The role of maternal reflective functioning on child mentalizing and child aggression: the influence of coaching

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Abstract

Objective To examine the relationship between maternal reflective functioning (RF) and child aggression and whether this relationship is mediated by child's precursors of Theory of Mind (ToM). The influence of coaching on maternal reflective functioning and child aggression is also examined. **Method** The sample consisted of 85 mother-infant dyads. Mothers were allocated to a high or low risk group based on maternal characteristics. Half of the high risk mothers were randomly assigned to a coaching group. Maternal reflective functioning was assessed prenatally and when children were 20 months of age by Pregnancy Interview (PI) and Parental Development Interview (PDI). Mothers were asked to aggressive symptoms in their child. Children's precursors of ToM were measured at 20 months by an imitation task, a visual perspectives task and a discrepant desires task. **Results** Maternal prenatal reflective functioning was found to be negatively related to child aggressive behaviour. However maternal postnatal self-related RF was positively related to child aggression. In addition, maternal reflective functioning was found to be positively related to one precursor of ToM, but ToM did not mediate the relationship between maternal reflective functioning and child aggression. No effect of coaching on maternal reflective functioning and child aggression was found. **Conclusion** The present study provides evidence for the relationship between maternal reflective functioning and child aggression at a young age. This emphasizes the importance of well-developed maternal reflective functioning capacities for the behavioural development of children. This relationship could be mediated by child's ToM, but this should be further researched. Coaching would be a suitable way to enhance maternal reflective functioning capacities, but the effects of coaching should be investigated after mothers received coaching for a longer period of time.

Keywords: maternal reflective functioning, PI, PDI, child psychopathology, child aggression, child mentalizing, Theory of Mind, coaching

Introduction

Mentalization is the capacity to understand and interpret one's own and others' behaviour as an expression of mental states such as feelings, thoughts, fantasies, beliefs and desires (Katznelson, 2014). In short: mentalization is the ability of seeing ourselves from the outside and others from the inside (Asen & Fonagy, 2012). Reflective functioning (RF) is an operationalization of mentalization (Katznelson, 2014), so mentalization is the latent trait, which can be assessed by measuring RF. Reflective functioning is an adult's quality of understanding his or her own and another's intentions, motivations and emotions (Crowell, Fraley, & Shaver, 2008). Parental reflective functioning is related to that, but focusses specifically on parents' ability to mentalize in relation to their child (Katznelson, 2014). The way in which parents are able to do so is of influence on infant's attachment (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Several studies have been performed to examine the relationship between adult attachment, reflective functioning and infant attachment (Fonagy, Steele, & Steele, 1991; Main, Goldwyn, & Hesse, 2003; Waters, Treboux, Fyffe, & Crowell, 2001 as described in Katznelson, 2014). In this research a moderate to strong relationship between RF and infant attachment has been found. The children of mothers with high reflective functioning capacities are more likely to be securely attached (Slade, 2008). This suggests that parents' reflective capacities (assessed prior to the birth of their child) were highly predictive of the extent to which their children were securely attached at one year of age. The parent's capacity to reflect upon the child's internal experience is crucial to the development of secure attachment (Slade, 2005). A number of theories on mentalization give insight in the way in which parental RF influences children's attachment. Examples include the social biofeedback theory (Gergely & Watson, 1996) and a theory of the development of psychic reality (Fonagy & Target, 1996). The first theory states that infants become sensitised through their categorical emotion-states through a natural social biofeedback process. This process is provided by the parents' 'marked' reflections of the baby's emotion display during affect-regulative interactions. A complex biosocial system regulates this process in which infants communicate dynamic affective change instinctively through their behaviour and the parents respond to this process by mirroring the infant's affective state 'markedly'. It is important that this affective state is 'markedly' mirrored, because it should communicate to the infant that the parent's reaction is not representative of his or her own affective state (Gergely & Watson, 1996; Katznelson, 2014).

The second theory behind mentalization is the theory of physic reality. This theory describes the changes in children's perception of physic reality and highlights a major shift in the child's understanding of minds at a very young age (oedipal stage, around 3-6 years of age). The authors stated that a child in that age uses three stages of psychic reality: psychic equivalent, pretend mode and teleological mode. The first one refers to the young child's experience of the world in which the internal world is equal to the outer reality. In this stage the world *is* how a child perceives it, the child has no understanding of thoughts and feelings as mental states. In the second stage, the pretend mode, the child can separate internal and external reality, but only when they are kept strictly apart, such as

in play. In the third stage (teleological mode) the child experiences a world in mental states which are not represented and consequently must be expressed in action. In normal development, those three stages are integrated into a mentalizing capacity in which the child begins to understand thoughts and feelings as mental representations expressed through behavior. The capacity to mentalize is a developmental achievement and this depends, in part, on the quality of caregiving a child receives. The goal for parents is to treat their children as a psychological agent, which is someone who can reason about their own and other people's explicit goals, intentions and beliefs (Sharp & Fonagy, 2008). In some cases parents are not able to reach this goal. Pathological development can interfere with the integration of the aforementioned three stages of thinking, which results in an inhibition of the mentalizing capacity (Fonagy & Target, 1996; Katznelson, 2014). So the capacity to mentalize is important in the development of young children. However the question is which developmental areas are influenced by mentalization.

Child mentalizing

As mentioned before mentalization involves both a self-reflective and an interpersonal component, is both implicit and explicit and concerns both feelings and cognitions (Lieberman, 2007). All humans are born with the ability to develop the capacity to mentalize. Early relationships create the opportunity for the young child to learn about mental states. In particular the mother plays an important role in allowing children to discover their own internal experience, because of her role as primary caregiver. Maternal capacities such as understanding that children have their own feelings, desires and intentions, observations of moment to moment changes in the child's mental state and her representation of these in gestures, actions, words and play are important in the development of mentalizing capacities in children (Slade, 2005). However the maternal capacities to foster mentalization in the child may be disrupted by a variety of child characteristics such as temperament (Sharp & Fonagy, 2008).

A concept which is related to RF is Parental Meta-emotion Philosophy (PMEP). This includes two important components, namely emotion-processing and metacognition. PMEP refers to a 'set of feelings and thoughts about one's own emotions and one's children's emotions' (Sharp & Fonagy, 2008, p. 744). It differs from RF in the way that PMEP focusses on parent's and child's emotions. Gottman, Katz and Hooven (1996) demonstrated that children whose parents were more able in emotion-coaching show greater physiological regulatory abilities, less evidence of physiological stress, greater ability to focus attention, less physical illness, better peer relations and higher academic achievement. So the way in which parents can reflect on their child's emotions is of influence on children's (mental) development.

Problem behavior

Human beings are adapted to participate in collaborative activities which involve the capacity to have shared goals and socially coordinated action plans (Tomasello, Carpenter, Call, Behne, & Moll, 2005, as described in Sharp & Fonagy, 2008). Three prerequisites are necessary for this shared intentionality: the capacity to understand intentions, the motivation to share psychological states and the ability to communicate relevant information (Gergely et al., 2005 as described in Sharp and Fonagy, 2008). In the parent-child relationship shared intentionality is a product of the capacity of the parent to convey relevant information and the receptiveness on the part of the child to receive this relevant knowledge. The way in which parents are able to function reflectively is important for this process. In relation to this process, Sharp and Fonagy (2008) suggest that social-environmental factors such as reflective functioning play a crucial role in the way in which the child matures into a mentalizing agent. It could be that if parental RF does not work at an optimal level, this may have implications for child's psychosocial functioning. The link between maternal RF (or a related concept) and children's psychosocial functioning has been investigated several times.

Sharp and colleagues (2006) investigated the influence of maternal accuracy in mentalizing on child development. They measured maternal accuracy by asking mothers to guess the responses of their 7-11 year old children and found that this is related to child's psychopathology: mothers who had average or high scores on maternal accuracy had children with lower psychopathology scores than mothers who scored low on maternal accuracy. Gottman, Katz and Hoover (1996) investigated the relation between psychopathology and meta-emotion, which refers to parents' emotions about their own and children's emotions. This concept is closely linked to reflective functioning, but the latter is wider and involves also parent's intentions and motivations. They found that parental meta-emotion is related to child's regulatory physiology at age 5 which is in turn related to child's emotional down-regulation (children's ability to regulate their emotions) at age 8. Strassberg (1997) investigated mothers of aggressive vs. non-aggressive children (aged 4.5) and showed both of them vignettes of different forms of child noncompliance, varying in severity. They found that mothers of aggressive children are more inclined to ascribe hostile intent to children on all forms of noncompliance, while mothers of non-aggressive children ascribed hostile intent to their children only to the most severe vignettes.

Those three studies make clear that maternal attributions towards their child, maternal accuracy in guessing the responses of their child and the way in which mothers can reflect on the emotions of their child are of influence on child's psychopathology. Mothers who have a high ability to accurately reflect on their child's emotions, reactions and intentions have children with less psychopathology. Strassberg (1997) showed the link between maternal attributions to their child and aggression in 4.5 year old children. The question is whether the link between maternal reflective functioning and aggression can be found earlier in life. When this link is already present at a very young age, it could be possible to provide coaching to the mother aimed at enhancing their reflective functioning which in turn could reduce aggressive symptoms.

Theory of Mind

As described above the link between maternal reflective functioning and child psychopathology has been found in several studies. More research is needed to investigate which areas of child psychopathology are influenced by maternal functioning and at which age those influences can be found. However it is unclear in which way maternal reflective functioning could 'cause' psychopathology. Sharp and Fonagy (2008) described a testable model of factors which relate parental mentalizing to child psychopathology. They hypothesize that the relationship between parental mentalizing and child psychopathology goes through child mentalizing and emotion regulation. This means that parental reflective functioning influences child mentalizing capacities which in turn influences emotion regulation and child psychopathology. One of the bases of this model is that parental mentalization influences child mentalizing. Both parental reflective functioning and child mentalizing are related to Theory of Mind, which could be described as a person's ability to attribute mental states to himself and others (Sher, Koenig, Rustichini, 2014). One central measure of ToM understanding involves knowledge that others can hold false beliefs about location or contents of an object, and that these beliefs produce undesired behavioral consequences. By the age of about 4 most typically developing children have an understanding of the consequences of holding false beliefs and thus have ToM understanding (Woolfe, Want, & Siegal, 2002). However early signs of ToM can be measured around the age of 2 (Hughes & Ensor, 2007), such as imitation (Sharp, 2006). Theory of Mind is preceded by a range of precursors to intentional understanding and those precursors emerge during the first year of life. An example of ToM precursor is a child's innate capacity to imitate facial expressions (Sharp, 2006). ToM is strongly related to mentalization, because both involve the capacity to understand mental states of oneself and others (Górska & Marszal, 2014). So child's mentalizing capacities can be measured by investigating their (precursors) of ToM. As described before, maternal RF is important in the development of mentalizing capacities in children (Slade, 2005). The question is whether the influence of maternal RF can be found in children's precursors of ToM in a way that mothers with high reflective functioning capacities have children with more developed precursors of ToM.

Minding the baby

The theory described earlier makes clear that maternal reflective functioning influences the mother-child relationship (attachment) and this could have consequences later in the child's life, for example with respect to problem behaviour. This emphasizes the importance of adequate reflective functioning capacities in mothers. The intervention 'Minding The Baby' (MTB) aims to enhance maternal reflective functioning to improve early health and relationship outcomes (Sadler et al., 2013). This intervention was first implemented in 2002 and is founded on two evidence-based early intervention models: Nurse home visiting and Infant-Parent Psychotherapy (IPP). The first mentioned

Nurse home-visiting programme (in particular Nurse Family Partnership, NFP) has been developed for socially disadvantaged families and women were recruited who were either low income, unmarried or adolescents. The focus was particularly on women who had no previous live births, because those have legitimate concerns about their own health and the well-being of their baby. Mothers who had live birth before may give less reason for concerns, because of their experience with previous children (Olds, Hill, Robinson, Song, & Little, 2000). Public health nurses who were extensively trained in the programme visited mother weekly beginning in pregnancy until the child is 1 year old and a biweekly visit until the child's second birthday. They educated the mother skills and provided information related to infant and maternal health (Sadler et al., 2013).

Three randomized clinical trials have been performed in three different areas in the USA: Elmira (Olds, Henderson, Tatelbaum, & Chamberlin, 1986; Olds et al., 1997), Memphis (Olds et al., 2010; Kitzman et al., 2010) and Denver (Olds et al., 2002; Olds et al., 2004). Those three randomized trials and the subsequent follow-up studies gave consistent evidence of positive health, public health, developmental, parenting and life-course outcomes (Sadler et al., 2013), such as less child abuse and neglect and greater intervals between the birth of first and second child in families participating in the Nurse Family Partnership (Olds, Sadler, & Kitzman, 2007).

The second model on which MTB was founded is Infant-Parent Psychotherapy, which is now part of Child-Parent Psychotherapy (Lieberman, Van Horn, 2009). In this intervention at-risk mothers were visited by a mental health professional with experience in child development and family system approaches. Those visits were weekly at the end of pregnancy and first year of age and every other week in the second year of baby's life (Heinicke et al., 1999) or took place between the baby's first and second year of age (Lieberman, Weston, & Pawl, 1991). This program aims to enhance the mother's skills on three different domains: communication and personal adaptation, alternate approaches to her relationship to her child and direct affirmation and support (Heinicke et al., 1999). So the affective obstacles in the mother-child relationship would be removed (Lieberman, Weston, & Pawl, 1991). Evidence for the efficacy of this intervention has been found in two studies by Lieberman and colleagues (1991) and Heinicke and colleagues (1999). They found mother-child dyads who followed the intervention more likely to be securely attached, mothers were higher in empathy and interactiveness towards the child. So mothers became more responsive to the needs of their children and the infants were more securely attached to their mothers (Heinicke et al., 1999).

So both NFP and IPP are successful interventions for high risk families and emphasizes sensitive parenting and the development of a healthy parent-child relationship. However the focus in NFP is on both infant and maternal mental and physical health (by nurses), while IPP focuses on child development and family system (by mental health professionals). MTB combines both approaches: nursing and infant mental health to meet families' multiple layers of need (Sadler et al., 2013). The focus of MTB is on enhancing maternal RF for all mothers: both mothers with low maternal RF and mothers who are able to make sense of their children's minds. Their sample consists of only high risk

mothers, which were found to have more negative representations about themselves and their child (Pajulo, Savonlahti, Sourander, Piha, & Helenius, 2001).

Families who take part in MTB are visited weekly beginning in mother's third trimester of pregnancy up through child's first birthday. From this point visits take place biweekly up to the child's second birthday. Visits are carried out by a team made up of a nurse practitioner and a social worker, which in turn visited the families. In times of crisis or when a family requires extra support or time, the home visits can be extended or increased in frequency. The nurse practitioner and the social worker confer regularly about each of their shared families. The role of the nurse practitioner includes reinforcing parental care and health education and supporting child's health and development. The social worker's role includes assessment of both mother and child, which includes diagnosing perinatal depression, anxiety and other forms of psychological distress and psychiatric illness and providing possible treatments, and helps mothers to negotiate issues involving the legal and court system. Both clinicians support maternal RF, promote the mother-infant attachment relationship and model and foster a range of parenting skills by modelling a reflective stance during home visits. This involves that they are curious with the mother about the child's and parent's thoughts and feelings. They often use 'wondering' questions and statements, such as 'What do you imagine your child is feeling when he hears you crying?' to make mothers able to explore their inner life as well as the child's feelings, needs and wants (Sadler et al., 2013).

The first outcomes in a pilot-phase randomized control trial (Yale, Connecticut) revealed that families who participated in MTB were less likely to be referred to child protective services and had lower rates of subsequent childbearing. The intervention infants were more likely to be securely attached and less likely to be disorganized in relation to attachment at 1 year of age. And finally, mothers' capacity to reflect on their own and their child experience improved over the course of the intervention in the most high risk mothers (Sadler et al., 2013). So overall those first results showed that MTB is effective in enhancing maternal RF and has positive family and child outcomes.

However those first promising results were found in the United States. The question is whether this intervention can also successfully be carried out in other countries such as The Netherlands. The Dutch situation is different from the American one in the care for mother and child. In The Netherlands all mothers have access to maternal health centre, which follows the development of the child. Mothers are standardly called to visit those mental health centres and certificated nurses and doctors examine the children. In case of developmental problems mothers are redirected to a medical specialist. So the 'nurse-side' of MTB is already arranged in The Netherlands for all mothers, as opposed to the USA. For that reason the program MTB was adapted to the Dutch situation so that mothers were visited weekly by social workers, who aim to enhance their reflective functioning capacities.

The current study

The current study focuses on maternal prenatal and postnatal reflective functioning and its possible influence on child's aggressive behaviour. The child's aggressive behaviour is studied when the child is 20 months old, by a questionnaire, filled in by mother. Based on the available literature, it is hypothesized that infants of mothers who have lower reflective functioning capacities have higher ratings of aggressive behaviour compared to mothers with average or high reflective functioning capacities. In addition, the current study aims to examine whether children's precursors of ToM mediate the relationship between maternal reflective functioning and child aggressive behaviour. The child's ToM is studied at an age of 20 months by means of a visual perspective task, an imitation task and a discrepant desires task. It is hypothesized that mothers with high reflective functioning capacities have children with more strongly developed ToM-capacities, which means higher scores on those three tasks. The third aim of this study is to investigate whether coaching program 'A Good Start' is effective in enhancing maternal reflective functioning and whether this is related to less aggressive behaviour in the coaching group. It is hypothesized that coaching enhances maternal reflective functioning, which in turn reduces child's aggressive behaviour.

Methods

Background information

The mothers and infants included in the present study participate in a larger longitudinal study in the Netherlands called 'A Good Start'. All mothers were aged between 17 and 25 years and were pregnant with their first child. Around 27 weeks of pregnancy the mothers were interviewed. When the children were 6 and 20 months of age, researchers visited mother and child at home, while at the age of 12 and 30 months, mother and child came to university. At those sessions several aspects of children's development were investigated such as emotion regulation, inhibition and ToM. Based on background characteristics of the mothers, some mothers are assigned to a high risk group. If mothers had two of the following characteristics, they were allocated to this high risk group: psychopathology (such as depressive complaints, borderline symptoms and aggression), substance use during pregnancy, single parenthood, unemployment, no secondary education, financial problems, inadequate social support (mothers mention less than 4 individuals who can give them social support) and an age below 20. In the case of only a psychiatric diagnosis or only substance abuse a mother was assigned to the high risk group as well. Half of the high risk mothers were randomly assigned to an intervention group, which receives individual coaching until the children are 30 months old and the remaining part of the group receives care-as-usual.

All participants live in The Netherlands and are able to understand Dutch. They are recruited by advertisements and recruitment at several health care facilities and pregnancy- and parenthood-fairs. Mothers are excluded in case of severe psychiatric problems, severe drug addiction or an IQ lower than 70 (which is estimated during the first appointment, before delivery) and when severe

medical problems with mother or child makes participation in this study too difficult or impossible. 'A Good Start' was approved by the ethics board of the Faculty Social Sciences of Leiden University as well as by the medical ethical board of Leiden University Medical Centre.

Participants

The sample used for the present study consisted of 85 mothers and their first-born child. All mothers lived in The Netherlands. To be included in the present study, all dyads needed to have data on all variables of interest from the first and the fourth appointment. During the first appointment, 190 mothers were interviewed regarding their thoughts and feelings about their pregnancy and their unborn child (Pregnancy Interview). During the fourth appointment, 85 mothers to date completed both the aggression questionnaire and the Parental Developmental Interview and their children performed three ToM-tasks. So overall, complete data was present for 85 dyads. The participants who were included did not differ from those who were excluded from the present study on background variables (ethnicity, age, maternal education). In Table 1 the demographics of the present study sample are provided. Mean age of the mothers at the first appointment was 22.32 years and 24.74 years at the fourth appointment. Children's age at the fourth appointment was 20.42 year and around half of the children were male (51%). Most of the mothers were Caucasian (85%). In the present sample most mothers completed vocational school (44%). Other mothers completed secondary school (24%) or were currently enrolled in higher education (21%).

In the present sample, 58 percent of the mothers (N = 49) were assigned to the low risk group, 29 percent (N = 25) were placed in the high risk control group and 13 percent of the mothers (N = 11) were assigned to the high risk group and received coaching.

Table 1. *Demographics* (N = 85).

	N	%	*M*	*SD*
Maternal age first appointment			22.32	2.38
Maternal age fourth appointment			24.74	2.37
Child age fourth appointment			20.42	0.78
Infant gender				
Male	43	50.6		
Female	42	49.4		
Ethnicity				
Caucasian	72	84.7		
Surinamese	3	3.5		
Antillian	2	2.4		
Other	8	9.4		

Maternal education		
Primary school	4	4.7
Secondary school	20	23.5
Vocational school	37	43.5
Higher education (Bachelor's degree)	18	21.2
University (Master's degree)	6	7.1

Procedure

The first home visit took place around the 27th week of pregnancy. During this visit mothers were interviewed about their thoughts and feelings concerning pregnancy and their upcoming role as mother of their first child. They were also asked about their hypothetical relationship with their child and their relationship with the father of their child and with their family. Mother completed also several questionnaires. The second and third appointment took place at 6 and 12 months after birth of the child. During these appointments several tasks were done with mother and child and mother completed some questionnaires. The fourth appointment took place when the child was around 20 months of age. During this home visit the child completed several tasks, such as a visual perspectives task, an imitation task and a discrepant desires task, which were all used in the present study. Mother completed some questionnaires such as a survey on aggressive behaviour of the child. During this visit mother is also interviewed using the Parent Development Interview, which asked mother to their current thoughts and feelings about their child and motherhood. This interview is also used in the present study.

Measures

Maternal Reflective Functioning

Pregnancy Interview – During the first appointment, before the birth of the child, mothers were interviewed using the Pregnancy Interview (PI; Slade, Grunebaum, Huganir, & Reeves, 1987; translated and revised by Suurland & Smaling, 2011). This instrument is developed to assess the quality of the expectant mother's representation of her relationship with her own unborn child. The interview inquiries several aspects of mother's view of her experience on pregnancy and her expectations and fantasies regarding her coming relationship with her child. The PI is a semi-structured clinical interview which takes about one hour to administer. The PI is an adaptation from the Adult Attachment Interview, which is used to assess the quality of an adult's representation of her childhood attachment experiences (Slade, Patterson, & Miller, 2007).

The PI consists of 22 questions which were all transcribed and coded by trained coders. Mother's responses on the questions were, if possible, assigned to one of the following categories: Awareness of the nature of mental states, The explicit effort to tease out mental states underlying

behavior, Recognizing developmental aspects of mental states and Mental states in relation to the interviewer. The responses on the questions were rated between -1 and 9. A score of -1 meant that the mother gives an anti-reflective or bizarre response. A score of 1 indicated that reflective functioning is not clearly present, but not completely absent. A score of 3 was given when a mother responses with questionable or low RF, while a score of 5 indicated definite or ordinary RF. A score of 7 was given when the mother responses with marked RF and the highest score (9) indicated that full or exceptional RF was present (Fonagy, Target, Steele, & Steele, 1998). All interviews were also rated with an overall score, which captures the typical reaction of the mother. This score is based on an assessment of the range of scores and their relation to each other (Slade, Patterson, & Miller, 2007). This total score is used in data analysis. In order to determine interrater reliability, 10 percent of the coded interviews were double coded and intraclass correlation coefficients were computed for both total scores and scores per question (ICC = .90 and .87 respectively). This indicated that the inter-rater reliability is acceptable.

Parent Development Interview – Maternal reflective functioning was measured when the child was around 20 months. In order to measure maternal RF mothers were interviewed using the Parent Development Interview (PDI; Slade, Aber, Berger, Bresgi, & Kaplan, 2003; revised by Smaling, 2013). This instrument is developed to assess a parent's capacity to think reflectively about his or her child, him of herself as a parent and his or her relationship with the child. The PDI is a semi-structured interview that takes about an hour and a half to administer. It probes a variety of aspects of the typically the mother's view of herself and with the child (Slade, Bernbach, Grienenberger, Levy, & Locker, 2005). Like the PI the PDI is an adaptation from the Adult Attachment Interview (Slade, Patterson, & Miller, 2007). In contrast to the AAI, the PDI examines the capacity to reflect on a current relationship with a developing child.

The PDI consists of 26 questions, of which 15 were directly rated for RF by trained coders. The remaining questions do not directly rely on RF, so they were only rated as 'bonus' if the mother reacts with explicit RF. The responses were rated on the same scale as the responses of the PI. So the responses were, if possible, assigned to one of the before mentioned categories and were all rated between -1 and 9. After rating all responses, an overall score is given, which captures the typical reaction of the mother (see '*Pregnancy Interview*' for more details). The total score is split in a child-centered RF and self-centered RF part. The first part captures mothers reflective functioning about herself and things that were changes in her situation after the birth of her first child. The child-centered part focuses on mother's relationship with her child. Both total score and the child-related and self-related score were used in data analysis. In order to determine inter-rater reliability, around 15 percent of the coded interviews were double coded and intra-class correlation coefficients were computed for both total scores and scores per question (ICC = .93 and .88 respectively). This indicated that the inter-rater reliability is acceptable.

Theory of Mind

ADOS – The precursors of Theory of Mind were measured when the child was 20 months. This is done by three different tasks, which all measure a part of ToM. First, one part of the Autism Diagnostic Observation Scale (ADOS Module 1 task 8; Lord et al., 2008) was performed. This task assessed whether a child is able to imitate behavior of the experimenter. Both functional and symbolic imitation are measured. In the functional imitation task the child sat behind the table in front of the experimenter. The experimenter took one specific object (cup, plane, flower), mentioned the name and showed the associated movement of that toy (drinking, flying, smelling) with the associated sound. Afterwards the object was given to the child and the child was asked to repeat the action ('It is your turn'). This was done with all three objects. In the symbolic imitation task a cube was shown to the child and the experimenter uses this cube as another object. The experimenter said: 'It is a cup now' demonstrates the associated movement (drinking). Afterwards the child was asked to repeat the action ('It is your turn'). This was done three times with three different objects: cup (drinking), dog (barking) and cookie (smacking). A trained observer rated the response of the child as 0 (incorrect) or 1 (correct). A response is correct when the child imitated the behavior of the experimenter. A total score is computed for functional and symbolic imitation separated and a total score for the whole task is computed as well. This total score was used in data analysis, because functional and symbolic imitation are related constructs. Symbolic imitation typically develops in children around 18-24 months, and prior to this development children engage in functional imitation (Thiemann-Bourque, Brady, & Fleming, 2012). So a total imitation score covers both aspects of imitation.

Visual Perspectives – Precursors of Theory of Mind were also measured by a Visual Perspective task. This task assessed whether the child understands that one must have visual access to objects to see them and share experience of them (Carlson, Mandell, & Williams, 2004). In this task the child is brought to one corner of the room, while mother was directed to sit on the floor opposite to the child. Children were instructed to show mother a variety of toys across five test trials. The experimenter positioned the child in the way that their backs were to the parent, gave them a toy and said 'See this? Show it to mommy'. Children then turned around and walked to mother to show her the toy and were then called by the experimenter to walk back for the next trial. An instruction card was handed to mother, on which instructions for each trial were described. The instructions for the five trials were as follows: (1) closing her eyes; (2) placing her hands over her eyes; (3) pulling a bandage over her eyes; (4) turning their back to the child. The last trial involved a snow globe containing a scene that could only be seen when viewed from one side. The child has to show the scene to the parent. In all five trials it is coded whether children acknowledge that the mother could not see the object and therefore corrected the mother (e.g. by removing the bandage and held up the object in front of mother's eyes). Children's attempts on each trial were scored from 0 to 5 by a trained researcher. A

score of 0 = child is not interested in the toy; 1 = child dropped the toy around mother; 2 = held toy near mother, but no attempt at correction; 3 = partial correction; 4 = full correction, but not showing the toy to mother; 5 = full correction and showing the toy to mother. Those scores are averaged to get a total score and this total score is used in data analysis.

Discrepant Desires – Precursors of ToM were also measured by a Discrepant Desires task. This task measures whether children can reason about other people's desires and understand that someone desires can be different from their own desires (Repacholi & Gopnik, 1997). In this task two bowls of food (one with raisins and one with cookies) were at the same time presented on a tray and the children were given 45 seconds to taste them ('Which one do you want?'). In this baseline period the children demonstrated their initial food preference. At the end of the baseline, the food was removed from the child's immediate reach. The experimenter then tasted the food and showed a negative expression towards the food preferred by the child. A positive expression is shown towards the food which the child did not prefer. Those expressions lasted for 5 seconds and afterwards the experimenter repeated the negative and positive expressions while pointing to the food. Then the experimenter placed one hand, palm facing up, exactly midway between the two bowls and requested some food as she moved the tray toward the child. The experimenter repeats her request for three times, and after the first repetition, the positive and negative expressions were also repeated. The responses of the child to the four trials were rated by trained coders. If the child gave the experimenter the snack of the experimenters marked preference, a score of 1 is given. A score of 0 is given when the child did not give a snack or gave the snack preferred by the child. A total score is computed over the four trials as well as a proportion score. Those scores will be used in data analysis.

Aggression

PASEC - Children's physical aggression is measured by the Physical Aggression Scale for Early Childhood (PASEC; Alink et al., 2006), which was completed by mother. The questionnaire consists of 11 items concerning child's physical aggression, which included items such as biting, hitting and destroying things. Mothers were asked whether their child had shown such behavior during the past two months and all items were scored on a 3-point Likert scale: 0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true. A physical aggression score was computed by summing all item scores (range between 0 and 22) (Mesman et al., 2006). The reliability and validity of the PASEC are considered to be satisfactory (Alink et al., 2006) and an internal consistency of .75 has been found in the present dataset.

CBCL – The Child Behavior Checklist for ages 1½ to 5 (CBCL/1½ -5; Achenbach & Rescorla, 2000) was also used to assess children's aggressive behavior. Mother had to indicate whether their child displayed any of the 100 behavioral descriptions in the lasting two months on a 3-

point Likert scale: 0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true. 19 of those questions assessed aggressive behavior in the toddlers and the responses on those questions were summed in order to get an aggressive behavior score, resulting in a total score ranging from 0 – 38. Scores of above 24 are considered to indicate problematic behavior, scores between 21 and 24 indicated borderline problematic behavior. The reliability and validity of the CBCL 1½-5 are considered to be satisfactory (Van Zeijl et al., 2006) and an internal consistency of .81 has been found in the present dataset.

Data analysis

All statistical analysis were performed using the Statistical Package for the Social Sciences (IBM SPSS; Version 22.0). Prior to the main analysis, all data had been inspected thoroughly with respect to normality, missing values and outliers. Both measures of aggression (CBCL and PASEC) missed values (3 and 6 respectively). For that reason a multiple imputation had been performed using the predictive mean matching technique. This technique is used because of its suitability for non-normally distributed variables, as was the case in the present dataset. It has also been investigated whether one of the variables of interest contained outliers. In order to detect outliers, all values of the predictor and outcomes were transformed into *z*-scores. All *z*-scores below -3.29 and above 3.29 were considered outliers. Those outliers had been imputed to the most extreme score within 3.29 standard deviations from the mean. With respect to all variables, correlations were inspected. All variables were also inspected in relation to the following background variables: Maternal age and maternal education (Taubner et al., 2013). In the case of a significant correlation, the background variable was controlled for in the analysis.

In order to investigate whether maternal reflective functioning, measured prenatally, was of influence on child aggression, a linear regression analysis was carried out. Child aggressive behavior was the dependent variable in this analysis. An independent sample *t*-test was also carried out to see if group means for low and high functioning RF were different.

In order to investigate whether the relationship between maternal RF and child aggression is mediated (completely or partially) by children's Theory of Mind, a mediation analysis was performed, using four different steps. First, as noted, it was investigated whether child aggression is related to maternal RF. Secondly it was investigated whether maternal RF is related to child's ToM. In the third step the relationship between child's ToM and child aggression was investigated, while controlling for maternal RF. Finally it had been investigated whether maternal RF is related to child aggressive behavior, while controlling for child's ToM. Those relationships were investigated using regression analyses. All regression analyses have to be significant in order to conclude there is mediation. If maternal RF is not significantly related to child aggressive behavior while controlling for child's ToM, there is full mediation.

In order to investigate whether high risk mothers who received coaching had greater improvement of RF-capacities compared to high risk mothers without coaching an independent sample t-test was carried out with the difference scores between maternal prenatal RF and maternal RF when children were 20 months of age. To investigate whether maternal RF (total score) and self-related and child-related RF at 20 months were related to children's aggression, linear regression analysis were carried out. Results were considered significant in case of a *p*-value of <.05.

Results

Preliminary analyses

Reflective functioning - On the PI measured during pregnancy at the first appointment, the mean total score of reflective functioning (*N* = 85, range 2 to 6) was 3.85, *SD* = 0.93. On the fourth appointment the mean total score of RF, measured by PDI, was 4.26, *SD* = 1.07 (*N* = 85, range 2 to 7). However the distribution of the total score of RF at the fourth appointment was skewed and was for that reason log-transformed for further analyses. The correlation between prenatal and (log-transformed) postnatal reflective functioning was significant (r = .43, p <.01). Several background characteristics significantly correlated with prenatal or postnatal maternal reflective functioning, see Table 2. Prenatal and postnatal RF and maternal age were significantly correlated (r = .38, p < .01 and r = .30, p < .01 respectively). Maternal education was also significantly related to both prenatal and postnatal RF (r = .55, p <.01 and r = 28, p < .01 respectively).

Table 2. *Correlations maternal RF and background characteristics (N = 85)*

	Reflective functioning			
	RF1	RF4	MA	ME
Reflective functioning				
Prenatal (RF1)	1	.43**	.38**	.55**
Postnatal (RF4)		1	.30**	.28**
Background characteristics				
Maternal age MM1 (MA)			1	.63**
Maternal education (ME)				1

Note: * p <.05; ** p <.01

Postnatal reflective functioning was split in two separate variables: self-related RF (*N* = 85, range 2 to 7) and child-related RF (*N* = 85, range 2 to 7). Self-related RF had a mean score of 3.98, *SD* = 1.02 and the mean score of child-related RF was 4.09, *SD* = .94. The distribution of child-related RF was positively skewed and for that reason log-transformed for further analysis. The correlation between self-related and (log-transformed) child-related RF was significant (r = .51, p <.01). Both self-related and child-related RF were significantly related to prenatal RF (r = .25, p <.05 and r = .41, p <.01

respectively). Correlations between child- and self-related RF and several background characteristics were also investigated. Child-related RF was significantly related to maternal education (r = .32, p <.01). Self-related RF was not significantly related to any of the background characteristics.

Mothers in the low risk group differed significantly from mothers in the high risk group (coaching and control) on age (t(83) = 4.95, p <.001). Mothers in the low risk group were older than mothers in the high risk group (M = 23.29, SD = 1.74 and M = 21.00, SD = 2.52 respectively). Low risk mothers differed also from high risk mothers in prenatal reflective functioning (t(83) = 3.95, p < .001). Low risk mothers had a significantly higher score on prenatal RF than high risk mothers (M = 4.16, SD = .85 and M = 3.42, SD = .78 respectively).

Prenatal RF-scores differed significantly from postnatal RF-scores (t(84) = -3.44, p = .001). Postnatal reflective functioning was significantly higher than prenatal reflective functioning (M = 4.26, SD = 1.11 and M = 3.85, SD = 0.93 respectively). If the mothers were split into low risk, high risk control and high risk intervention, it became evident that the improvement in RF-scores was only significant for high risk control mothers (t(24) = -2.79, p = .01). Their mean scores improved from 3.52 (SD = .87) to 4.08 (SD = .95). Mean scores of low risk mothers improved from 4.16 (SD = .85) to 4.49 (SD = 1.19) and mean scores of high risk intervention mothers did improved from 3.18 (SD = .87) to 3.64 (SD = .81), but those improvements were non-significant, probably due to the small sample size (N = 11).

A**ggression** – The mean score of infant aggression as measured with the CBCL at 20 months (N = 82, range 1 to 26) was 13.27, SD = 4.95. Infant aggression was also measured with the PASEC and had a mean score (N = 79, range 0 to 10) of 2.90, SD = 2.48. However, de distribution of the aggression scores measured by the PASEC was highly skewed and was therefore log-transformed for further analyses. The correlation between (log-transformed) PASEC and CBCL was significant (r = .58, p < .01). Background characteristics (maternal age and education) did not significantly relate to PASEC and CBCL.

Theory of Mind – This construct was measured by three different tasks. The visual perspective task (N = 85, range 0 to 25) had a mean total score of 15.26, SD = 5.71. The scores on the imitation task (ADOS, N = 85, range 0 to 6) had a mean of 3.28, SD = 2.06. The discrepant desires task (N = 85, range 0 to 3) had a mean total score of .45, SD = .92. However, the distribution of the discrepant desire scores was highly positively skewed and for that reason log-transformed. However, this log-transformation did not solve the entire problem of non-normality, because of the low variability of the data. More than 75 percent of the children had a score of 0 in this task. For that reason, it is questionable whether this task is a proper way to measure precursors of ToM at this age. This measure could not differentiate much between children, because almost all children had a low score. The (log-transformed) variable will be used in the main analysis, but should be regarded with

caution. The correlation between Visual perspective and Imitation was significant (r = .22, p <.05). Visual perspective was also significantly related to Discrepant desires (r = .26, p <.05). However, Discrepant desires and Imitation were not significantly related (r = .01, p =.92). For that reason no composite score of all ToM-tasks was made. Only one background characteristic was significantly correlated to one of the ToM-tasks: Visual perspectives had a significant correlation with education (r = .25, p <.05).

Main analyses

Maternal reflective functioning predicting infant aggression – Regression analysis revealed that maternal prenatal reflective functioning was not significantly related to any measure of infant aggression at 20 months, controlling for significant background characteristics (CBCL: B = .13, t = .19, p = .850 and PASEC: B = -.04, t = -.46, p = .643).

If maternal prenatal reflective functioning was split in low (RF is smaller than 4) and high (RF is 4 or higher) functioning RF, a t-test revealed a significant difference in PASEC group means (t(77) = 2.41, p = .019). Mothers in the high functioning RF group had a significant lower aggression score on the PASEC than mothers in the low functioning RF group (M = 2.29, SD = 1.98 and M = 3.83, SD = 2.90 respectively, d = .62). This effect can be interpreted as moderate. No significant differences in group means were found for CBCL (t(80) = .71, p = .479).

Maternal prenatal RF was also split into three groups, because of the possible differences between low, medium and high functioning RF mothers in aggression scores, as is shown in Figure 1. When maternal prenatal reflective functioning was split in three groups (low (RF is smaller than 4), medium (RF is 4) and high (RF is higher than 4), analysis of variance showed that the effect of reflective functioning was significant for PASEC, F(2,76) = 3.59, p = 0.032. Post hoc analyses using Bonferroni post hoc criterion for significance indicated that the average score of aggression was significantly higher in the low RF group (M = 3.80, SD = 2.98) than in the medium RF group (M = 2.06, SD = 1.63), F(2,57) = 2.68, p = 0.027. No significant group differences were found between low and high functioning RF mothers in aggression scores and between medium and high functioning RF mothers in aggression scores. For CBCL no significant differences were found between all three groups of maternal prenatal RF.

Postnatal reflective functioning was also not related to child aggression measured with CBCL, B = .51, t = 1.00, p = .318. Child aggression measured with PASEC was also not related to postnatal RF, B = .05, t = .70, p = .482. However, when the two categories of postnatal reflective functioning were analysed separately, it became clear that self-related postnatal reflective functioning was significantly (positively) related to child aggression, measured with CBCL, see Table 3. This significant relationship is visualized in Figure 2. However this relationship is only significant for the low risk mothers (B = 1.56, t = 2.53, p = .015). No significant relationship between self-related

postnatal RF and infant aggression is found for either coaching or non-coaching high risk mothers (*B* = 3.92, *t* = 1.42, *p* = .191 and *B* = .47, *t* = .42, *p* = .675 respectively).

Self-related postnatal reflective functioning was non-significantly related to child aggression measured with PASEC, *B* = .08, *t* = 1.13, *p* = .261. Child-related postnatal RF was also non-significantly related to both CBCL (*B* = 7.22, *t* = 1.20, *p* = .232) and PASEC (*B* = -.11, *t* = -.13, *p* = .895).

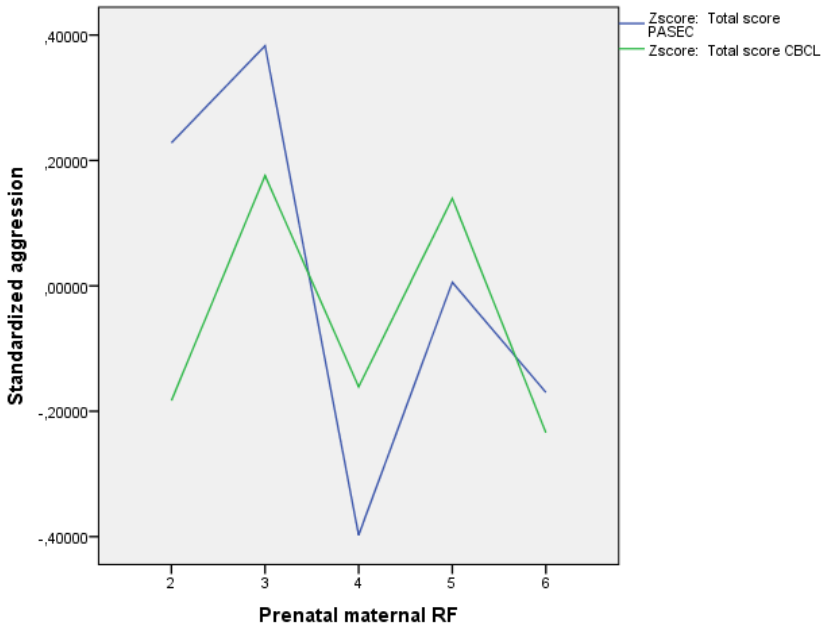

Figure 1. Relationship between maternal prenatal RF and standardized child aggression, measured by CBCL and PASEC.

Table 3. *Results of regression analysis testing the effects on infant aggression (CBCL) (N = 85)*

	Regression coefficients					95% confidence intervals	
	B	SEM	*t*	*p*	r^2	Lower bound	Upper bound
(Constant)	8.25	2.18	3.78	<.001		3.80	12.52
Self-related RF	1.26	.55	2.31	.02	.08	.19	2.33

Maternal reflective functioning predicting infant aggression through infant ToM – Because only the effect of maternal self-related postnatal RF on infant aggression measured by CBCL was significant, this relationship will be further investigated in order to find possible mediation effects. So the first step in mediation is fulfilled, because the relationship between maternal (postnatal) RF and child aggression is significant. Secondly the relationship between RF and ToM is investigated. This relationship is non-significant for the Imitation task (*B* = .05, *t* = .24, *p* = .815), the Visual Perspectives task (*B* = -.51, *t* = -.83, *p* = .41) and the (log-transformed) Discrepant Desires task (*B* = .06, *t* = 1.30, *p*

= .20). In the third step the relationship between ToM and CBCL-aggression is investigated, while controlling for maternal (postnatal) RF. ToM was found to be non-significantly related to the Imitation task (B = -.07, t = -1.53, p = .125), the Visual Perspective task (B = -.05, t = -.36, p = .719) and the (log-transformed) Discrepant Desires task (B = -.01, t = -.61, p = .540). Because of those two non-significant relationships, it became clear that the relationship between maternal RF and infant aggression is not mediated by ToM.

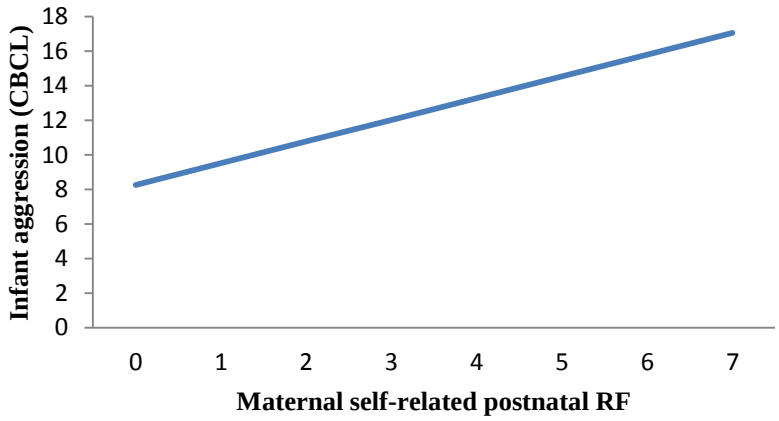

Figure 2. Relationship between maternal self-related postnatal RF and child aggression, measured by CBCL.

To investigate whether there is a difference between high- and low-RF mothers in children's ToM a *t*-test had been performed. It became clear that children of high RF-mothers had higher scores on the ADOS than children of low RF-mothers ($t(83)$ = -2.01, p = .047, M_{high} = 3.63, SD = 1.99 and M_{low} = 2.73, SD = 2.08) and is only significant for prenatal RF. This difference is non-significant for other measures of ToM.

Effect of coaching on infant aggression – High risk mothers who received coaching did not show more improvement in RF-skills than high risk mothers who did not receive coaching ($t(34)$ = -.11, p = .912). Maternal postnatal RF was also non-significantly related to infant's aggression measured by PASEC in both coaching and non-coaching group (B = .89, t = .58, p = .576 and B = .19, t = .37, p = .715 respectively). CBCL and maternal postnatal RF were also non-significantly related in both the coaching and non-coaching groups (B = 12.60, t = 1.00, p = .347 and B = -3.07, t = -.64, p = .53).

Discussion

Maternal reflective functioning is crucial to the development of secure attachment in children (Slade, 2005) and the way in which parents can reflect on their child's emotions is of influence on children's

(mental) development and could influence development of psychopathology (Gottman, Katz, & Hooven, 1996; Strassberg, 1997; Sharp et al., 2006). The first aim of the present study was to investigate whether maternal RF was related to child aggression. Maternal prenatal RF has found to be related to child aggression in the way that children of high RF mothers have significant lower aggression scores compared to children of low RF mothers. However this relationship was only significant for one of the aggression measures, the PASEC. An explanation for this finding is that the PASEC and the CBCL are different measures of aggression. PASEC focuses on physical aggression (Alink et al., 2006), while the CBCL measures the whole concept of aggression, including also verbal aggression (Achenbach & Rescorla, 2000). It seems that maternal prenatal RF is only related to physical aggression and not to the broader concept of aggression, because physical aggression is more clearly observable in 20 months old children than verbal aggression. Mothers with good reflective functioning capacities are able to prevent physical aggression in their children, because they react on children's aggressive behaviour in a reflective way. In that way children learn that physical aggression is not an adequate way to express their emotions and feelings. Mothers with less optimal reflective functioning may not be able to verbally reflect on their children's physical aggressive behaviour, so their children do not learn to express their emotions and feelings in an non-aggressive way. This hypothesized mechanism should be further investigated.

Group differences were also found when investigating the relationship between maternal RF and child aggression. Low RF mothers had higher child aggression scores than mothers with medium RF capacities. However no difference in aggression scores were found between high and low RF mothers so it seems that children of high RF mothers are just as aggressive as children of low RF mothers. A possible explanation for this finding is the low statistical power to find differences between high RF mothers and other groups, because of the small high RF group (N = 21). A second explanation is that the aggression questionnaire was less sufficient for high RF mothers. They do reflect much on their child's behavior and register for that reason lots of their behavior, which is not all registered by low and medium RF mothers. As a result high RF mothers report more aggressive behaviour, which is not observed by medium and low RF mothers. This finding emphasizes the need for research to the reliability of questionnaires in high functioning RF mothers. This could be done by measuring child aggressive by an objective researcher as well and compare those results with mother's ratings of child behaviour.

The present study did also focus on postnatal maternal RF and found this positively related to child aggression. This relationship was only significant for the self-related part of postnatal RF and only in the low risk group. The child-related part of RF was not related to child aggression as well as the whole concept of maternal postnatal RF. This finding is in contrast with the relationship which was found between child aggression and prenatal RF, which was not split in a self-centered and a child-centered part. A possible explanation lies in the difference between child- and self-centered RF, which are two different concepts. Mothers could be able to reflect upon themselves, while they have low

child-centered capacities. Because they do reflect much on themselves and on their own behavior and less on the behaviour of their child, they reflect on their child as would it be an adult. For that reason they label normal child behaviour (e.g. having difficulties being patient) as abnormal child behaviour, because this behaviour is not normal for most adults. It could be that high RF mothers misread the behaviour of the child, which is called 'distorted mentalizing' (Sharp, 2006). Future research should be performed to investigate this concept in mothers with high RF capacities. An explanation for the finding that self-related postnatal RF was only related to child aggression in low risk mothers could be the low statistical power in this group analysis. The high risk coaching and control group were both smaller than the low risk group (N = 11, 25 and 49 respectively).

The second aim of this study was to investigate whether ToM mediates the relationship between maternal RF and child aggression, which was hypothesized by Fonagy and Sharp (2008). The present study did not find this mediating effect. However Fonagy and Sharp (2008) did not describe the age on which they expect this mediating effect. Child mentalizing, operationalized by ToM, is normally measured in children aged four or older. At a younger age only precursors of ToM could be measured (Sharp, 2006). The present study did find one precursor of ToM related to maternal RF: Children of high-RF mothers scored higher on imitation than children of low-RF mothers. This difference was not found for the discrepant desires task. However in this task less variability was measured. It is for that reason questionable whether children's scores in this task were reliable to interpret. It is yet not clear why there was less variability, because this task was validated in a comparable aged children (Repacholi & Gopnik, 1997). The task used in that study gave children the choice between an attractive snack and a unappetizing raw vegetable, while in the present study children may choose between two attractive snacks.. It could be that a child is more likely to give an unattractive snack to the experimenter than an attractive snack. For that reason children in the present study did not give any food to the experimenter and receive a score of 0 on this task. It should be investigated whether the discrepant desires task has more variability if an unattractive snack is used. The third ToM, visual perspectives, was also unrelated to maternal RF. It is possible that this precursor of ToM is not related to maternal RF on this young age or that visual perspective taking is indeed not related to maternal RF. Future research should shed light on the possible relationship between maternal RF and visual perspective taking.

Besides the effect of RF on child aggression and ToM this study also focused on the development of RF over time. It became clear that RF-scores did improve during the time of this study. However this finding was only significant for high risk control mothers. This outcome is inconsistent with findings by Sadler et al. (2013), who found that all mothers (both intervention and control) did improve in RF-scores over the course of the intervention. A possible explanation for this difference is that Sadler and colleagues only investigated high risk mothers, while in the present study also low risk mothers were investigated. Those low risk mothers started with higher RF-scores, but did not improve significantly. This could be explained by a ceiling effect. The finding that mothers in the

intervention group did not significantly improve in RF-scores could be explained by the small group of intervention mothers (only 11) which took part of the present sample, which leads to less statistical power. The differences between prenatal and postnatal RF in the different groups should be investigated in a larger sample to see if the findings will be the same.

The third aim of this study was to investigate whether maternal RF could be enhanced by coaching. The program Minding The Baby (MTB) did found that coaching increased maternal RF in a high risk sample (Sadler et al., 2013), but this is not found in the present study. An increase in RF was only measured in high risk control mothers. This finding is inconsistent with the research of Sadler and colleagues. A first explanation for this inconsistency is the low amount of statistical power of this study. Only 11 mothers received coaching while 25 high risk mothers did not receive coaching. A second explanation are the differences between the situation in the USA, where Sadler did her research, and the Dutch situation. In The Netherlands all mothers have access to maternal health centres and mothers are standardly called to visit those centres, while this is not the case in the USA. So differences between high risk coaching and high risk control group were larger in the American situation than in The Netherlands. A third possible reason for the difference is that in the American study postnatal measurement of RF took place four months later than in the Dutch situation (at 24 months instead of 20 months after birth). It is possible that the effect of coaching in the Dutch sample can be found when assessments take place some months later.

The present study did also find a relationship between maternal RF and background variables maternal age and maternal education. This finding is inconsistent with findings from earlier research. Fonagy et al. (1998) described the validation of the PDI and found that RF was non-significantly related to maternal age and to maternal level of education, but used a lower risk sample than the present study did (Fonagy, Steele, & Steele, 1991). A second study which find that maternal RF was related to intelligence did not focus on pregnant mothers (Taubner et al., 2013). So the present sample was more at risk than the samples in which no relationship between RF and maternal age and education was found. Significant correlations between age, education and RF in the present sample could therefore be the result of specific sample characteristics (Pajulo, Savonlahti, Sourander, Piha, & Helenius, 2001).

Strengths and limitations

The present study contributes to our insight with respect to the influence of maternal reflective functioning on child aggression. The present study is part of the project ‘A Good Start’, which is a longitudinal study starting at pregnancy until the child is 2.5 year. This design provides possibilities to longitudinally examine maternal reflective functioning, precursors of ToM and behavioural development. A second strength of this study is the specific sample which is used. Both high risk and low risk mothers are included in this sample, which makes it possible to compare those mothers on characteristics such as reflective functioning and to compare their children as well. A third strength

which follows the former is the intervention which is given to half of the high risk sample. Because those samples did not differ in background characteristics the possible effects of coaching on mother and child can be investigated. The study should be continued for longer time to find effects of coaching on maternal reflective functioning.

However, the present study has some limitations as well. The first limitation is the small subsample for the current study. 85 mothers were included, which is not particularly small, but only 11 mothers were assigned to the intervention. Future research into the effects of coaching on maternal RF should include more intervention mothers to increase the chances of finding significant results. A second limitation is the use of questionnaires for measuring child aggression. Now it is only clear that mothers with low RF capacities rated their children as more aggressive, but it is not clear whether the children indeed are more aggressive. It is unclear whether such questionnaires are reliable for mothers with high or low RF capacities. It is possible that they rate their children as more aggressive, because they are more aware of the behavior of their child. Future research should also include observational measures of aggression in order to rate children's aggression.

Future directions and implications

The influence of maternal reflective functioning on child attachment has been studied several times before (Main, Goldwyn, & Hesse, 2003; Waters, Treboux, Fyffe, & Crowell, 2001 as described in Katznelson, 2014) and it became clear that children of mothers with high RF capacities were more likely to be securely attached (Slade, 2008). The influence of maternal reflective functioning on child psychopathology was also investigated before (Strassberg, 1997; Gottman, Katz & Hoover, 1996; Sharp et al., 2006), but these relationships were generally found for older children (> 4.5 years). The present study shed light on the relationship between maternal RF and child aggression at a younger age. High maternal prenatal RF was associated with low child aggression at 20 months. Future research should investigate the influence of several mother- and child factors on this association. Temperament and parenting style might be important factors to investigate in this respect (Sharp & Fonagy, 2008).

Sharp and Fonagy (2008) expected that the relationship between maternal RF and child psychopathology was mediated by child's Theory of Mind. The present study did not find this relation at the age of 20 months, but did find that maternal RF and a precursor of ToM were related at that young age. Future research should be done to investigate the relationship between maternal RF and child aggression at later ages to investigate the possible mediating effect of ToM in more detail.

Taken together the present study provided evidence for the relationship between maternal reflective functioning and child aggression at a young age. Earlier research did not focus on children at this young age. Maternal RF was also related to precursors of ToM. Coaching might be a suitable way to enhance maternal reflective functioning capacities in order to avoid the development of child psychopathology and to foster the development of ToM. Although this could not be confirmed by the

results of the present study the effects should be re-investigated after mothers received coaching for a longer period of time.

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