal talk (e.g., labeling current activities

or compliments/encouragements). Consistent with the aforementioned studies, the current study's preliminary analyses also showed that sensitivity was not related to the key study variables (i.e., appropriate mind-related comments, non-attuned mind-related comments, and emotion regulation). These findings suggest that it is the more specific mental content of mind-mindedness that promotes toddlers' regulatory skills rather than warm parenting. Thus, the current results may build on existing evidence that maternal mind-related comments contribute in unique ways to young children's development, either by predicting outcomes when sensitivity does not or contributing uniquely beyond maternal sensitivity.

Taken together, the current study contributes to a growing body of evidence supporting maternal mind-mindedness as a bridge to the development of emotion regulation, over and above sensitivity. Moreover, as there is limited published research on the association between maternal mind-mindedness and emotion regulation in low-income families; hence, the current study can shed light on the effects of mind-mindedness specific to low-income populations.

The Moderating Effect of Toddler Sex

Contrary to the hypotheses, appropriate mind-related comments are particularly beneficial only for boys' development of emotion regulation. The results were consistent with Martin and Green's (2005) study. Researchers have theorized that the sex differences in children's social-emotional outcomes may exist because parents may socialize their children differently around emotions (Block, 1983; Morris et al., 2007). Some research suggests that parents not only tend to initiate emotion-related conversations with daughters more frequently than with sons (Fivush, 1993), but they tend to spend more time talking about emotions with daughters than sons (Dunn et al., 1987; Fivush, 1989). However, in this current study, interestingly, boys and girls were not statistically differently exposed to maternal mind-mindedness; that part of socialization practices was not different for girls and boys. In fact, the

differences tests between boys and girls revealed that the mothers did not use more mind-mindedness with girls or with boys t (120) = 0.58, p = .51 for maternal appropriate mind-related comments; t (120) = -0.82, p = .41 for maternal non-attuned mind-related comments. Thus, a possibility (at least in the current study) is that the same parenting practices may differentially affect outcomes in boys and girls, and toddler boys may be more sensitive to parenting behaviors. For example, Martin & Green (2005) found that boys' emotional understanding was strengthened through maternal use of emotion talk and cause-focused explanations, which are characteristics of emotional coaching. Also, mothers' negative reactions to children's emotions were detrimental to boys' but not girls' later emotion understanding in preschool years (Denham, Zoller, & Couchoud, 1994). These results suggest that boys may be more sensitive to parenting behaviors, particularly during early childhood. Likewise, it is possible that boys may be more sensitive to maternal interpretations and articulations of their mental states, as socialization supports them when they regulate their emotions, and thus, more maternal mind-mindedness for boys may be related to better emotion regulation. This supposition requires future bidirectional studies to determine causation.

In this study, girls were not statistically significantly benefitted from the maternal appropriate mind-related comments – this was a surprising result given other studies in the field. A possible explanation is that girls' superior language proficiency may stem from intrinsic cognitive abilities, which could be independent of appropriate maternal mind-related comments. Toddler girls generally have better language skills, and this has been reported by numerous studies (Cournoyer, Solomon, and Trudel, 1998; Vallotton & Ayoub, 2011; Vallotton et al., 2012). Advanced capacity for children's language skills is closely related to emotion regulation (see Taumoepeau & Ruffman, 2008). For example, children's larger emotion vocabulary and

greater use of emotion language can promote the acquisition of self-regulation and emotion regulation skills (Eisenberg et al., 2005). Children who talk more about emotions are more skilled at emotion understanding (Raikes & Thompson, 2006) and this can also offer young children a powerful tool to regulate their emotions (Laible, 2007; Laible & Thompson, 1998). Likewise, girls' better language skills may allow them to gradually increase their emotion regulation regardless of the impact of maternal appropriate mind-related comments.

Meanwhile, there was no moderating effect of sex in the relation between maternal non-attuned mind-related comments and emotion regulation. I expected that boys would show greater sensitivity to more negative maternal emotional communication, such as maternal non-attuned mind-related comments. However, as I mentioned above, infrequently occurring non-attuned mind-related comments may not be serious hindrances and interferences to the development of girls' or boys' emotion regulation.

The Moderating Effect of Toddler Temperament

I hypothesized that toddlers with greater negative emotionality would have significantly better emotion regulation than toddlers with less negative emotionality when mothers use higher levels of appropriate mind-related comments and significantly worse emotion regulation than toddlers with greater negative emotionality when mothers use higher levels of non-attuned mind-related comments. Unexpectedly, toddler temperament did not moderate the link between maternal appropriate mind-related comments and emotion regulation or the link between maternal non-attuned mind-related comments and emotion regulation. The current findings suggest that maternal mind-mindedness may influence toddlers' emotion regulation independently of their temperament. Although focusing on infants, Meins et al. (2011) and Demers et al. (2010b) also reported non-significant relations between temperament and mind-related comments, suggesting that mind-mindedness in infancy and early toddlerhood may not

related to temperament. Interestingly, in the current study, maternal appropriate mind-minded comments were inversely related to negative emotionality (r = - 0.18 p < 0.05), suggesting that mothers made fewer appropriate mind-related comments to their toddlers with greater negative emotionality. Although temperament was not a significant moderator in the current study, further investigation may be useful in better understanding any potential differences in parental mentalization practices and socialization practices related to temperament. Another possible explanation for the null findings related to temperament may reflect measurement issues. For example, some researchers suggest that temperament (i.e., negative emotionality) and emotion regulation are not distinct constructs, and it could be difficult to methodologically separate temperament from emotion regulation (Rothbart & Sheese, 2007). Although I argue that emotion regulation could be a product of temperamental predisposition and socialization processes (i.e., parent-toddler interactions), it is possible that temperament and emotion regulation are not easily distinguishable during toddlerhood. Future studies should clarify the possibilities by focusing on biological or physiological aspects of temperament. Second, in the current study, negative emotionality was measured using a parent-reported Negative Emotionality Subscale of the Emotionality, Activity, Sociability, and Impulsivity Temperament Survey (EASI, Buss & Plomin, 1984). Parent-report may be biased by parental mental health such as parental stress and thus may not be accurate. Thus, future research could further examine associations between temperament, maternal mind-mindedness, and emotion regulation by assessing temperament using multiple measures including observational or more sophisticated techniques.

Limitations and Future Directions

The main limitation of the current study is the limited generalizability of the findings, and a number of areas could be enhanced in future studies. First, as the current sample utilized the data from one Midwestern research site reflecting a primarily White population, a larger sample

with more racial and ethnic diversity might have revealed different findings. Although preliminary analyses found that there were no differences in key study variables by race (e.g., maternal appropriate mind-related comments: F (3, 104) = 0.42, p = 0.74), additional mind-mindedness research among diverse parents and children, including potential links between mind-mindedness and children's emotion regulation, and other developmental outcomes, is warranted. In addition, including a diverse group of coders when observing mind-mindedness is an important step in authentic research practices.

Importantly, with the exception of two studies (Hughes, Devine, & Wang, 2018; Dai, McMahon, & Lim, 2020), the mind-mindedness literature has been mostly investigated in Western settings. The parent's awareness of the child's mental states, a key component of mind-mindedness, is highly valued in Western cultures; however, in other cultures, the child's capacity to suppress the emotions could be prioritized (Doan & Wang, 2010; Keller et al., 2018). Moreover, the cross-cultural validity of the mind-mindedness construct and its coding process has not been fully investigated. Therefore, it is possible that some cultural bias occurred during coding as our coders were White. In addition, parents' use mental-state language with their children differs according to their cultural background (e.g., Wang, Doan, & Song, 2010; Hughes, Devine, & Wang, 2018; Dai, McMahon, & Lim, 2020). For example, mothers in Western cultures used a higher level of appropriate mind-related comments and used lower levels of non-attuned mind-related comments than mothers from Asian cultures (Hughes, Devine, & Wang, 2018; Dai, McMahon, & Lim, 2020). Thus, it would be useful to extend the current findings by examining cultural differences in future studies and considering coding procedures from cultural perspectives.

Second, in the current study, relatively small variations were observed for both appropriate and non-attuned mind-related comments. Indeed, the range of total number of maternal appropriate mind-related comments and non-attuned mind-related comments tended to be low compared to previous studies. The range of appropriate mind-related comments in the current study was from 0 to 16 and the range of non-attuned comments in the current study was from 0 to 9 comments. Both are comparatively narrower ranges than previous studies (e.g., from 0 to 42 and from 0 to 28, respectively; Meins et al., 2011) with infants. As I addressed above, the narrow range of overall mind-related comments in the current study may reflect the differences in maternal mind-mindedness with toddlers and infants. Different from pre-verbal infants, toddlers who are more advanced in development skills than infants, particularly those having more communicative skills, may have fewer needs to interpret their mental states and fewer chances to misinterpret their mental states. These small variations make it difficult to detect interaction effects, and even if an interaction effect is detected, it may have lower explanatory power (Ohler et al., 2000). Therefore, there is a need for future research that explores appropriate and non-attuned caregiver interpretations of toddlers' mental states within interactive stressful contexts as suggested by McMahon and Newey (2018). When toddlers are frightened and stressed, toddlers' attachment system becomes alerted and activated and they may be more likely to find physical and psychological contact with attachment figures during times of distress. Thus, there will be more chances to observe mind-related comments.

Third, it is possible that toddlers' characteristics might drive parents' behaviors. For instance, Eisenberg et al. (2010) found that mothers' supportive regulatory strategies were elicited for toddlers with higher negative emotionality. Thus, bidirectional associations between toddlers' characteristics (i.e., sex and temperament) and maternal mind-mindedness need to be

examined. In addition, we might expect an association between maternal mind-mindedness in toddlerhood and emotion regulation in the preschool years as evidenced from previous studies. For instance, appropriate mind-related comments in infancy were related to delay of gratification, such as effortful control in children aged 3 and 4 years (Bernier et al., 2017; Gagne et al., 2017); and lower behavioral problems (deficits in emotion regulation) in children aged 4 to 5 years (Meins et al., 2013), and 10 years (Centifanti et al., 2016). To examine how maternal mind-mindedness and toddlers' characteristics influence one another, concurrently and longitudinally at the within-person level and how they are related to child emotion regulation, future studies should apply more advanced statistical methods such as Random Intercept Cross-Lagged Path Model; RI-CLPM (Hamaker, Kuiper, & Grasman, 2015) should be applied.

Fourth, mind-mindedness is one component of larger socialization processes – related parenting construct, contributes to toddlers' emotion regulation (Senehi et al., 2018; Brophy-Herb et al., 2015; Centifanti et al., 2016, Meins et al., 2013). Therefore, future studies need to take mind-mindedness into consideration along with other socialization practices similarly focusing on the parental tendency to understand toddler's mental states, such as reflective functioning (Fonagy, Steele, Steele, Moran, & Higgitt, 1991) and insightfulness (Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002).

Fifth, the current study's measurement of emotion regulation (the Bayley Scales of Infant Development, 2nd ed; BSID-II; Bayley, 1993) was assessed using examiner ratings. Although this scale has been used in the child regulation literature (e.g., Chazan-Cohen et al., 2007; Vogel et al., 2006), it is possible that toddlers' behaviors are situation-specific (child during the test) and toddlers' emotion regulation outside the situations may differ. Future work may benefit from including other informants, situations, and methods of emotion regulation.

Finally, the current dissertation included only mothers' mind-mindedness. However, it is critical to understand the contributions of other parents and/or caregivers to toddlers' emotion regulation development. There may be the effect of cumulative mind-mindedness so that both parents using high levels of appropriate mind-related comments might be more beneficial to emotion regulation than parents with lower levels of accumulated appropriate mind-related comments. Continued work in this area should include other parents' and/or caregivers' mind-mindedness.

Conclusion

Although the generality of the current results must be established by future research, this study highlights a number of important underexplored questions. This study reveals that maternal mind-mindedness, particularly high levels of maternal appropriate mind-related comments, is important in promoting better emotion regulation particularly for toddlers from low-income families. Moreover, this study extends the work of previous studies on the link between maternal mind-mindedness and emotion regulation by illustrating the importance of individual factors (i.e., sex and temperament) in the development of emotion regulation. More specifically, this study contributes to the literature by providing empirical evidence that maternal appropriate mind-related comments were important for boys. The findings also suggest that the relation between maternal mind-mindedness and emotion regulation is not dependent on toddlers' temperament. To date, non-attuned comments were infrequently discussed in previously published studies. Thus, this study will be beneficial for future researchers as it will help them acquire a better understanding of both appropriate and non-attuned mind-related comments on toddlers' emotion regulation. In addition, given that stressors associated with socioeconomic disadvantages are linked to less optimal parent-child interactions and toddlers' developmental outcomes (Bradley & Corwyn, 2002; Conger & Donnellan, 2007), the current findings highlight

the importance for caregivers and educators to be aware of the associations of mind-mindedness with emotion regulation to establish intervention programs such as Early Head Start and parenting education programs. The results also suggest that a knowledge of individual differences may provide caregivers and educators with further information on how to best meet the toddlers' needs and support their emotion regulation.

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