

**The mediating role of parental reflective functioning in child social-emotional development**

Liesbet Nijssens • Nicole Vliegen • Patrick Luyten

**Conflict of Interest:**

The authors declare that they have no conflict of interest.

**Brief running head:**

Parental attachment, PRF, and social-emotional development

**Authors and affiliations:**

L. Nijssens • N. Vliegen • P. Luyten

Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium

P. Luyten

Research Department of Clinical, Educational and Health Psychology, University College London, London, UK

**Corresponding author:**

L. Nijssens, Faculty of Psychology and Educational Sciences, KU Leuven, Tiensestraat 102 pobox 3722, 3000 Leuven, Belgium.

E-mail: liesbet.nijssens@kuleuven.be

Telephone: +32 496645300

### **Abstract**

Parental attachment and parental reflective functioning (PRF) have been shown to be related to attachment, mentalizing capacities, and psychopathology in children. Studies also suggest that parental insecure attachment is related to lower levels of PRF. However, no study has directly investigated whether PRF dimensions mediate the relationship between parental attachment dimensions and features of social-emotional development other than attachment, mentalizing, and psychopathology. We prospectively investigated whether PRF mediates the relationship between parental attachment dimensions (i.e., levels of attachment avoidance and anxiety) and social-emotional competences and problems, using data from a 1-year longitudinal study of first-time parents and their biological children ( $N = 106$ ). We found that low PRF as assessed with the Parental Reflective Functioning Questionnaire at one-year follow-up, was an intervening variable in the relationship between parental attachment dimensions at time 1 and child social-emotional development at time 2. In particular, maternal attachment avoidance and paternal attachment anxiety were indirectly related to child competences and problems through high levels of prementalizing modes (i.e., attributing malevolent mental states to the child and an inability to enter the child's internal world). Additionally, in mothers only, there was a partial mediation effect of PM in the relation between attachment anxiety and child competences.

**Keywords:** Parental reflective functioning, attachment, child development, psychopathology, intervention.

### **Highlights:**

- 1-year prospective study on the role of parental reflective functioning (PRF)
- Impairments in PRF are negatively related to child social-emotional development
- Parental attachment influences child development through distorted PRF

Parental attachment has been thought to be a key factor in fostering secure attachment in children as well as in the development of children's social-emotional capacities (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2005; Ordway, Webb, Sadler, & Slade, 2015). Consistent with these assumptions, studies have shown that an association between parental and child attachment (e.g., Arnott & Meins, 2007; Berthelot et al., 2015; van IJzendoorn, 1995). However, only a handful of studies have examined the relationship between parental attachment and other aspects of child social-emotional development beyond the development of attachment security. Furthermore, most of these studies have been conducted over a decade ago. For example, Crowell and Feldman (1989) showed that maternal attachment as measured by the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984) was related to toddlers' social-emotional behaviors as coded on a free-play session and problem solving tasks. In line with these results, van IJzendoorn, Kranenburg, Zwart-Woudstra, van Busschbach, and Lambermon (1991) found that parental insecure attachment as measured by the AAI was related to maladaptive social-emotional child development in toddlers as measured by the Nijmegen-California Child Q-Sort (NCCS; Block & Block, 1980). They also found interesting sex differences, in that maternal attachment insecurity was related to less resilience and control in their children, whereas paternal attachment insecurity was related to less social, less timid, and more aggressive behavior in their children. Esbjørn et al. (2013) investigated associations among parental romantic attachment as measured by the Experiences in Close Relationships Questionnaire-Revised (ECR-R; Fraley, Waller, & Brennan, 2000) and child anxiety as measured by the Screen for Child Anxiety Related Emotional Disorders (SCARED-R; Muris, Merckelbach, Schmidt, & Mayer, 1998; Muris, Merckelbach, Van Brakel, & Mayer, 1999). They found that child anxiety was related to both maternal and paternal attachment anxiety, but child anxiety was only related to paternal (but not maternal) attachment avoidance. These findings stress the need for further research investigating the role of both maternal and paternal attachment in early social-emotional development, as mothers and fathers may play a different role in child development.

Furthermore, it has become clear that the influence of parental attachment on child development might be less pronounced than was originally expected. The growing evidence for considerable fluctuations in attachment and the role of genetic factors and gene-environment interplay in explaining developmental trajectories associated with attachment plays an important role in this context (Fearon, Shmueli-Goetz, Viding, Fonagy, & Plomin, 2014; Fraley, Vicary, Brumbaugh, & Roisman, 2011). As a result, recent theoretical developments focus on the role of broader socioecological factors associated with child development (Luyten, Campbell, Allison, & Fonagy, 2020).

In this regard, the capacity for parental reflective functioning (PRF) or parental mentalizing, that is, the capacity of parents to envision their child in terms of internal mental states (Slade, 2005), is increasingly assumed to be an important factor. More specifically, PRF refers to the parent's capacity to reflect upon both his/her own and the child's internal mental experience, and to understand the child's behavior in the context of underlying mental states, such as thoughts, feelings, desires, and intentions (Slade, 2005). PRF is thought to underlie caregiver sensitivity, as it permits caregivers to respond sensitively and appropriately to their infant's physical and emotional needs in a consistent and sensitive way, which in turn engenders in the infant attachment security and the development of emotional expression and communication (Rostad & Whitaker, 2016; Turner, Wittkowski, & Hare, 2008). Several studies have shown that parental sensitivity mediates the relationship between PRF and infant attachment (Ensink, Normandin, Plamondon, Berthelot, & Fonagy, 2016; Grienberger, Kelly, & Slade, 2005; Stacks et al., 2014). Within a context of secure relationships with caregivers who pay appropriate attention to the role of internal mental states, the child is enabled to learn about self and others, fostering aspects of his/her social-emotional development such as adaptive socio-cognitive skills, an increased sense of self-efficacy, and self- and affect regulation (Ensink & Mayes, 2010; Fonagy & Target, 2005; Luyten, Nijssens, Fonagy, & Mayes, 2017; Sharp & Fonagy, 2008; Slade, 2005). PRF is thus considered to be part of a broader, inbuilt evolutionary mechanism that is involved in the intergenerational transmission of culturally and personally relevant knowledge that people need to understand themselves and others in their intrinsically social and interpersonal world (Luyten, Nijssens, et al., 2017).

Being mentalized by the parent has indeed been demonstrated to promote attachment security (for a meta-analysis, see Zeegers, Colonesi, Stams, & Meins, 2017). Several studies reported associations among PRF and (subsequent) child attachment (Arnott & Meins, 2007; Berthelot et al., 2015; Fonagy, Steele, Steele, Moran, & Higgitt, 1991; Kelly, Slade, & Grienberger, 2005; Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002; Luyten, Mayes, Nijssens, & Fonagy, 2017; Meins et al., 2012; Oppenheim & Koren-Karie, 2002; Pazzagli, Delvecchio, Raspa, Mazzeschi, & Luyten, 2018). Further, there is growing empirical evidence for the role of PRF with regard to child development beyond attachment (for a review, see Ensink & Mayes, 2010; Katznelson, 2014). However, these studies are still relatively scarce and have mainly been conducted in mothers of school-aged children. Maternal PRF, for instance, has been positively related to infant emotion-regulation capacities (Heron-Delaney et al., 2016), child internalizing and externalizing problems (Benbassat & Priel, 2012; Ensink, Bégin, Normandin, & Fonagy, 2016, 2017; Ensink, Leroux, Normandin, Biberdzic, & Fonagy, 2017; Esbjørn et al., 2013;

Ordway et al., 2014; Smaling, Huijbregts, van der Heijden, van Goozen, & Swaab, 2016; Wong, Stacks, Rosenblum, & Muzik, 2017), and child mentalizing capacities (Benbassat & Priel, 2012; Ensink et al., 2015; Meins et al., 2002; Rosso & Airoldi, 2016; Rosso, Viterbori, & Scopesi, 2015; Scopesi, Rosso, Viterbori, & Panchieri, 2015; Sharp, Fonagy, & Goodyer, 2006). Studies on the respective roles of maternal and paternal RF are still scarce in this area, and thus there is a need to further investigate the respective role of PRF of fathers and mothers.

Moreover, most studies in this area have considered PRF as a unidimensional feature. However, it has become increasingly clear that PRF is a multidimensional capacity. For instance, maternal use of appropriate mind-related comments while playing with their infant was longitudinally related to secure attachment, whereas inappropriate, nonattuned mind-related comments were not (Arnott & Meins, 2007; Meins et al., 2012). Similarly, Miller, Kim, Boldt, Goffin, and Kochanska (2019) demonstrated that appropriate MMM (and not nonattuned MMM) was longitudinally related to attachment security in middle childhood. In addition, these authors reported that the relation between appropriate MMM and secure child attachment in mothers was mediated by maternal responsiveness and infant attachment security, while in fathers mediation was only found for infant security. Smaling et al. (2016), in turn, found that self-focused maternal PRF was positively related to child externalizing behavior and negative emotionality in offspring, while relation-focused PRF was negatively associated with child physical aggression.

To the best of our knowledge, however, no study has investigated the role of PRF, and specific subdimensions of PRF, in the relationship between parental attachment and child social-emotional development in early childhood. In this study, we therefore investigated whether both maternal and paternal PRF mediated the relation between parental attachment dimensions (i.e., levels of attachment avoidance and anxiety) and children's social-emotional development (i.e., social-emotional competences and problems), using data from a two-wave prospective study from infancy to toddlerhood among biological first-time parents and their children ( $N = 106$ ). Given the increasing evidence for the multidimensionality of reflective functioning, including PRF (Krink, Muehlhan, Luyten, Romer, & Ramsauer, 2018; Luyten, Mayes, et al., 2017; Rostad & Whitaker, 2016; Rutherford, Booth, Luyten, Bridgett, & Mayes, 2015; Rutherford, Goldberg, Luyten, Bridgett, & Mayes, 2013), we used the Parental Reflective Functioning Questionnaire (PRFQ; Luyten, Mayes, et al., 2017) to assess PRF.

With regard to the assessment of parental attachment, two broad research traditions have been developed. One tradition has relied on interview-based measures of adult attachment, such as the AAI, the other on self-report

measures, such as the ECR-R (Mikulincer & Shaver, 2007). The AAI assesses individuals' state of mind with regard to past attachment experiences, while measures such as the ECR-R measures more manifest attitudes and feelings with regard to attachment relationships. Studies investigating associations among self-reported attachment and interview-based assessment of states of mind with regard to attachment experiences have shown mixed results, ranging from nonsignificant to modest associations (Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2010). This may not be surprising, as the AAI and self-report questionnaires measuring attachment dimensions are substantially different in their conceptualization of attachment as well as in used methodology (Bernier & Matte-Gagné, 2011). Nevertheless, despite differences between these two approaches, both states of mind attachment with regard to past attachment experiences assessed using interviews as well as self-reported thoughts and feelings with regard to current attachment relationships are thought to emerge from a person's attachment experiences with caregivers that are underpinned by similar underlying dimensions, i.e attachment anxiety and attachment avoidance (Mikulincer & Shaver, 2007). Research also shows that self-reported measures of attachment insecurity have been found to be related, similarly as the AAI, to problems with emotion regulation and a variety of negative parenting behaviors such as impairments in parental responsiveness and sensitivity (Jones, Cassidy, & Shaver, 2015). Moreover, there is growing evidence that each of these assessment traditions tap into distinct aspects of attachment. Therefore, both measures may relate in unique ways to personal and relational functioning (Bernier & Matte-Gagné, 2011; Fortuna & Roisman, 2008; Roisman et al., 2007). In this study, we used the ECR-R as we were primarily interested in the influence of attachment as a dimensional feature of parents, rather than focusing on a typological distinctions between parents as is typical of interview-based approaches to attachment. Although sex differences in the distribution of attachment insecurity have not been reported in studies using the AAI (Bakermans-Kranenburg & van IJzendoorn, 2009a, 2009b; van IJzendoorn & Bakermans-Kranenburg, 2010), studies with self-report questionnaires of attachment such as the ECR-R are thought to be more strongly affected by sex differences (van IJzendoorn & Bakermans-Kranenburg, 2010). Indeed, a meta-analysis of sex differences in romantic attachment showed that men tend to score higher on attachment avoidance and lower on attachment anxiety than women (Del Giudice, 2011)

### **The present study**

In line with the literature review above, we expected parental attachment dimensions to be directly as well as indirectly, namely through PRF, related to child social-emotional development. More specifically, we hypothesized that insecure parental attachment dimensions would be negatively related to indices of child social-

emotional development. Furthermore, we expected that PRF dimensions would mediate the longitudinal relationships between parental attachment dimensions assessed at baseline and child social-emotional competences and problems at follow-up 1 year later. No a priori hypotheses were made with regard to potential sex differences in predicting child social-emotional development, given the scarcity of available studies in this context. However, we did expect the strongest mediation effects for the PRF dimension “prementalizing modes” (PM), which is characterized by the parent’s tendency to make maladaptive and malevolent attributions about the child, in both mother and fathers. Indeed, empirical research suggests that indices of more adaptive PRF (such as “interest and curiosity in mental states” and “certainty about mental states”) vary in the degree to which they are related to parental attachment dimensions, whereas maladaptive PRF (i.e., PM) is strongly related to parental attachment anxiety and avoidance (Burkhart, Borelli, Rasmussen, Brody, & Sbarra, 2017; Luyten, Mayes, et al., 2017; Pazzagli et al., 2018; Rostad & Whitaker, 2016).

## Method

### Participants

At time 1 (T1), the study sample consisted of 76 first-time parental couples and their infants aged 8–13 months. Mothers and fathers differed significantly in age ( $t(134.62)=3.57, p<.001$ ), with mothers being a mean 29.31 years ( $SD=3.00$ ; range 23–39) and fathers 31.48 years ( $SD=4.39$ ; range 20–47). The majority of parents had attained higher education (82.9% for mothers and 72.8% for fathers). The 76 infants, comprising 45 girls (59.2%) and 31 boys (40.8%), were a mean 10.11 months old ( $SD=1.24$ ; range 8–13) at T1.

The final sample at time 2 (T2) consisted of 53 couples (response rate 69.73%) and their infants (31 girls [58.5%], 22 boys [41.5%]). The mean age of the mothers was 29.69 ( $SD=2.72$ ; range 24–40) and the fathers 32.83 ( $SD=4.42$ ; range 26–48) years. The infants were a mean 21.81 months old ( $SD=1.31$ ; range 19–26). A comparison of parents who participated at T2 and those who did not revealed no significant differences with regard to parental sex, age, or educational level, or child sex or age.

### Procedure

Participants were recruited by undergraduate university students in central Belgium in return for credits in a methodology course. Prior to contacting potential participants, students were educated and trained in the principles of research and the study itself. Students were instructed to recruit Dutch-speaking, heterosexual couples who were

first-time parents of a healthy biological child aged 8–13 months. Couples who agreed to participate were told they would participate in a study about the characteristics of young parents and their relationship with their child.

Participation was voluntary and confidentiality was guaranteed. There was no compensation provided for parents who participated in the study. Eligible participants were home visited by the students and written informed consents by both parents were obtained. Parents were then asked to complete a booklet of questionnaires, which was collected by the students two weeks later. Approximately 1 year later, the same parents were contacted by post and/or e-mail and invited to participate in the second wave of the study by completing a second booklet of questionnaires. Parents who did not complete the booklet within 2 weeks were contacted by up to three follow-up telephone calls to encourage them to complete the set of questionnaires, after which they were considered dropouts if they had not responded.

### Measures

*Parental attachment dimensions* were assessed at T1 by using the Experiences in Close Relationships Questionnaire-Revised (ECR-R; Fraley et al., 2000), a 36-item self-report questionnaire scored on a 7-point Likert scale. The ECR-R measures insecure attachment strategies in the context of adult romantic attachment (Brennan, Clark, & Shaver, 1998). Two dimensions underlying attachment are defined: *attachment anxiety* refers to fear of rejection and abandonment (18 items; e.g., “I am afraid that I will lose the love of the other”), whereas *attachment avoidance* refers to discomfort with closeness and dependence on others (18 items; e.g., “I don’t like a relationship with the other to be too close”). Studies have supported the reliability and validity of the ECR-R (Sibley, Fischer, & Liu, 2005; Sibley & Liu, 2004). In this study, internal consistencies of the subscales were good, with Cronbach’s alphas of .87 for attachment anxiety and .86 for attachment avoidance.

*Parental reflective functioning* was assessed at T2 by using the PRFQ (Luyten, Mayes, et al., 2017), an 18-item self-report questionnaire scored on a 7-point Likert scale. The PRFQ assesses three basic dimensions of PRF: *prementalizing modes* (PM), reflecting the repudiation of or defense against mentalizing (6 items; e.g., “My child sometimes gets sick to keep me from doing what I want to do”); *certainty about mental states* (CMS), reflecting the parent’s ability to recognize the opacity of mental states (6 items; e.g., “I always know what my child wants”); and *interest and curiosity in mental states* (IC), reflecting active curiosity about and willingness to understand the mental states of the child (6 items; e.g., “I am often curious to find out how my child feels”). Experimental data support the

reliability and preliminary validity of the PRFQ (Luyten, Mayes, et al., 2017). In the present study, Cronbach's alphas for PM, CMS, and IC were .73, .73, and .72, respectively.

*Child social-emotional capacities* were measured by using the Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan & Carter, 2002) at T2. The BITSEA is a 42-item parent-report questionnaire for children aged 12–36 months (scored on a 3-point Likert scale), pertaining to two domains, namely *problems* (31 items; e.g., “Hits, shoves, kicks, or bites children – not including brother or sister”) and *competences* (11 items; e.g., “Tries to help when someone is hurt, for example gives a toy”). Higher scores on the problems scale indicate a higher risk for the development of social-emotional or behavioral problems (i.e., internalizing and externalizing problems), whereas lower scores on the competences scale indicate a higher risk for delayed development of social-emotional competences such as compliance, empathy, mastery motivation, and prosocial peer interactions (Briggs-Gowan & Carter, 2007). Research has shown very good reliability and validity for the BITSEA (Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004; Kruizinga et al., 2012). In this study, we calculated average scores for competences and problems. Cronbach's alphas in this study were .67 for problems and .60 for competences.

### **Data analyses**

First, descriptive statistics were calculated to describe the sample. A power analysis was conducted based on other studies suggesting small to medium effect sizes between attachment dimensions and child socio-emotional development (Fearon, Bakermans-Kranenburg, Van Ijzendoorn, Lapsley, & Roisman, 2010; Madigan, Atkinson, Laurin, & Benoit, 2013; Madigan, Brumariu, Villani, Atkinson, & Lyons-Ruth, 2016; Verhage et al., 2016). Similarly, small to medium effect sizes have been shown to be typical for the relation between PRF on the one hand and child attachment and socio-emotional development on the other (Zeegers et al., 2017). For medium effect sizes, the required sample size is  $n = 85$  ( $p < .05$ ) and  $n = 125$  ( $p < .01$ ) (power = .80) (Cohen, 1992). Second, we computed zero-order correlations among parental attachment dimensions, PRF dimensions, and child social-emotional capacities for mothers and fathers separately (see Table 1). Structural equation modeling (SEM) in mothers and fathers separately was used to investigate longitudinal mediational effects of PRF on child competences and problems. We evaluated multiple SEM models, starting with a base model that included all direct paths between the predictor (parental attachment anxiety and avoidance at T1) and dependent (child social-emotional competences and problems at T2) variables. Next, we tested a full mediation model with only indirect effects through PRF at T2 (i.e., without direct paths from parental attachment dimensions to child social-emotional competences and

problems). In a final step, we tested partial mediation by adding all direct paths to the second model with indirect effects (Cole & Maxwell, 2003). Potential intervening effects (Hayes, 2009) were examined if the first criterion of mediation was not met (no direct association between predictor and outcome variable; Baron & Kenny, 1986). We used modification indices to evaluate potential modifications with a step-by-step approach, omitting nonsignificant paths if this increased the model fit. We compared the fit of each model by inspecting several fit indices according to conventional criteria (Byrne, 1998; Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999; Steiger, 2007): The ratio of  $\chi^2$  to  $df$  is recommended to range from 5.0 to 2.0 to provide an acceptable fit for the model. The comparative fit index (CFI) and Tucker-Lewis index (TLI) should be  $\geq .95$  for a good fit, and the root mean square error of approximation (RMSEA) should be  $\leq .06$  for a good fit. The confidence interval for the RMSEA should be between 0 and .07 to provide a good fit.

SPSS version 22.0 and AMOS 18.0 for was used for all statistical analyses.

## Results

### Preliminary Analyses

Table 1 shows the descriptive statistics for parental attachment dimensions, child social-emotional competences and problems, and PRF dimensions. None of the child and parent demographic features were significantly related to child social-emotional competences and problems. None of the children had mother- or father-reported scores below the clinical cut-off score for competences ( $\leq 15$ ). For problems, six versus ten percent of the children scored above the clinical cut-off score ( $\geq 14$ ) as reported by fathers and mothers, respectively.

There was a significant correlation between mother- and father-reported child socio-emotional problems ( $r = .38, p < .01$ ), but not with regard to reported child competences ( $r = .09, p = .51$ ). In addition, there was a significant negative association between father-reported problems and mother-reported competences ( $r = -.34, p < .05$ ), while the relation between mother-reported problems and father-reported competences showed a small trend towards significance ( $r = -.24, p = .09$ ). Paternal nor maternal attachment and PRF dimensions were significantly associated with maternal or paternal child competences and problems.

We also examined possible differences between mothers and fathers with regard to parental attachment dimensions, PRF dimensions, and self-reported child social-emotional development using paired samples *t*-tests. As expected mothers scored slightly higher on attachment anxiety than fathers, although the difference was not

significant ( $p = .10$ ). Fathers had significantly higher levels of attachment avoidance ( $p < .05$ ). There was no significant difference between mothers and fathers for levels of PM and CMS, but levels of IC were significantly higher in mothers ( $p < .05$ ). Finally, there was no significant difference in the mother- and father-reported child competences, and there was a trend that mothers reported higher child problems compared to fathers ( $p = .07$ ).

### **Associations Among Parental Attachment Dimensions, PRF, and Child Social-Emotional Development**

Zero-order correlations among the study variables were calculated for mother- and father-reported data separately (Table 1). Both attachment anxiety and attachment avoidance at T1 were highly significantly related to PM at T2 in mothers and in fathers, although correlations in fathers were slightly weaker. We found no significant correlations with the other subscales of the PRFQ (IC and CMS), except for a significant positive correlation between attachment anxiety at T1 and CMS at T2 in fathers.

At T2, for both mothers and fathers, PM was significantly negatively correlated with child social-emotional competences. Further, PM in fathers was significantly positively correlated with child social-emotional problems, whereas this association was marginal in mothers. Furthermore, attachment anxiety and avoidance were negatively related to child social-emotional competences in mothers (but not in fathers). Neither attachment anxiety or avoidance in either mothers or fathers was significantly related to child social-emotional problems. Finally, we found no significant correlations between CMS and social-emotional competences and problems. Hence, the findings warranted the testing of PM as a potential mediator between parental attachment dimensions and child social-emotional competences and problems.

(Place Table 1 here)

### **The Mediating Role of PM on Child Competences and Problems in Mothers**

The first (base) model with only direct paths did not provide a good fit to the data,  $\chi^2(1) = 1.44$ ;  $\chi^2/df = 1.44$ ;  $p = .23$ ; CFI = 0.99; TLI = 0.93; RMSEA = .09 (CI = .00, .40). In this model, only the path from attachment anxiety to child social-emotional competences was significant ( $\beta = -.39$ ,  $p < .05$ ). Removal of the nonsignificant paths yielded a model with a good fit to the data,  $\chi^2(1) = 0.11$ ;  $\chi^2/df = 0.11$ ;  $p = .74$ ; CFI = 1.00; TLI = 1.00; RMSEA = .00 (CI = .00, .26).

The second model, with only indirect effects, yielded a good fit to the data,  $\chi^2(5) = 5.86$ ;  $\chi^2/df = 1.18$ ;  $p = .32$ ; CFI = 0.97; TLI = 0.99; RMSEA = 0.06 (CI = .00, .21). The paths from attachment avoidance to PM ( $\beta = .36$ ;  $p < .05$ ) and from PM to child social-emotional competences ( $\beta = -.40$ ;  $p < .01$ ) were significant, while the paths from

attachment anxiety to PM ( $\beta = .25; p = .11$ ) and from PM to child social-emotional problems ( $\beta = .25; p = .06$ ) showed a trend toward positive associations, but these trends failed to reach significance. We first removed the path from attachment anxiety to PM, which led to a model that provided an adequate fit to the data,  $\chi^2(6) = 8.93; \chi^2/df = 1.40; p = .21; CFI = 0.96; TLI = 0.93; RMSEA = 0.09$  (CI = .00, .21). The paths from attachment avoidance to PM ( $\beta = .53; p < .001$ ) and from PM to child social-emotional competences ( $\beta = -.40; p < .01$ ) remained significant, while the path from PM to child social-emotional problems remained marginally significant ( $\beta = .25; p = .06$ ). Next, we removed the path from PM to child social-emotional problems, which led to a model that did not provide a good fit to the data,  $\chi^2(3) = 7.26; \chi^2/df = 2.42; p = .06; CFI = 0.92; TLI = 0.86; RMSEA = 0.17$  (CI = .00, .32). We therefore decided to keep the first model with all the indirect paths (including the marginally significant paths) as the final indirect effects model.

The final model, with both direct and indirect paths, provided a good fit to the data,  $\chi^2(4) = 1.18; \chi^2/df = .29; p = .88; CFI = 1.00; TLI = 1.00; RMSEA = 0.00$  (CI = .00, .10). The paths from attachment avoidance to PM ( $\beta = .36; p < .05$ ) and from attachment anxiety to child social-emotional competences ( $\beta = -.31; p < .05$ ) were significant. The paths from attachment anxiety to PM ( $\beta = .25; p = .11$ ) and from PM to social-emotional competences ( $\beta = -.25; p = .08$ ) and problems ( $\beta = .25; p = .06$ ) showed a trend towards significance. We first removed the path from attachment anxiety to PM, which led to a model that also provided a good fit to the data,  $\chi^2(5) = 3.68; \chi^2/df = .74; p = .60; CFI = 1.00; TLI = 1.00; RMSEA = 0.00$  (CI = .00, .16). The paths from attachment avoidance to PM ( $\beta = .53; p < .001$ ) and from attachment anxiety to child social-emotional competences ( $\beta = -.32; p < .05$ ) remained significant. The paths from PM to child social-emotional competences ( $\beta = -.25; p = .06$ ) and problems ( $\beta = .25; p = .06$ ) showed a trend towards significance. This model did not differ in terms of goodness of fit from the previous model ( $\Delta\chi^2 = 2.5(1), ns$ ). We then removed the path from PM to child social-emotional problems, leading to a model that yielded an adequate fit to the data,  $\chi^2(2) = 2.55; \chi^2/df = 1.28; p = .30; CFI = 0.99; TLI = 0.97; RMSEA = 0.07$  (CI = .00, .30). The paths from attachment avoidance to PM ( $\beta = .53; p < .001$ ) and from attachment anxiety to child social-emotional competences ( $\beta = -.31; p < .05$ ) remained significant. The path from PM to child social-emotional competences showed a trend towards significance ( $\beta = -.25; p = .06$ ). Finally, we removed the path from PM to child social-emotional competences. This model did not provide a good fit to the data,  $\chi^2(3) = 5.59; \chi^2/df = 1.86; p = .13; CFI = 0.96; TLI = 0.91; RMSEA = 0.13$  (CI = .00, .30). The paths from

attachment avoidance to PM ( $\beta = .53; p < .001$ ) and from attachment anxiety to child social-emotional competences ( $\beta = -.43; p < .001$ ) remained significant.

Thus, the final model contained a direct path from attachment anxiety to child social-emotional competences, and indirect paths from attachment anxiety and avoidance to child social-emotional competences and problems (see Figure 1). Hence, PM partially mediated the relation between attachment anxiety and child social-emotional competences, and played an intervening role in the relation between attachment avoidance and child social-emotional competences and problems.

(Place Figure 1 here)

### **The Mediating Role of PM on Child Competences and Problems in Fathers**

The first (base) model, with only direct paths, did not provide a good fit to the data,  $\chi^2(1) = 2.53; \chi^2/df = 2.53; p = .11; CFI = .90; TLI = .41; RMSEA = .17$  (CI = .00, .45). As expected, in this model, paths from attachment anxiety and avoidance to child social-emotional competences and problems were nonsignificant. Therefore, only indirect effects through PM were investigated.

The second model, with only indirect effects, yielded a good fit to the data,  $\chi^2(5) = 2.52; \chi^2/df = .50; p = .77; CFI = 1.00; TLI = 1.00; RMSEA = 0.00$  (CI = .00, .13). The paths from attachment anxiety to PM ( $\beta = .33; p < .05$ ), and from PM to child social-emotional competences ( $\beta = -.31; p < .05$ ) and problems ( $\beta = .33; p < .05$ ) were significant. The path from attachment avoidance to PM, however, was nonsignificant ( $\beta = .07; p = .64$ ). Removing this nonsignificant path yielded a model that also provided a good fit to the data,  $\chi^2(6) = 2.73; \chi^2/df = 0.46; p = .84; CFI = 1.00; TLI = 1.00; RMSEA = 0.00$  (CI = .00, .10). This model did not differ in terms of goodness of fit from the previous model ( $\Delta\chi^2 = 0.21$  (1), *ns*). Because of the nonsignificant path between attachment avoidance and PM in the previous unrestricted model, we decided to keep the restricted model as the final model (see Figure 2). These results indicate an intervening effect of PM in the relation between attachment anxiety and child social-emotional competences and problems in fathers.

(Place Figure 2 here)

### **Discussion**

Although many studies have explored the relationships among parental attachment, PRF, and infant attachment, few have focused on the putative role of PRF in the relationship between parental attachment and child

development. This is the first study to attempt to disentangle prospective relationships among parental attachment dimensions, PRF, and the development of child social-emotional capacities, using a multidimensional measure of PRF.

As expected, maternal attachment anxiety and avoidance were negatively related to subsequent child social-emotional competences in toddlerhood. However, the same associations were not found for social-emotional problems in toddlerhood. Similarly, we found no direct associations between fathers' attachment dimensions and social-emotional child development. This lack of direct associations between parental attachment and subsequent child social-emotional development may not be surprising in the light of current socioecological views on child development that de-emphasize the unique role of parental attachment in fostering developmental trajectories in their children (Luyten et al., 2020). This assumption is further supported by results of the mediation analyses, showing that attachment dimensions were only indirectly related to the development of child social-emotional competences and problems through high levels of PM in both mothers and fathers. For example, we found parental PM in toddlerhood to be an intervening variable in the relationship between parental attachment dimensions in infancy and child social-emotional competences and problems in toddlerhood. More specifically, higher levels of paternal attachment anxiety and maternal attachment avoidance in infancy led to higher PM in toddlerhood, which in turn was related to fewer competences and more problems in the toddlers' social-emotional development. These sex-related results are consistent with research on the role of sex differences in attachment. Attachment avoidance seems to be more common in men, whereas attachment anxiety is more common in women (Blatt, 2004; Zuroff & Fitzpatrick, 1995), especially in Western societies that place a greater emphasis on the need for self-definition in men and on the capacity for relatedness in women (Luyten & Blatt, 2013). In this context, sex incongruence (i.e., high levels of attachment anxiety in men and high levels of attachment avoidance in women) has been hypothesized to be associated with an increased risk for maladjustment and psychopathology in both parents and their children because of incongruent socio-cultural expectations (Luyten & Blatt, 2013). This may explain why high levels of attachment anxiety in fathers were associated with more child social-emotional problems and fewer competences, whereas in mothers this was the case for high levels of attachment avoidance.

Additionally, in mothers only, we found PM to partially mediate the relation between attachment anxiety and child social-emotional competences. Maternal attachment thus seemed to influence child social-emotional development both directly and indirectly. The fact that in mothers only, attachment was directly and prospectively

associated with child socio-emotional competences may not be surprising, as mothers are still the primary caregivers in most Western countries, particularly in the early stages of development, and thus may have more influence on the developmental trajectory of their child (Leckman et al., 1999). This finding is also consistent with findings reported by van Ijzendoorn et al. (1991), showing that maternal attachment insecurity was related to less resilience and control in their children. Contrary to our study in which no direct (and only indirect) relations between paternal attachment and child social-emotional development were found, the study of van Ijzendoorn et al. (1991) also reported a direct association between attachment insecurity and indices of externalizing problems in fathers. However, differences in results obtained may be due to methodological issues, in that our study used the ECR-R to assess adult attachment dimensions, whereas van Ijzendoorn et al. (1991) used the AAI to measure adult attachment. We also used different measures of child social-emotional development (BITSEA versus NCCS). As mentioned before, both measurement methods are thought to tap into different features of child development, and this could also explain the differences in results. Further research is needed to expand on hypothesized differences in the role of mothers and fathers in predicting developmental trajectories.

Finally, in line with previous research pointing out the unique role of PM in understanding the development of emotional problems (Burkhart et al., 2017; Krink et al., 2018; Luyten, Mayes, et al., 2017; Pazzagli et al., 2018; Rostad & Whitaker, 2016; Rutherford et al., 2015), we found effects only for the maladaptive dimension of PRF, that is, PM, and not for the other PRF dimensions (IC and CMS). These results are also congruent with theoretical assumptions that maladaptive PRF negatively influences child social-emotional development (e.g., Ensink & Mayes, 2010; Fonagy & Target, 2005; Sharp & Fonagy, 2008; Slade, 2005). Specifically, parents with high levels of PM tend to make malevolent attributions about their child's mind, which may lead to a feeling of non-markedness in the child. Subsequently, this might hamper the child's development of the capacity to reflect on emotions and their impact, resulting in affect regulation problems (Fonagy, Gergely, Jurist, & Target, 2002). Affect regulation problems have been shown to be associated with problems in social-emotional development (e.g., Halligan et al., 2013). These findings also further extend the assumption of a loose coupling between attachment and PRF, suggesting that insecure attachment (characterized by high levels of attachment anxiety and/or avoidance) is associated with maladaptive and inaccurate PRF (PM), but not necessarily with other, more adaptive features of PRF (IC and CMS). This hypothesis is also in line with research on the impact of arousal on mentalizing capacities showing that distress activates the attachment system and the use of hyperactivating or deactivating attachment

strategies (which are associated with attachment anxiety and avoidance, respectively), in turn causing impairments in mentalizing, which can be accompanied by the use of PM (Fonagy & Luyten, 2009; Luyten & Fonagy, 2015).

Together, these findings, if replicated, might have implications for clinical interventions, particularly for insecurely attached parents. Early interventions focusing on the parent's sensitivity and appropriate responsiveness to the infant's cues, as well as promoting PRF by helping the parent understand the child's behavior in the context of his/her internal mental experience, could serve important preventive functions with regard to children's social-emotional development. Finally, it is important to include both parents in early intervention programs, as mothers and fathers may provide unique contributions with regard to child development.

We acknowledge several limitations of the current study. First, the sample size was relatively small, which may have led to limited statistical power to detect small effects which seem to be typical in this area. Yet, on the whole, findings seem quite robust and consistent with theoretical expectations, although some relatively substantial correlations only were significant at the trend level.

Second, the sample was relatively homogeneous, comprising mainly middle-class, well-educated mothers and fathers. Yet, even within this relatively well-educated and well-functioning group, impairments in PRF were prospectively related to child socio-emotional problems and competences. Yet, studies in at-risk and in clinical samples are needed to further investigate the purported role of PRF in explaining the development of children's socio-emotional problems and competences.

Third, only parental self-report measures were used to assess parental attachment dimensions, PRF, and child social-emotional development. Multimethod and multi-informant studies are therefore needed to see whether our results can be replicated when other measurement methods are used. For example, we used the ECR-R to measure parental attachment dimensions that stem from attachment strategies in close relationships instead of the AAI that assesses state of mind attachment. As noted, associations among the ECR-R and the AAI are typically weak, possibly due to conceptual and methodological differences between both measurement methods (Bernier & Matte-Gagné, 2011; Ravitz et al., 2010). Nevertheless, both measures are thought to be equally important in predicting parental features and child development, as they may have unique and differential contributions towards these outcomes (Bernier & Matte-Gagné, 2011; Fortuna & Roisman, 2008; Roisman et al., 2007). Similarly, studies examining the association between multiple informants suggest that there is only a modest association between observer-related and parental or child self-report measures of child social-emotional development (e.g., Gartstein &

Marmion, 2008; Karp, Serbin, Stack, & Schwartzman, 2004; Van Roy, Groholt, Heyerdahl, & Clench-Aas, 2010). Future research should therefore apply a multi-method and multi-informant approach (De Los Reyes & Kazdin, 2005). In this regard, it would also be interesting to investigate whether PRF accounts for differences in ratings of child development, as informant discrepancies are thought to be related to the attributions that different informants have about the causes of the child's behaviors (De Los Reyes & Kazdin, 2005).

Finally, we focused on PRF as a possible mechanism explaining the relationship between parental attachment and child social-emotional capacities. In line with recent theoretical developments concerning the role of epistemic trust and social learning, which warn against a simplistic and linear understanding of the relationship between parental attachment and child development, findings of this study stress the importance of considering the broader caregiving environment in determining children's social-emotional development (Luyten et al., 2020; Luyten, Nijssens, et al., 2017; Sharp & Fonagy, 2008). In this regard, child developmental trajectories are also thought to be influenced by evocative person–environment interactions (Klahr & Burt, 2013; Marceau et al., 2013), where child features increasingly influence the parent–child interaction, including PRF. Children who have deficits in social-emotional competences may be, for example, more challenging for their parents, leading to higher levels of attachment insecurity in the parents and an ensuing vicious cycle of increasing impairments in social-emotional skills in children and increasing attachment insecurity in parents. In infancy, these evocative person–environment correlations may be weaker, with parental features being the most important factor driving effects on child development, whereas parent and child features may become progressively more interdependent. Multi-wave longitudinal studies are needed to investigate the potential role of such evocative person–environment interactions.

### **Compliance with Ethical Standards**

#### **Funding**

No funding was received for this study.

#### **Ethical Approval**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Ethics Committee of KU Leuven (Belgium).

### **Informed Consent**

Informed consent was obtained from all individual participants included in the study.

### **Author Contributions**

LN: designed and executed the study, analyzed the data, and wrote the first draft of the paper. NV: collaborated with the design and writing of the study. PL: designed the study, assisted in data analyses and in the writing and editing of the final manuscript.

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Table 1

*Zero-Order Correlations, Means, and Standard Deviations among Study Variables for Mother- and Father-Reported Data*

	1	2	3	4	5	6	7	<i>M (SD)</i>
1. Competences	—							1.69 (0.22) / 1.63 (0.24)
2. Problems	-.20/-.22	—						0.28 (0.16) / 0.24 (0.12)
3. Anxiety	-.43**/-.04	.10/.20	—					2.21 (0.75) / 1.99 (0.66)
4. Avoidance	-.33**/-.12	.17/.14	.67**/.52**	—				1.99 (0.59) / 2.19 (0.61)
5. PM	-.40**/-.31*	.25°/.33*	.49**/.37**	.53**/.24°	—			1.62 (0.65) / 1.64 (0.74)
6. CMS	-.08/.21	-.01/.07	.25/.31*	.22/.04	.18/.17	—		3.71 (0.89) / 3.59 (1.10)
7. IC	.07/.34*	.29*/-.07	-.14/-.11	-.13/-.04	-.15/-.23°	.01/-.19	—	6.03 (0.59) / 5.70 (0.79)

*Note.* Data are presented as mother data ( $n = 53$ )/father data ( $n = 53$ ). PM = pre-mentalizing modes; CMS = certainty about mental states; IC = interest and curiosity in mental states.

°  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$  (two-tailed test).

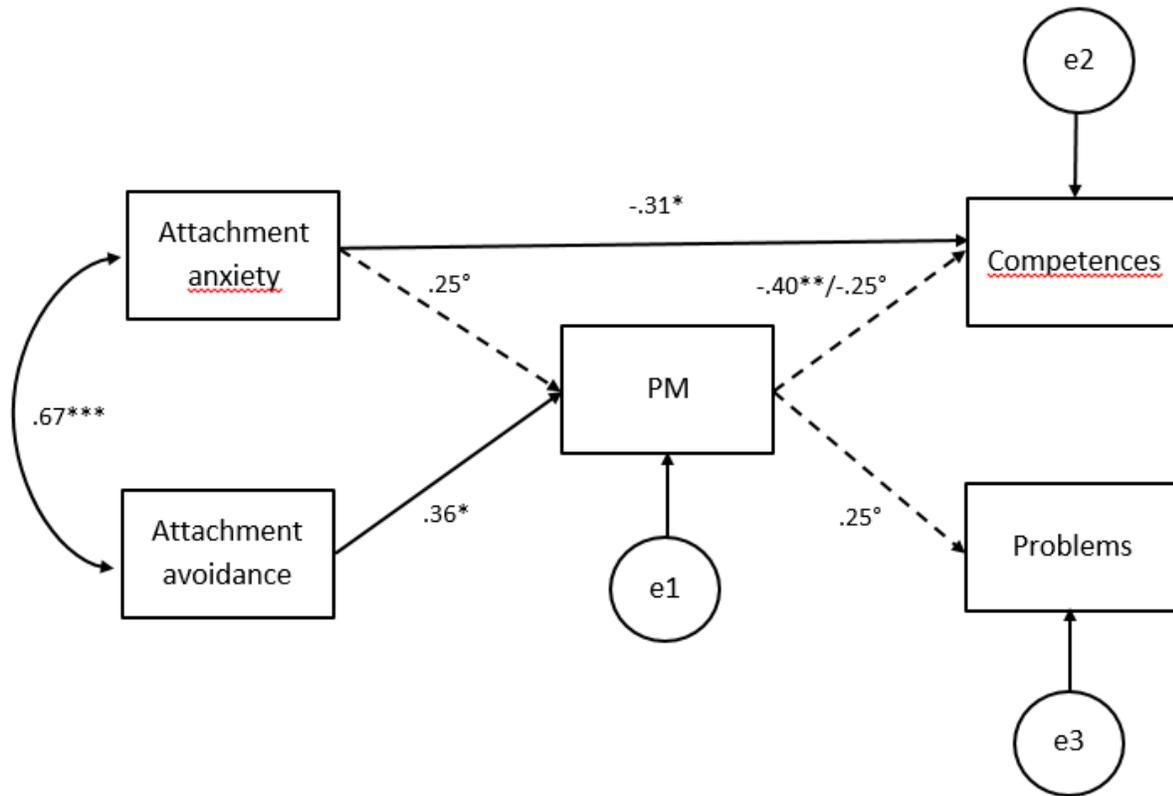


Figure 1. Final model of the role of PM in the relationship between parental attachment dimensions and child social-emotional competences and problems in mothers.

Note. Rectangles indicate measured variables and the small circles reflect residuals (e). The bidirectional arrow depicts covariance and unidirectional arrows depict hypothesized directional links. Standardized regression weights are given for the path coefficients (if values changed after adding direct paths to the indirect model, values are presented as value for the indirect model/value for the direct model).

$N = 53$ ; °  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

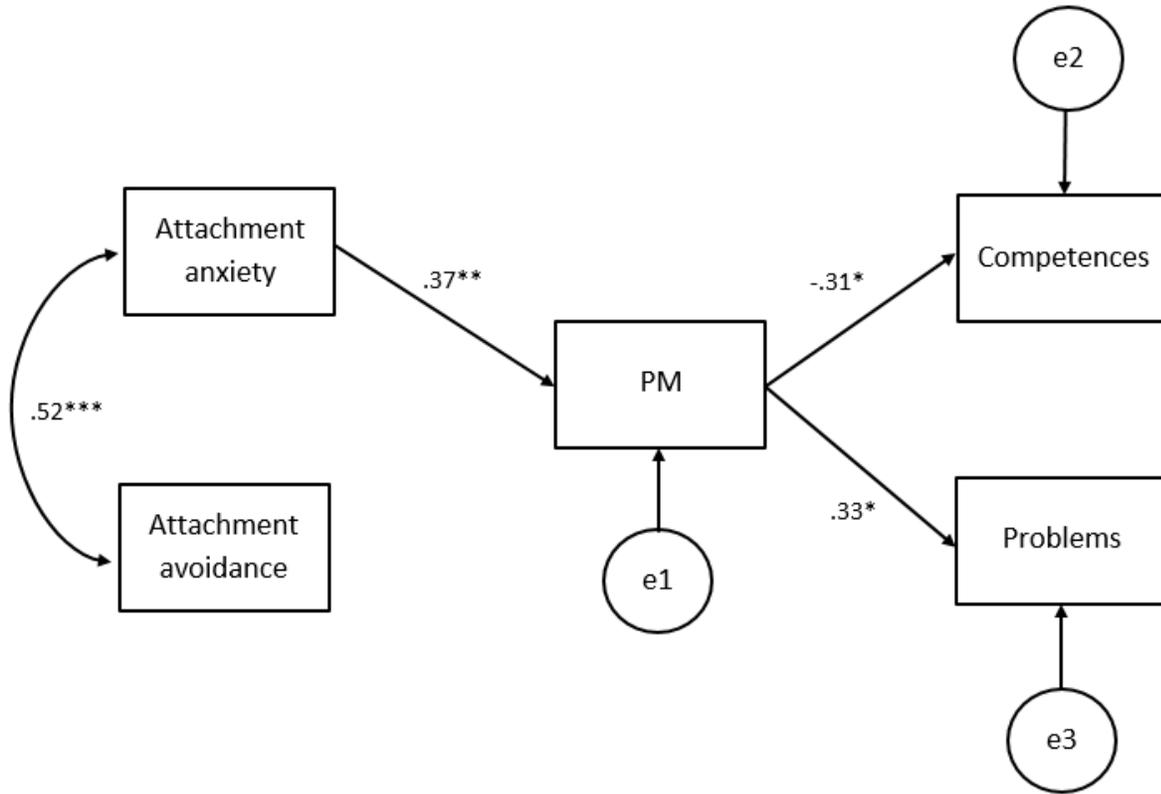


Figure 2. Final intervening model of the role of PM in the relationship between parental attachment dimensions and child social-emotional competences and problems in fathers.

Note. Rectangles indicate measured variables and the small circles reflect residuals (e). The bidirectional arrow depicts covariance and unidirectional arrows depict hypothesized directional links. Standardized regression weights are given for the path coefficients.

$N = 53$ ; \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .