Maternal reflective functioning: influence on parenting practices and the early development of externalizing behavior

Smaling, H.J.A.

Chapter 6

Maternal reflective functioning as a multidimensional construct: Differential associations with children's temperament and externalizing behavior

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Abstract

Maternal reflective functioning (RF) has been associated with children's behavioral development. This study examined maternal prenatal and postnatal RF, as measured by the Pregnancy Interview and Parent Development Interview, as multidimensional constructs. It was also examined whether the RF-dimensions were associated with children's temperament and externalizing behavior, as assessed by several questionnaires. The sample consisted of 123 first-time mothers (*M* age = 22.85 years, *SD* = 2.21) and their children (*M* age = 19.97 months, *SD* = 0.85, 56% male). Two related but distinct dimensions were found for prenatal RF, termed self-focused and child-focused mentalization. Three dimensions were observed for postnatal RF, termed self-focused, child-focused, and relation-focused mentalization. Results showed that prenatal RF negatively related to reported child physical aggression. Postnatal self-focused RF was positively linked to externalizing behavior and negative emotionality in offspring, while relation-focused RF scores were again negatively associated with child physical aggression. Findings show that it is important to also look at the specific RF-dimensions when examining the effects of maternal RF on children's behavioral development, as differential associations with behavioral outcomes exist. Discussion further focuses on the importance of these findings in prevention and clinical practice, and suggestions are being made to further improve the measurement of maternal RF-dimensions.

Introduction

Reflective functioning (RF), an operationalization of mentalization, has been defined as the ability to understand and interpret one's own and others' behavior in the light of mental states such as feelings, thoughts, fantasies, beliefs and desires (Fonagy, Gergely, Jurist, & Target, 2002). Ascribing (personal) meaning to underlying emotions and helping to clarify the cause and effect relations between those underlying mental states and behavior, are essential for adequate interpersonal functioning.

Mentalizing or RF in the context of parenting has been defined as a parent's ability to understand their own mental states, to keep their child's mental states in mind, and to understand how these mental states impact behavior (Ordway, Webb, Sadler, & Slade, 2015). More specifically, maternal RF is seen as the mother's ability to think reflectively about herself as a parent, her child, and her relationship with the child (Slade, 2005). Maternal mentalizing starts to develop during pregnancy, as a woman's representations of herself as a mother and of the baby become increasingly specific (Slade, Cohen, Sadler, & Miller, 2009). Prenatal maternal RF refers to the mother's ability to think of the fetus, from at least the last trimester onwards, as a separate individual, with developing personal characteristics, needs, and temperament (Pajulo et al., 2015).

During pregnancy, a highly reflective mother prepares concretely and psychologically for the birth of the baby by making room for the infant both in mind and in practice (Pajulo et al., 2015). Postnatal maternal RF provides the mother an outline of how to respond when confronted with child-rearing issues (Ordway, Sadler, Dixon, & Slade, 2014). Specifically in times of elevated emotions, a reflective mother is likely to respond to her child's signals with acceptance and in an appropriate manner. The reflective mother's empathic responses serve a crucial function in organizing and regulating the child's emotional states (Fonagy et al., 2002) and enable the child to develop the capacity to self-regulate. Furthermore, the mother is most likely to respond sensitively when she can understand the meaning and intention of children's cues and see her children as separate from herself (Fonagy et al., 2002; Smaling et al., 2016). When the mother acts on incorrect assumptions about her child's mental states or does not recognize her own and her child's individual and separate emotional states, there is a risk for miscommunication (Ordway et al., 2015), which, in turn, could lead to poor emotion regulation, elevated stress responses, and behavioral problems (Bowlby, 1988; Ha, Sharp, & Goodyer, 2011; Sharp & Fonagy, 2008; Smaling et al., 2016).

Poor maternal RF or mentalizing has already been associated with behavioral problems in children (Benbassat & Priel, 2012; Ha et al., 2011; Meins, Centifanti, Fernyhough, & Fishburn, 2013), including attention problems, social withdrawal, anxiety, and dysfunctional mother-child interactions (Esbjørn et al., 2013; Fonagy et al., 2002; Smaling et al., 2016). The majority of studies linking maternal RF to child socio-behavioral development have focused on postnatal RF. Few studies have examined the role of prenatal maternal RF in the development of children's behavioral development, although some evidence exists showing that this is predictive of children's externalizing behavioral problems (specifically: physical aggression) as well (Smaling et al., 2016).

Prenatal and postnatal reflective functioning

Maternal RF has mostly been assessed postnatally, but it may be argued that for RF to develop optimally, this development should have started prenatally. Support for this notion comes from studies examining stability and change in maternal representations, part of maternal RF, which indicate moderate stability between prenatal and postnatal maternal representations (Benoit, Parker, & Zeanah, 1997; Theran, Levendosky, Bogat, & Huth-Bocks, 2005). Besides the moderate stability of the maternal representations, there are also studies suggesting more changeability of maternal representations (Aber, Belsky, Slade, & Crnic, 1999; Vizziello, Antonioli, Cocci, & Invernizzi, 1993). During the perinatal period mothers will slowly adapt to their new role. Likewise, during this period mothers might increasingly reflect upon their own childhood experiences. The birth of a healthy baby may also alleviate maternal anxieties activated during pregnancy, nurturing a more coherent and enriched representation of the woman as a mother and of her newborn baby. Furthermore, changes in maternal representations and mentalizing may be expected as these will be influenced by interactions with the actual baby. The importance of examining stability and change during the perinatal period is further underlined by the fact that prenatal maternal mentalizing predicts postnatal maternal mentalization, but not perfectly (Arnott & Meins, 2007, 2008; Steele & Steele, 2008). In case pre- and postnatal RF indeed differ, it may be hypothesized that they will differentially predict child socio-behavioral outcomes as well.

A dimensional approach to maternal reflective functioning

When looking more closely at the definitions used to describe the mentalizing ability or maternal RF, the following characteristics of RF can be identified: (a) awareness, recognition, and acknowledgement of mental states in oneself and others, (b) an

understanding of how mental states influence interpersonal interaction and behavior, (c) an understanding of mental state-dynamics in relationships, and (d) mental representations about relationships containing cognitive and emotional components (Fonagy & Bateman, 2008; Fonagy et al., 2002; Slade, 2005). Mentalizing with respect to infants and toddlers also often involves adopting a developmental perspective about the child's growing capabilities and trying to make sense of the child's internal world through observation of behavioral and affective cues (Slade, 2005, 2007). Whereas most studies to date have focused on maternal RF as a unitary construct, RF may have to be regarded as a multidimensional construct. Components may include (some of) the previously mentioned RF-characteristics. Whereas a distinction between these components appears to reflect a hierarchical structure of RF (with c being a more advanced form of RF than b, which in turn is more advanced than a), another plausible form of multidimensionality is one that distinguishes an intrapersonal dimension and interpersonal dimension (Benbassat & Priel, 2015). Awareness, recognition, and acknowledgement of mental states of oneself and of others may be related but distinguishable qualities, which, in turn, could differentially influence the understanding of mental-state dynamics of behavior and within relations.

Some empirical evidence for a two-dimensional structure of postnatal RF already exists. Suchman and colleagues (2010) identified a two-dimensional structure for postnatal RF in a sample of 47 substance-abusing mothers. A similar two-factor structure was identified by Borelli, St John, Cho, and Suchman (2016) in a high-risk community sample. The observed dimensions are in line with those theoretically suggested by Benbassat and Priel (2015). One dimension represented the maternal capacity to mentalize about her own emotions and behaviors (self-focused RF), while the second dimension represented the mother's capacity to mentalize about her child's mental states and behaviors, and about her interactions with the child (child-focused RF). Further indirect evidence for multidimensionality of concepts such as RF and mentalizing stems from studies showing separate though proximal neural networks for self-understanding and the understanding of others (Lieberman, 2007). These two forms of understanding may be related to different forms of interpersonal problems and psychosocial disorders (Luyten & Fonagy, 2012). For example, an impaired ability to self-mentalize appears to be an important characteristic of different forms of psychopathology (Fonagy et al., 2002), and may be present even when more general RF is intact (Bateman & Fonagy, 2006; Rudden, Milrod, Target, Ackerman, & Graf, 2006; Sharp et al., 2011).

Research aims

No studies to date have investigated whether the two postnatally identified RF-dimensions can also be observed for prenatal reflective functioning and no studies to date have examined whether these RF-components (prenatally and postnatally) are differentially related to children's temperament and externalizing behavior. A more detailed understanding of separate components of RF, and their implications for early behavioral development has the potential to enhance the efficacy of prevention and intervention programs aimed at reducing children's behavioral problems (Smaling et al., 2016; Smaling et al., 2015).

To summarize, the first goal of this study was to examine maternal reflective functioning (RF) prenatally and postnatally as multidimensional constructs. We expected to find two distinct, but related dimensions for both prenatal and postnatal maternal mentalizing. More specifically, we expected to find a self-focused and a child-focused component of RF prenatally and postnatally.

The second goal was to investigate associations between the different dimensions of prenatal and postnatal RF with children's temperament (i.e., negative emotionality and effortful control) and externalizing behavior (i.e., physical aggression and externalizing problems) at the age of 20 months. We expected that increased levels of RF, especially postnatal child-focused levels, would be associated with more optimal child behavior (less physical aggression, externalizing problems, and negative emotionality, and more effortful control).

Method

Participants

The present study is part of the Mother-Infant Neurodevelopment Study in Leiden, The Netherlands (*MINDS* – Leiden; Smaling et al., 2015). *MINDS* – Leiden is an ongoing longitudinal study into neurobiological and neurocognitive predictors of early behavior problems. Women were recruited during pregnancy via midwifery clinics, hospitals, prenatal classes and pregnancy fairs. Dutch speaking primiparous women between 17 and 25 years old with uncomplicated pregnancies were eligible to participate. We oversampled women characterized by the presence of risk factors associated with suboptimal offspring behavioral development. The study was approved by the ethics committee of the Department of Education and Child Studies at the Faculty of Social and Behavioral Sciences, Leiden University (ECPW-2011/025), and by the Medical Research Ethics Committee at Leiden University Medical Centre Committee (NL39303.058.12) and complied with the Helsinki Declaration and APA ethical standards. All participating women provided written informed consent.

The total sample at the first assessment, around 27 gestational weeks, consisted of 142 women. 19 families left the study (13%). Attrition was due to inability to contact (n = 8), personal problems (n = 7), emigration (n = 1), or premature delivery (>8 weeks early, n = 3). Sample attrition was unrelated to maternal age or ethnicity. However, mothers who left the study had lower educational levels: $t(140) = 3.27$, $p < .005$, and lower family income: $t(140) = 2.84$, $p < .005$.

Our final sample consisted of 123 mothers and their 20-month-old children who had completed both the first (prenatal home visit) and fourth wave (home visit 20 months post-partum) of the study. Women were predominantly Caucasian (89%), 5% Surinamese or Antillean, 2% mixed (Caucasian and other origin), and 4% other origin. At the time of the first assessment, 6% of the women were currently receiving treatment from a psychologist or psychiatrist (trauma (n = 2), anger management (n = 1), light therapy (n = 1), 'motivational issues' (n = 1), past depression (n = 1), Attention Deficit Hyperactivity Disorder (n = 1)). Most mothers had a partner (93%), and of these 7% were in a romantic relationship with someone other than the biological father of the baby. Only 5% of the women were unemployed and 7% reported to have financial problems. Most women (47%) had completed higher secondary school or lower vocational education, 32% had completed

higher vocational education or an university degree, 20% had completed lower secondary school, and 1% completed primary school. Women generally listed 9 people as part of their social support network (*SD* = 4.06, range 3 – 22). More demographic variables and child characteristics are summarized in Table 1.

Table 1. Demographic and obstetric sample characteristics.

	M	*SD*
Age at T1 (years)	22.85	2.21
Ethnicity (% Caucasian)	89%	
Monthly family income (in Euros)	2,456.99	1,215.84
Bachelor's or Master's degree (%)	32%	
Single (%)	7%	
Number of people listed in social support network	9.02	4.06
Unplanned pregnancy (%)	38%	
Caesarian (%)	12%	
Infant gestational age at birth (weeks)	39.20	1.97
Infant birth weight (gram)	3348	534
Infant APGAR-score at 5 minutes	9.45	0.98
Child gender (% male)	56%	
Child age at T4 (months)	19.97	0.85
Child receptive vocabulary*	9.04	2.02
Child expressive vocabulary*	2.91	2.46

Note. N = 123, M = mean, SD = standard deviation, *= raw scores, T1 = first wave around 27 gestational weeks, T4 = fourth wave 20 months post-partum.

Procedures and instruments

Waves 1 and wave 4 of the *MINDS* – Leiden study consisted of a 2- to 2,5-hour home visit, conducted by two trained female researchers. Wave 1 included an interview regarding the emotional experience of the pregnancy, a semi-structured psychiatric interview, and a variety of questions concerning demographic information, lifestyle and health of the mother. The fourth wave started with a free play task, followed by several mother-infant

tasks with a focus on children's cognitive and social development and two language tasks. After the infant tasks, the first researcher looked after the child, while the second researcher interviewed the mother about her emotional experiences as a parent. Each wave ended with the mother filling out several questionnaires. All mother-infant tasks were videotaped.

Demographics, information about maternal health and life style, and obstetric characteristics were gathered using Dutch translations of the 'Becoming a mother' and 'Being a mother' questionnaires from the Cardiff Child Development Study (Hay et al., 2011).

A Dutch translation (Smaling & Suurland, 2011) of the Pregnancy Interview – Revised (PI-R; Slade, 2007a) was administered to assess the level of prenatal RF. The PI-R is a 22-item semi-structured interview with questions that tap into the emotional experience of the pregnancy, mother's prenatal representations of her unborn child and of herself as a parent. The Parent Development Interview Revised - short version (PDI-R2; Slade et al., 2003) was used for determining postnatal RF. The PDI-R2 is a 24-item semi-structured interview that assesses the parents' representations of their relationships with their child, their own internal experience of parenting, and the child's reactions to normal separations, and routine upsets. Both interviews were digitally recorded and transcribed verbatim. Both pre- and postnatal RF were scored on a 11-point scale with higher scores reflecting better RF-skills (Slade, Bernbach, Grienenberger, Levy, & Locker, 2005; Slade, Patterson, & Miller, 2007). Scores of 5 indicate the presence of a basic mentalizing capacity; a rudimentary understanding of how mental states work together and influence behavior (Slade et al., 2007). Indices of high RF have the following characteristics : (a) showing an awareness of the nature of mental states, (b) explicitly making an effort to tease out mental states underlying behavior, (c) acknowledging the developmental aspects of mental states, and (d) recognizing mental states in relation to the interviewer (Fonagy, Target, Steele, & Steele, 1998; Slade, Bernbach, Grienenberger, Levy, & Locker, 2002; Slade et al., 2007). Low RF is characterized by: (a) denial of mental states, (b) bizarre or inappropriate attributions of RF, (c) distorted or self-serving RF, (d) naive or simplistic awareness of mental states, and (e) overly analytical or hyperactive usage of RF (Slade et al., 2002; Slade et al., 2007). Transcripts were coded by trained research assistants under supervision of the first author with different raters for the PI and PDI. The mean inter-rater agreement of individual passage scores were .87 for the PI and .91 for the PDI, and for the overall RF-score .90 for the PI and .94 for the PDI.

The 11-items Physical Aggression Scale for Early Childhood (PASEC; Alink et al., 2006) was used to assess children's use of physical aggression. Mothers were asked whether their child had shown certain behaviors during the past 2 months on a 3-point scale ranging from 0 (not true) to 2 (very true or often true). A total score for physical aggression was calculated. The internal consistency in our study was .73. This is in line with internal consistency reported by Alink et al. (2006).

The Child Behavior Check List 1 ½ -5 year (CBCL; Achenbach & Rescorla, 2000; Achenbach & Ruffle, 2000; Koot et al., 1997) was used to quantify externalizing behavioral problems. Items are scored from 0 (not true) to 2 (very true or often true) on the basis of the preceding 2 months, with higher scores indicating higher levels of problem behavior. The questionnaire generates a total problem-score, two broadband factors (i.e., externalizing and internalizing behavioral problems) and seven narrow band factors (i.e., emotionally reactive, anxious depressed, somatic complaints, withdrawn, sleep problems, attention problems, and aggressive behavior). Only the externalizing problems factor was used in the present study. Internal consistency in this sample was .85 for externalizing problems.

To assess children's negative emotionality (i.e., tendency to react to stressors emotionally) and effortful control (i.e., self-regulatory mechanisms of attention, activity, and inhibitory control), the mother completed the Dutch version of the Short Form of Rothbart's temperament questionnaire: the Early Childhood Behavior Questionnaire (ECBQ; Putnam & Rothbart, 2006). The items are phrased in the form of questions about the child's behavior in a given context (e.g., 'While having trouble completing a task [e.g., building, drawing, dressing], how often did your child get easily irritated?') and can be rated on a 7-point Likert scale ranging from 1 (never) to 7 (always). The Short Form of the ECBQ assesses the three broad dimensions of temperament: Negative affectivity or emotionality (discomfort, sadness, fear, anger-frustration, and soothability), Surgency (high-intensity pleasure, activity level, impulsivity and approach positive anticipation), and Effortful control (low-intensity pleasure, inhibitory control, perceptual sensitivity, and attentional control). Higher scores indicate higher levels of negative emotionality and surgency, and better effortful control. For the present study only the subscales Negative emotionality and Effortful control were used. Adequate internal consistency has been demonstrated for all scales (Putnam, Gartstein, & Rothbart, 2006). Internal consistency in this sample was .77 for Effortful control and .83 for Negative emotionality.

Language development was also assessed as it has been related to both maternal mentalizing and externalizing behavioral problems in young children in the past (Girard et al., 2014; Laranjo & Bernier, 2013; Petersen et al., 2013). The Reynell Developmental Language Scales (RDLS) were used to evaluate receptive language skills (Reynell, 1985). On the RDLS, children were asked to identify an array of objects and pictures (e.g., "Where is the ball?"). The RDLS yields receptive vocabulary age that can be converted into receptive language quotients. This instrument is appropriate for age range 1-7 years. The subtest word development of the Schlichting Expressive Language Test (SELT) was used to assess expressive vocabulary skills by asking the child to name objects or pictures. This subtest has good internal consistency (Schlichting, Van Eldik, Lutje Spelberg, Van der Meulen, & Van der Meulen, 1995). Raw scores were used in statistical analyses.

Data-analyses

All variables were examined for outliers and violations of specific assumptions applying to the statistical tests used. To test for the presence of multiple RF-dimensions on the PI and PDI, we entered all item scores per interview in a principle components factor analysis (PCA) and used a Scree-Test (Cattell, 1965) to determine the point where eigenvalues leveled off. Next, using an orthogonal Varimax rotation, we examined factor loadings for each variable. Based on our sample size, only factor loadings with an absolute value greater than .40 were interpreted (Stevens, 1992). Pearson *r* bivariate correlations (two-tailed) were conducted to test associations between maternal reflective functioning and children's externalizing problems, physical aggression, and temperament, and to identify potential confounding factors. All analyses were conducted using the Statistical Package for Social Sciences (SPSS for Windows, version 21.0, SPSS Inc., Chicago, IL).

Results

Descriptives

Demographic and obstetric characteristics of the sample are presented in Table 1. Prenatal RF levels ranged from 2 (inexplicit references to mental states) to 7 (marked RF), with an average of 4.04 (rudimentary RF, *SD* = 1.02). Postnatal RF levels ranged from 2 to 8 (on the way to exceptional RF), with an average of 4.32 (*SD* = 0.99). On average, RF increased 0.27 point (*SD* = 1.12) over time (range -3 to 3); $t(122) = 2.73$, $p < .005$.

Reflective functioning dimensions

The preliminary tests indicated that the data of the PI were suitable for factor analysis, KMO = .85, Bartlett's test of Sphericity = 440.06, $p < .001$. Results of the Scree-Test for the PI (prenatal RF) showed that a two-factor solution best fit the data. Results of the orthogonal Varimax rotation showed substantive loadings (i.e., ≥ .41) of "self-focused" RF-items on Factor 1 (eigenvalue = 5.10), and "child-focused" items on Factor 2 (eigenvalue = 1.51; see Table 2). Internal consistency for the seven self-focused items was .78 and for the six child-focused items this was .71. Pearson *r* correlation coefficient for the two factors was .55 ($p < .001$), indicating that the dimensions were related but distinct.

For the PDI (postnatal RF), examination of the scree plot indicated that a three-factor solution was the best fit for the data. The preliminary tests indicated that the data were suitable for factor analysis, KMO = .73, Bartlett's test of Sphericity = 301.94, $p < .001$. Results of the orthogonal Varimax rotation showed substantive loadings (i.e., ≥ .42) of "self-focused" RF-items on Factor 1 (eigenvalue = 4.05), "mother-child relationship"-focused RF-items on Factor 2 (eigenvalue = 1.42), and "child-focused" RF-items on Factor 3 (eigenvalue = 1.23; see Table 3). Internal consistency was .68 for the five self-focused items, .59 for the three mother-child relation items, and .50 for the thee child-focused items. Pearson *r* correlation coefficients for the three factors were between .42 and .47 ($p < .001$), indicating that the constructs were related but distinct. For further correlations between prenatal, postnatal, and pre- and postnatal dimensional and total scores, please see Table 4.

Table 2. Results of factor analysis[a] for reflective functioning coded from the Pregnancy Interview (N = 123).

	Factor Loading[b]	
Item	F_1	F_2
% variance	30.02	8.92
Mentalization: self		
What changes have you made in your daily activities since your pregnancy? How do you feel about doing these things differently?	**.70**	.04
Describe the father of the baby's reaction when he found out you were pregnant (including mother's feeling about reaction)*.	**.67**	.11
Describe your family's reaction when they found out about your pregnancy (including mother's feeling about reaction)*.	**.64**	.30
What are some of the good feelings you've had during your pregnancy?	**.41**	.34
Have you had any hard/difficult feelings during your pregnancy?	**.67**	.27
Have you had any worries about the baby?	**.64**	.07
Considering the first six months of your baby's life, when do you imagine you'll be the happiest?	**.48**	.22
Mentalization: child		
When would you say you first believed there was a baby growing inside of you?	-.01	**.55**
Would you say you have a relationship with the baby now?	.14	**.51**
What will your baby need from you after it's born?	.14	**.61**
What kind of person do you imagine your baby's going to be?	.08	**.51**
What do you imagine to be the hardest time of the first six months of your baby's life?	.39	**.51**
Who's going to help you take care of the baby after it's born?	.20	**.76**

Note: Only the items that loaded high on either one of the factors are shown, [a]Two-factor solution, Varimax rotation. [b]Factor loadings ≥ .40 were considered to be high, * = mothers are always asked about their own feelings about this as well, unless they already spontaneously answered this (sub)question, by the following probes: How did you feel about the reaction? Why do you think he/they reacted that way?

Table 3. Results of factor analysis[a] for reflective functioning coded from the Parent Development Interview (N = 123).

	Factor Loading[b]		
Item	F_1	F_2	F_3
% variance	26.97	9.44	8.19
Mentalization: self			
Have you ever felt angry as a parent?	**.60**	.30	.37
Have you ever felt needy as a parent?	**.80**	-.04	.07
Tell me about a time in the last week or two when you felt guilty as a parent.	**.42**	.35	.38
How has having your child changed you?	**.53**	.41	-.27
How do you want to be like and unlike your mother/father as a parent?	**.65**	.04	.09
Mentalization: relation			
Tell me about a recent time when you and your child really clicked. [How did you feel? How do you think child felt?]*	.04	**.85**	.08
Tell me about a recent time when you and your child weren't clicking. [How did you feel? How do you think child felt?]*	.37	**.44**	.31
How do you think your relationship with your child is affecting his/her development or personality?	.05	**.68**	-.01
Mentalization: child			
Has your child ever felt rejected?	.02	.14	**.51**
When your child is upset, what does he/she do?	.39	.14	**.58**
Describe a recent time when you and your child were separated. [What kind of effect did it have on the child?]#	.05	-.01	**.82**

Note: Only the items that loaded high on either one of the factors are shown, [a]Three-factor solution, Varimax rotation. [b]Factor loadings ≥ .40 were considered to be high, * = example of probe only to use if the question has not been answered, # = standard probe that must be asked.

Maternal reflective functioning and child behavior

Table 4 shows correlations between RF-scores and child temperament and behavior scores. Prenatal total RF was negatively associated with child physical aggression, indicating that mothers with higher prenatal RF-skills reported less child physical aggression 20 month post-partum. Higher self-focused postnatal RF was positively associated with externalizing problems and negative emotionality in the child. Higher postnatal relation-focused RF was linked to less reported child physical aggression.

To identify potential confounding factors, Pearson *r* bivariate correlations and t-tests were conducted to examine associations between maternal (e.g., age, education and income) and child factors (e.g., child age, gender, and language development) on the one hand, and reflective functioning, child temperament, externalizing problems, and physical aggression on the other. Although on a number of occasions significant associations were observed, these never concerned both the exact RF- and child outcome variables that were related in the first place, thus excluding the necessity to perform partial correlations. For example maternal age was positively related to prenatal total RF ($r = .30$, $p < .005$) and lower levels of children's negative emotionality ($r = -.28$, $p < .005$), but prenatal total RF was not significantly related to negative emotionality (only to physical aggression, which, in turn, was not significantly related to maternal age). Similarly, higher educated mothers had higher prenatal total RF ($r = .47$, $p < .001$) and higher relation-focused postnatal RF ($r = .28$, $p < .005$). They also reported less negative emotionality ($r = -.21$, $p < .05$) (and more effortful control ($r = .19$, $p < .05$)) in their children. However, the RF-dimensions associated with maternal education were not significantly related to negative emotionality (only to physical aggression, which, in turn, was not significantly related to maternal education). When partial correlations were performed anyway, despite not meeting the conditions for such statistical analyses, associations observed between RF-dimensions and child outcomes remained significant.

Table 4. Associations between maternal reflective functioning and children's externalizing behavior and temperament.

		1	2	3	4	5	6	7	8	9	10
1.	Prenatal RF	-									
2.	Postnatal RF	.38***	-								
3.	Prenatal self-focused RF	.02	.02	-							
4.	Prenatal child-focused RF	-.01	-.11	.55***	-						
5.	Postnatal self-focused RF	.15^{+}	.28**	.05	.11	-					
6.	Postnatal child-focused RF	.16^{+}	.14	.21*	.27**	.46***	-				
7.	Postnatal relation-focused RF	.13	.20*	.19*	.14	.47***	.42***	-			
8.	Physical aggression	-.21*	-.03	.04	.01	-.04	.11	-.18*	-		
9.	Externalizing problems	-.10	.17^{+}	.06	-.03	.19*	.08	-.02	.61***	-	
10.	Negative emotionality	-.11	.05	.12	-.04	.19*	.12	.02	.41***	.45***	-
11.	Effortful control	.02	-.10	.03	-.04	.04	-.01	.17^{+}	-.14	-.31***	-.24**

Note. Pearson correlation coefficients (two-tailed), N = 123, ***$p < .001$, **$p < .01$; *$p < .05$, $^{+}p < .1$, RF = reflective functioning.

Discussion

The goal of the present study was to investigate maternal prenatal and postnatal reflective functioning as multidimensional constructs, and to examine whether the observed dimensions of RF were differentially associated with 20-month-old children's temperament and externalizing behavior. Two related but distinct dimensions were found for prenatal RF, termed self-focused and child-focused mentalization. Three dimensions were observed for postnatal RF: self-focused, child-focused, and (mother-child) relation-focused mentalization. For prenatal RF, higher total prenatal RF-skills were related to lower reported levels of child physical aggression 20 months post-partum. Furthermore, higher levels of postnatal self-focused RF were related to more externalizing problems and more negative emotionality in the children. Better relation-focused RF was linked with less child physical aggression.

Maternal (total) RF over time

In general, maternal RF improved over time. This might to some degree be a function of normal development, as similar results have been identified by others using relatively young mothers and a comparable timespan between pre- and postnatal assessment of RF (Sadler et al., 2013). Apparently maternal RF develops as the mother grows more into the maternal role, becomes more experienced with her infant, and mother and child get to know each other better (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Supporting this claim, Poznansky (2010) found that as the infant became gradually more known to the mother, RF-levels increased between 10 and 28 months post-partum. It would be interesting to investigate in more detail whether parental RF-levels vary as a function of the child's developmental stage. For instance, parental RF may become easier with time, as children become more aware of their own mental states and will be better equipped to communicate more clearly about them to their parents, especially with developing language abilities. The fact that prenatal and postnatal (total) RF were only moderately related suggests that maternal RF-levels are definitely susceptible to change.

Components of maternal RF

Regarding the dimensionality of maternal RF, our results were, in part, as expected, with for example, a similar distinction for prenatal RF (child-focused versus self-focused RF) as was observed before for postnatal RF. For postnatal maternal RF, besides the child-focused and

self-focused dimension, an extra relation-focused RF-dimension (i.e., mentalization about how dynamics in mental processes influence interpersonal interaction and behavior) was identified. Although both termed "child-focused RF", the association between prenatal and postnatal child-focused RF was moderate, which seems indicative of the changeable nature of RF. There is evidence showing that women start viewing their unborn children as different individuals from themselves and that they form clear and distinct representations of both themselves as mothers and their infants by the third trimester of pregnancy (Ammaniti et al., 1992; Darvill, Skirton, & Farrand, 2010), but prenatal child-focused RF may for the larger part still differ from postnatal child-focused RF.

Based on the components that generally feature in theoretical descriptions of parental RF (see also Introduction), a three-dimensional structure for postnatal RF seems feasible. In the definitions of mentalizing, especially maternal RF, a great emphasis is placed on the dynamics in mental states and their influence on interpersonal interactions and behavior, and on the fact that parental RF consists of mental representations about relationships. These aspects might be specifically important in infancy and early childhood when the child is dependent on its parents for survival. Furthermore, the fact that the PI asks the mother to describe a relationship which does not yet have a basis in concrete reality, and the PDI refers to a current, ongoing relationship with the child, might be a possible explanation for the discrepancy in observed factor structure for both instruments.

The relation-component observed in postnatal RF may be specific to the mother–child relation or might also be observed in different types of relationships (e.g., with partners/parents/others). Similarly, it would be interesting to examine whether child-focused RF is specific for the mother-child relationship or that the ability to mentalize for the child can be indicative of a more general tendency towards greater reflectiveness for others, i.e., a more general other-focused RF-component. It has been suggested that, at least in part, RF and related constructs such as mind-mindedness (MM) are relation-specific (Luyten & Fonagy, 2014). For example, Meins, Fernyhough, Arnott, and Wilson (2006) found no relation between mothers' MM with their own infants and their tendency to attribute mindful intention to the behaviors of unknown infants. Mothers were only mind–minded when interpreting the behaviors of an infant with whom they had formed a relationship. The lack of significant concordance in MM between partners in study of Arnott and Meins (2007) provides further support for the argument that parental mentalizing is a relationship–specific construct.

In contrast to pre- and postnatal child-focused RF, the self-focused factors were not related. It is possible that self-focused RF in particular is influenced by the transition from pregnancy to becoming a mother, which would make this construct more sensitive to change. The perinatal period has been associated with major mental changes including a redefinition of the self, redefining relationships, redefining professional goals, and envisioning the baby (Laney, Hall, Anderson, & Willingham, 2015; Sadler, Novick, & Meadows-Oliver, in press; Sethi, 1995). It is also possible that postnatally self-focused RF remains more stable again. However, more longitudinal studies into parental RF are required to examine this in more detail.

As is clear from the above, the labeling of different dimensions of prenatal and postnatal RF remains, to some extent, speculative. In order to further improve (clarity about) the measurement potential of the PI- and PDI-interviews, some methodological issues may be considered. Originally the PI and PDI were developed in such a way as to ask for child- and self-mentalization to an even extent. In the current versions of the PI-R and PDI-R2S this does not yet appear to be the case. For example, the 'changes'-question of the PI-R (What changes have you made in how active you are…. for example in what you eat, and how much you exercise? Have there been any changes in how you are sleeping? How do you feel about doing these things differently) does not necessarily involve child-mentalization (at least not to the same degree as it asks for self-mentalization). The PDI-R2S has questions that more explicitly involve child-focused RF (such as: 'Does your child ever feel rejected?'), while others seem much more likely to elicit self-focused RF (for example: 'What gives you the most joy/pain or difficulty in being a parent?'), and there are also questions that explicitly ask for both self- and child-mentalization (such as: 'Tell me about a time in the last week or two when you felt really angry/guilty as a parent. Probe, if necessary: What kinds of situations make you feel this way? How do you handle your angry/guilty feelings? What kind of effect do these feelings have on your child?'). However, of those questions only the 'separation' question ('Think of a time you and your child weren't together, when you were separated. Can you describe it to me? Probe: What kind of effect did it have on the child? What kind of effect did it have on you?') is coded separately for mother and child. In order to be truly able to achieve equal measurement of self- and child-focused RF, some minor adjustments to the interviews may be required.

Maternal RF and children's externalizing behavior and temperament

We also examined whether the maternal RF-dimensions were differentially associated with 20-month-olds' temperament and externalizing behavior. For prenatal RF, the total score was related to child physical aggression, while the separate prenatal RF-components were not associated with child effortful control, negative emotionality, or externalizing problems. This might simply indicate that associations between total prenatal RF-score and behavior outcomes are stronger or more robust because of more restricted ranges in the separate prenatal RF-dimensions (ranges were 3.00 for child-focused prenatal RF and 3.43 for self-focused prenatal RF, versus 5.00 for total prenatal RF).

For postnatal maternal mentalizing, higher levels of self-focused RF were related to more reported negative emotionality and externalizing problems in the child. This is not the first study that found that (aspects of) parental RF can also be negatively linked to children's behavior For example, better parental RF has been associated with more internalizing problems and less positive self-perception among adolescents (Benbassat & Priel, 2012). As expected, higher levels of relation-focused maternal RF were linked with less reported child physical aggression. This seems to indicate that for postnatal mentalizing different maternal RF-components are differentially linked to child temperament and externalizing behavior.

The PDI items loading on relation-focused RF-factor ask the mother to reflect on situations that are less emotionally-salient compared to those loading on the self-focused RF-dimension. RF in these instances can be considered more implicit and subconscious (Allen, Fonagy, & Bateman, 2008). The PDI questions loading on the self-focused RF-factor ask the mother to reflect about painful or difficult emotions. This might make self-focused RF more difficult, as it can be characterized as a process requiring explicit and conscious analysis (Allen et al., 2008).

Although a certain level of self-reflectiveness is generally considered to be a good quality, there might also be less desirable consequences (Farber, 1989). The self-absorption paradox, for example, states that self-consciousness may improve the accuracy of self-knowledge at the cost of psychological distress (Trapnell & Campbell, 1999). Higher levels of postnatal self-focused RF may indicate that these mothers are working harder than mothers with lower self-focused RF to control their internal mental processes. Higher self-mentalization has also been linked with depression in substance abusing mothers, suggesting a possible self-absorbent component of self-mentalization (Borelli et al., 2012; Suchman et al., 2010). To speculate a bit more, it could be that because of this the more self-focused mothers might be less patient and therefore more inclined to report their child as

being 'difficult' (i.e., more negative emotionality and externalizing problems). The fact that higher levels of mind-mindedness (an operationalization of maternal mentalizing) have been negatively linked with mothers' perceptions of their child being difficult and that negative maternal preconceptions predict child difficult temperament (Kiang, Moreno, & Robinson, 2004) seem to partially support this claim (Demers, Bernier, Tarabulsy, & Provost, 2010).

Otherwise, children of more self-absorbed mothers might also exhibit more externalizing behavior to try and regain their mother's attention or as a result of less adequate self-regulatory skills (Ha et al., 2011; Sharp & Fonagy, 2008). Subsequently, because their children show more negative emotionality and externalizing problems perhaps this could trigger these mothers to engage in more postnatal self-mentalization.

Results for relation-focused RF were more in line with what would intuitively be expected: more relation-focused reflecting mothers reported lower levels of physical aggression in their 20-month-olds. Given that the interaction between children and their parents is ongoing and dynamic, it would make sense that reflection of the mother on her impact on the child and an awareness of the bidirectional influences, especially as the child matures, play an important role in child behavioral development. One might speculate that more adequate maternal relation-focused RF will enhance mother–child interaction, thereby enabling the child to develop self-regulatory abilities associated with fewer behavioral problems (Sharp & Fonagy, 2008).

Another worthwhile topic for future investigations into multidimensionality of RF and potentially differential associations with child outcomes would be to compare RF in controlled contexts (e.g., structured interview) and RF in uncontrolled situations (e.g., interaction with the child) (see also Luyten and Fonagy (2014)). Possibly, maternal RF during more challenging contexts is especially important for child socio-behavioral development.

Strengths and limitations

Strengths of the current study are the low attrition rate, its longitudinal nature, and the heterogeneous non-clinical sample. The use of gold-standard, time-intensive instruments for assessing maternal RF adds to the reliability of our findings. Furthermore, the measurement of maternal RF to date has largely been limited to one single dimensional scale. This is one of the first studies to not only investigate both prenatal and postnatal

maternal RF as multidimensional constructs, but also the first to relate the RF-dimensions to children's temperament and externalizing behavior.

This study has several limitations as well. First, mothers who discontinued study participation were more poorly educated and had lower family incomes. This may have resulted in the loss of some more extreme cases. Second, our sample consisted of fairly young, predominantly Caucasian women with a relatively high rate of unplanned pregnancy which might limit generalizability of results. Also, Borelli et al. (2016) found that child-focused RF differed across ethnic/racial groups for primary caregivers of school-aged children. Third, we used maternal report to assess children's externalizing behavior and temperament. The use of multiple informants (e.g., partners or co-parents) or direct observation of child externalizing behavior or temperament would strengthen the findings further.

Finally, the PI-R and PDI-R2 differ in the degree to which they call for explicit mentalization: while the PI-R only consists of demand questions, the PDI-R2 consists of both permit and demand questions. Demand questions 'demand' that the parent demonstrates the RF-ability, whereas permit questions 'permit' the parent to display the RF-capacity, but do not explicitly ask the use of mental state language (Fonagy et al., 1998). Furthermore, the PI-R explicitly asks about positive and negative emotions and more 'neutral' situations, while the PDI-R2 questions focus on difficult emotions and more emotional-laden situations (for example separations). Further refinement of the PI and PDI in which demand and permit questions and positive and negative emotions are balanced, and where self-focused and child-focused (as well as relation-focused) RF receive equal explicit attention, seems desirable.

Implications and conclusion

The results of the study emphasize the importance of acknowledging maternal RF as a complex, multidimensional construct. More research investigating the multiple dimensions of maternal mentalizing (e.g., self-focused versus child-focused versus relation-focused, implicit versus explicit, automatic versus intentional), especially in relation to parent-child interactions and children's behavioral development is warranted.

Our study also provides further support for the notion that maternal RF is important for early child temperament and externalizing behavior (Sharp & Fonagy, 2008; Slade, 2005; Smaling et al., 2016). Especially considering the fact that a difficult temperament (higher negative emotionality and reduced regulatory abilities) in early childhood has been linked

to disruptive behavior problems later in life (Calkins & Fox, 2002; Eisenberg et al., 2009; Moffitt & Caspi, 2001; Suurland et al., 2015). The associations between maternal reports of children's temperament and externalizing behavior, and maternal RF also lend support to parenting programs with a focus on the parents' understanding of their child's mental states and how these mental states impact behavior. The prevention of child externalizing behavioral problems in (very) early childhood may help to reduce the cascading effects of these behavior problems later in life.

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