

The Parental Reflective Functioning Questionnaire in mothers and fathers of school-aged children

Pazzagli, Chiara<sup>1\*</sup>. Delvecchio, Elisa<sup>1</sup>. Raspa, Veronica<sup>1</sup>. Mazzeschi, Claudia<sup>1</sup>. Luyten, Patrick<sup>23</sup>

<sup>1</sup>Department of Philosophy, Social & Human Sciences, and Education, University of Perugia, Italy

<sup>2</sup>Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium

<sup>3</sup>Research Department of Clinical Educational, and Health Psychology, UCL, London, United Kingdom

\*Requests for reprints should be addressed to Chiara Pazzagli, Department of Philosophy, Social & Human Sciences, and Education, University of Perugia - Piazza Ermini 1, 06123 Perugia, Italy (e-mail: [chiara.pazzagli@unipg.it](mailto:chiara.pazzagli@unipg.it)).

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**Conflict of interest**

The authors declare that they have no conflict of interest.

PRFQ across mothers and fathers

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2

**Abstract**

1  
2 Research on parental reflective functioning (PRF)—defined as parents’ capacity to comprehend the developing mind  
3 of their child, reflect upon it, and hold in mind the inner life of the child—has mostly involved mothers of infants  
4 and young children, and rarely fathers and parents of school-aged children. The present study sought to extend  
5 research on PRF by examining aspects of the construct that are still scarcely explored, such as the role of gender and  
6 attachment; to investigate whether there were differences between mothers’ and fathers’ PRF and whether there  
7 were differences in PRF related to the gender and age of the child; and, finally, to assess the association between  
8 PRF and each parent’s attachment style. The Parental Reflective Functioning Questionnaire (PRFQ) and the  
9 Attachment Style Questionnaire (ASQ) were administered to a community sample of mothers and fathers of 385  
10 children aged 3–10 years. A multi-group factor analysis supported the hypothesized three-factor model among both  
11 fathers and mothers. Univariate and multivariate analyses of variance showed that mothers had higher levels of  
12 interest and curiosity in their children’s mental states than fathers. Parents of daughters showed higher pre-  
13 mentalizing modes than parents of sons. Parents of preschool children showed less nonmentalizing modes than  
14 parents of children aged 8–10. Correlations between PRFQ and ASQ showed that both mothers’ and fathers’ interest  
15 in thinking about their child’s internal experience and in taking the child’s perspective were correlated with higher  
16 levels of secure attachment style. Research implications are discussed.

17  
18 *Keywords:* Parental reflective functioning, PRFQ, parents’ gender, child’s gender, attachment.  
19

## Introduction

Mentalizing or reflective functioning (RF) is the term used to label the mental function that organizes the experience of one's own and others' behavior in terms of mental-state constructs. It represents the capacity to go beyond observable phenomena to explain one's own or others' actions in terms of thoughts, feelings, and intentions (Fonagy and Target, 1997). RF is acquired in the context of the child's early social relationships, and parent-child relationships play a key role in the transformation of the pre-reflective experience of mental states into a reflective understanding of them. The parents' capacity to hold in mind a representation of their child as having his/her own feelings, desires, and intentions is considered to promote the development of mentalizing and self and affect regulation in children (Slade, 2005).

Parental RF (PRF)—defined as parents' capacity to comprehend the developing mind of their child, reflect upon it, and hold in mind the inner life of the child—is postulated to lie at the root of sensitive caregiving by making parents more able to imagine and try to understand the experience of their infant. Parents' sensitive responding allows them to provide a more secure base for their child, thereby playing a critical role in linking adult and infant attachment. Evidence has shown that mothers with higher PRF were more likely to be classified as secure and that the development of a reflective stance in childhood depends on the quality of attachment relationships (Ensink, Normandin, Plamondon, Berthelot, & Fonagy, 2016; Fonagy, Gergely, & Target, 2007; Fonagy, Steele, Steele, Moran, & Higgitt, 1991; Fonagy, Target, Gergely, & Jurist, 2002; Meins and Fernyhough, 1999; Sharp and Fonagy, 2008; Slade, 2005; Slade, Grienberger, Bernbach, Levy, & Locker, 2005).

Whereas early studies focused on assessing parents' general capacity to reflect on mental states, more recently, greater attention has been paid to RF as being relationship-specific. In early work, Fonagy, Steele, Steele, Moran and Higgitt (1991) developed RF scales to be used with the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985). RF has thus been scored measuring the individual's ability to reflect upon memorialized childhood experiences with parental figures in mentalizing terms. More recently, it has been suggested that the capacity to reflect on a specific relationship with a significant other could differ from more general mentalizing processes. PRF is intended to directly assess RF "within the specific context of (1) the parent-child relationship and (2) an ongoing, developing, 'live' relationship, as opposed to a prior, memorialized relationship" (Slade et al., 2005, p. 293). In other words, PRF is focused on parents' capacity to mentalize about and reflect upon their actual and evolving relationship with their children.

1 Experimentally, PRF was initially assessed from interviews about parents' experiences of parenthood (the  
2 Parent Development Interview—PDI; Slade, 2005), but more recently it has been assessed with more cost-effective  
3 and less time-consuming measures, such as the Parental Reflective Functioning Questionnaire (PRFQ; Luyten,  
4 Mayes, Nijssens, & Fonagy, 2017). The PRFQ assesses some critical aspects of the construct of PRF, such as the  
5 parent's understanding, curiosity about or disavowal of mental states, and the relationship between mental states and  
6 behavior (Ordway, Sadler, Dixon, & Slade, 2014). Specifically, it investigates low and high mentalizing capacities in  
7 three dimensions of PRF: (i) repudiation or defense against mentalizing, as reflected in various nonmentalizing (or  
8 "pre-mentalizing") modes of thought; (ii) lack of recognition of the impossibility of knowing exactly what is going  
9 on in the child's mind (certainty about mental states); and (iii) parental interest in the child's thoughts and feelings,  
10 and a genuine curiosity about the child's states of mind that underlie his/her behavior (interest and curiosity in  
11 mental states).

12 To date, only a few studies of PRF assessed using the PRFQ have been published. These studies showed  
13 that a parent's capacity to mentalize may be a critical factor in tolerating their infant's distress but not in tolerating  
14 general distress, thus indicating a specific connection between PRF and the context of parenting (Rutherford,  
15 Goldberg, Luyten, Bridgett, & Mayes, 2013). Rutherford, Booth, Luyten, Bridgett, and Mayes (2015a) replicated  
16 findings showing that mothers who scored higher for pre-mentalizing modes showed lower distress tolerance on  
17 both self-report and observational measures. Recently, Rutherford, Maupin, Landi, Potenza, and Mayes (2017)  
18 found an association between PRF and neural correlates of perception of infant cues, providing deeper evidence of  
19 the relationship between higher levels of PRF and greater sensitivity to infant emotional signals. Furthermore,  
20 Rostad and Whitaker (2016) found that mothers and fathers with higher PRF had greater involvement and  
21 communication with their child, practiced more positive discipline strategies, and experienced more satisfaction in  
22 their parental role. The findings of these studies suggest that higher PRF allows parents to be more attuned to their  
23 child's needs, and support the hypothesized relationship between PRF and the parents' ability to regulate their own  
24 emotions in the caregiving context (Sharp and Fonagy, 2008).

25 Despite studies having suggested that mothers and fathers have different relationships with their children, to  
26 date there is little evidence exploring differences between mothers' and fathers' RF (Benbassat and Priel, 2012;  
27 Lamb and Lewis, 2004; Luyten et al., 2017). Moreover, the few quantitative studies carried out to date have  
28 examined parents' general capacity to reflect on mental states, and not specifically PRF. Fonagy et al. (1991) found

1 no significant difference between mothers' and fathers' RF in a normal sample. Subsequently, Arnott and Meins  
2 (2007) found differences between mothers and fathers in the association between mind-mindedness, attachment state  
3 of mind, RF, and infant–parent attachment style. Esbjørn et al. (2013) found that mothers had significantly better RF  
4 than fathers. Two other studies investigated RF only in fathers, without comparing them with mothers, and provided  
5 evidence to suggest that fathers' RF is generally low (Madsen, Lind, & Munck, 2007; Stover and Kiselica, 2014).

6         These few available findings comparing mothers' and fathers' RF are in line with studies investigating the  
7 association between sensitivity and attachment. Van IJzendoorn and De Wolff (1997) found a weaker association  
8 between sensitivity and infant attachment in fathers than in mothers. More recently, Lucassen et al. (2011) showed a  
9 similar weak association between paternal sensitivity and infant–father attachment. Furthermore, attachment studies  
10 have shown that intergenerational transmission of attachment may be different between fathers and mothers  
11 (Cassibba, Coppola, Sette, Curci, & Costantini, 2017; van IJzendoorn, 1995; Verhage et al., 2016). As one factor  
12 underlying sensitive parenting, PRF is considered to be a crucial mechanism in the intergenerational transmission of  
13 attachment. PRF is proposed to be a mechanism through which parents' attachment influences children's attachment  
14 security, permitting caregivers to respond sensitively to children's attachment-related needs (Rostad and Whitaker,  
15 2016). To date, two studies have shown mothers' RF and maternal PRF to be associated with parenting sensitivity  
16 (Ensink et al., 2016; Stacks et al., 2014). Because good PRF affords parents greater capacity for regulation of  
17 emotion, which in turn can promote sensitivity, there is thus a need for additional studies comparing PRF in mothers  
18 and fathers.

19         Furthermore, although parental capacity to mentalize is believed to be influenced by a variety of child  
20 characteristics (Sharp and Fonagy, 2008), no studies have yet investigated whether there are differences in parents'  
21 RF related to their children's gender. In the scientific literature, differences in the relationship with mothers related  
22 to the child's gender have been reported by Tronick and Cohn (1989), who found different forms of emotional  
23 attunement between mothers and their daughters compared with their sons. Gender differences in children's levels  
24 of self-regulation at different ages were assessed in later studies (Kochanska, Murray, & Harlan, 2000; Raffaelli,  
25 Crockett, & Shen, 2005; Stifter and Spinrad, 2002). Because the parental capacity to engage in accurate and  
26 appropriate mentalizing is also influenced by child characteristics (Fonagy et al., 2002; Sharp and Fonagy, 2008),  
27 studies exploring differences in PRF related to children's gender are needed.

1           Moreover, several studies have investigated the essential role of parents' RF in general and PRF  
2 specifically for very young children. These studies demonstrated that it is challenging for parents to comprehend  
3 their young child's mental states, especially given that communication between parents and infants is mainly  
4 nonverbal (for a review see Katznelson, 2014). As children grow up, their capacities for emotional regulation and  
5 their relational needs change, along with the development of more sophisticated expressive capacities. More studies  
6 investigating parents' mentalizing when their children are at different ages could deepen comprehension of the  
7 connection between PRF and the child's changing developmental needs.

8           Finally, although the association between parents' attachment and mentalizing has been extensively  
9 theorized, only a few studies have empirically investigated it. Fonagy et al. (1991) reported higher scores on the RF  
10 scale in parents with secure–autonomous states of mind with respect to attachment, as measured by the AAI, and  
11 lower scores on the RF scale in parents classified as insecure with regard to attachment relationships. Slade et al.  
12 (2005) found significant group differences on attachment and maternal PRF, assessing the first in parents before  
13 their children's birth with the AAI, and the latter after birth with the PDI. Results showed secure–autonomous  
14 mothers to be significantly higher on PRF than insecure mothers. There is a paucity of studies on the relationship  
15 between PRF as measured with a self-report and adult attachment style (Camoirano, 2017). The findings of existing  
16 studies on the PRFQ support a significant association between PRF and parents' attachment avoidance and anxiety  
17 in current close relationships (Rostad and Whitaker, 2016; Luyten et al., 2017). However, the direct association  
18 between the subscales of the PRFQ and mothers' and fathers' secure and insecure attachment styles measured with a  
19 self-report has not yet been investigated.

20           The present study sought to extend research on PRF, as measured by the PRFQ, by examining aspects of  
21 the construct, such as the role of gender and attachment, that have not been yet explored. Specifically, we aimed to  
22 investigate (a) whether there were differences between mothers' and fathers' PRF; (b) whether there were  
23 differences in PRF related to children's gender and (c) related to children's age groups; and (d) the direct association  
24 between the subscales of the PRFQ and mothers' and fathers' attachment styles.

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## Method

### Participants

Participants were parents (385 mothers and 385 fathers) of 385 Italian children (182 girls, 203 boys) aged 3–10 years ( $M = 6.72$ ,  $SD = 2.08$ ). Of the children, 133(34.5%) were in preschool (3–5 years), 101 (26.2%) were in grades 1–2 (first cycle; 6–7 years), and 151 (39.2%) were in grades 3–5 (second cycle; 8–10 years) according to the Italian primary school system. All families were Caucasian and lived in central Italy. The average age of mothers was 36.62 years ( $SD = 5.77$ ) and the average age of fathers was 38.82 years ( $SD = 6.26$ ). Parents' socioeconomic status, measured according to Hollingshead (1975), was middle to upper for 92% of families, middle to low for 7%, and very high for 1%.

Families were primarily recruited through nurseries and schools and met the following criteria: (a) both mothers and fathers agreed to participate; (b) all mothers and fathers were heterosexual married couples; (c) all participants completed the entire assessment phase; and (d) parents and children did not meet criteria for psychiatric diagnosis and were not receiving psychological treatment.

### Procedures

The study was conducted in compliance with the ethical standards for research outlined in the Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association (2010). Ethical approval was obtained from the Bio-Ethical Committee for Research of the University of Perugia.

Parents were recruited in six preschools and four primary schools in central Italy; both public and private schools in urban and suburban school districts were represented. With the consent of the school principal, flyers were distributed inviting parents to participate in a study about how they feel and think about their children. Attrition was approximately 16% of invited families; parents who refused to participate reported reasons such as lack of time or interest. Parents signed informed consent forms to participate in the study. Parents completed the questionnaires at home and returned them to school via their children. Questionnaires were then collected by the research team. No incentives were given, and it was emphasized that participation in the study was voluntary. Confidentiality was ensured by replacing personal information with a numeric code.



1 **Measures**

2 *Parental Reflective Functioning Questionnaire* (Luyten et al., 2017). The Italian version of the PRFQ was  
3 administered. PRFQ was translated into Italian with the authors' permission according to the guidelines developed  
4 by the international committee of psychologists of the International Test Commission (Van de Vijver and  
5 Hambleton, 1996). A pilot study was performed to assess whether the questionnaire was clear and appropriate to the  
6 target population. The Italian version of the items was pilot tested with 40 mothers and fathers of children aged 3–10  
7 years, giving good results in terms of consistency ( $\alpha=.91$ ), which allowed its use in a large population. The PRFQ  
8 includes 18 items divided into three subscales that measure PRF. Participants are asked to rate a series of statements  
9 regarding their child, which assess the parent's curiosity about the child's mental states; efforts to understand mental  
10 states and how they relate to behavior; and refusal to acknowledge mental states and their influence on behavior. A  
11 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) is used to score each item. The first subscale,  
12 *Pre-Mentalizing*, comprises items designed to capture pre-mentalizing (or nonmentalizing) ways of thinking, with  
13 higher scores indicating the participant's struggle to understand and interpret the child's mental experience  
14 accurately; items include "My child sometimes gets sick to keep me from doing what I want to do" and "When my  
15 child is fussy he or she does that just to annoy me." The second subscale, *Certainty about Mental States*, is made up  
16 of items designed to reveal a parent's inability to recognize that mental states are not readily apparent; items include  
17 "I always know why my child acts the way he or she does" and "I can always predict what my child will do." The  
18 third subscale evaluates the level of *Interest and Curiosity* a parent has in thinking about the child's internal  
19 experience and in taking the child's perspective, with items such as "I like to think about the reasons behind the way  
20 my child behaves and feels" and "I am often curious to find out how my child feels." Exploratory and confirmatory  
21 factor analyses (CFAs) on the three-factor structure of the PRFQ have been carried out in two different samples  
22 (mothers and fathers); the questionnaire showed good internal consistency, with  $\alpha=.70$  for Pre-Mentalizing,  $\alpha=.82$   
23 for Certainty about Mental States, and  $\alpha=.74$  for Interest and Curiosity in mental states (Rutherford et al., 2013).  
24 Alpha coefficients for the current sample are reported in Table 2.

25 *Attachment Style Questionnaire* (ASQ; Feeney, Noller, & Hanrahan, 1994). The validated Italian version of  
26 the ASQ was used (Fossati et al., 2003). The ASQ is a self-report questionnaire, made up of 40 items, measuring  
27 five dimensions of adult attachment that, according to Hazan and Shaver (1987) and Bartholomew (1990), are key  
28 concepts of attachment. The five dimensions are *Confidence in Self and Others* (8 items), *Discomfort with Closeness*

1 (10 items), *Need for Approval* (7 items), *Preoccupation with Relationships* (8 items), and *Relationships as*  
2 *Secondary* (7 items). Items are evaluated using a 6-point Likert scale that ranges from 1 (*totally disagree*) to 6  
3 (*totally agree*). The ASQ has acceptable reliability, with Cronbach's alpha coefficients for the five scales ranging  
4 from .81 to .87 (Feeney et al., 1994; Fossati et al., 2003). Reliability coefficients for the current study ranged from  
5 .69 to .75.

## 6 **Data Analyses**

7 A multi-group CFA was performed to test the measurement invariance of the PRFQ across parental gender.  
8 Because the measure used a Likert-type format to generate ordinal data, the Diagonally Weighted Least Squares  
9 method was selected. First, the model was tested independently for both parents to establish configural invariance  
10 (van de Schoot, Lugtig, & Hox, 2012). The root mean square error of approximation (RMSEA), comparative fit  
11 index (CFI), and Tucker-Lewis index (TLI) were selected to evaluate model fit. A RMSEA value below .08 and CFI  
12 and TLI values above .90 suggested acceptable model fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003; van de  
13 Schoot et al., 2012). Next, to investigate whether the factor structure of the PRFQ was invariant across parental  
14 gender (Model 1; M1), the equivalence of (1) thresholds (Model 2; M2) and (2) thresholds and factor loadings  
15 (Model 3; M3) was assessed.

16 Measurement invariance was established when (a) the  $p$  value associated with  $\Delta\chi^2$  was greater than .02 and  
17 the change in CFI ( $\Delta$ CFI) was below the threshold of .01; and (b) the other fit indices of the model indicated a good  
18 fit (Beaujean, Freeman, Youngstrom, & Carlson, 2012; Cheung and Rensvold, 2002). Internal consistency was  
19 evaluated by Cronbach's alpha (low effect size  $\leq .30$ ; medium effect size = .31–.50; large effect size  $\geq .50$ ; Cohen,  
20 1992). After establishing the scalar invariance, analysis of variance (ANOVA) and multivariate ANOVA  
21 (MANOVA) were performed on the PRFQ sum scores, with parents' gender used as a between-subjects variable.  
22 Bonferroni correction was used to interpret age differences. Pearson's correlations were used to assess the  
23 relationships between the PRFQ three subscales and the five ASQ dimensions.

24 The R package (R Development Core Team, 2012; Rosseel, 2012) and PASW Statistics 18 (SPSS, Inc.,  
25 2009) were used for the analyses.

## Results

Table 1 shows the fit indices of the CFAs carried out separately for mothers and fathers and the fit indices of the measurement invariance procedure. Figure 1 shows the dimensional structure of the PRFQ for mothers and fathers. The baseline model for mothers reflected a good fit, whereas the baseline model for fathers displayed an adequate fit (Table 1). All items loaded on the expected directions and were significant at  $p=.05$ . The majority of factor loadings ranged from .55 to .80 (Figure 1). Item 14 (“I believe there is no point in trying to guess what my child feels”) showed the lowest factor loading in mothers, whereas item 11 (“I can sometimes misunderstand the reactions of my child”) showed the lowest factor loading in fathers. Correlations between factors ranged from .10 to .50 for mothers and from .17 to .47 for fathers.

Insert Table 1 here

Insert Figure 1 here

The configural model (M1) showed a good fit to the data, suggesting that the factorial structure of the construct may be equivalent across groups. M3 displayed  $p$  values for  $\Delta\chi^2$  greater than .02 and minor change in  $\Delta CFI$ , representing the best solution between model fit and model complexity. The other fit indices of M3 were also good.

Cronbach’s alpha coefficients ranged from good to acceptable in the whole sample, as well as in mothers and fathers separately (Table 2). Table 2 also reports alpha values with one item excluded and the 95% confidence interval for each subscale. Item exclusion caused the alpha scores to increase appreciably, especially for the PRFQ subscale Interest and Curiosity (PRFQ\_IC) with the exclusion of item 14.

Insert Table 2 here

A  $2 \times 2 \times 3$  MANOVA was performed on the PRFQ subscales with parents’ gender (Table 3), child’s gender (Table 4), and child’s age group (Table 5) included as independent variables. Means and standard deviations of PRFQ for parent’s gender, child’s gender, and child’s age group are reported in Tables 3, 4, and 5, respectively. A significant effect of parents’ gender (Table 3) was found on PRFQ\_IC ( $F_{(1,758)}=21.74, p<.001, \eta^2=.028$ ), with mothers ( $M=6.08, SD=0.77$ ) reporting greater interest and curiosity in their child’s mental states than fathers ( $M=5.79, SD=0.90$ ). The results showed one difference related to the child’s gender (Table 4) ( $F_{(1,758)}=7.64, p=.006, \eta^2=.010$ ), with parents of girls ( $M=2.02, SD=0.92$ ) showing higher values on the Pre-Mentalizing subscale (PRFQ\_PM) than parents of boys ( $M=1.80, SD=0.88$ ) (Table 4).

1 Insert Table 3 here

2 Insert Table 4 here

3 PRFQ\_PM was also affected by the child's age group (Table 5) ( $F_{(2,758)}=4.34, p=.013, \eta^2=.011$ ), with  
4 parents of preschool children (3–5 years) ( $M=1.79, SD=0.85$ ) scoring significantly lower than parents of second  
5 cycle students (8–10 years) ( $M=2.04, SD=0.95$ ). No significant interaction effects between parent's gender, child's  
6 gender, and child's age group were found.

7 Insert Table 5 here

8 Several Pearson's correlations between mothers' PRFQ subscales and ASQ subscales were significant at  
9  $p \leq .05$  (Table 6). The correlation between the PRFQ\_PM scale and the ASQ Relationships as Secondary scale  
10 showed a medium effect size, suggesting that higher pre-mentalizing modes were associated with more pronounced  
11 features of avoidant attachment. Furthermore, although the correlations had small effect sizes, significant positive  
12 relationships emerged between PRFQ\_PM and ASQ Discomfort with Closeness, Need for Approval, and  
13 Preoccupation with Relationships (Table 6). No significant correlation was found between the PRFQ\_PM and ASQ  
14 Confidence in Self and Others scale. Looking at the PRFQ subscale Certainty about Mental States (PRFQ\_CM), the  
15 only significant correlation was found with the ASQ Confidence in Self and Others scale. Moreover, higher scores  
16 on PRFQ\_IC correlated with higher levels of ASQ Confidence in Self and Others and a lower perception of  
17 Relationships as Secondary.

18 Insert Table 6 here

19 For fathers, correlations were similar, although somewhat lower (Table 6). The only exception was for the  
20 PRFQ\_PM scale, which, in addition to correlating positively with the ASQ Relationships as Secondary, Need for  
21 Approval, and Preoccupation with Relationships scales, correlated negatively with the Confidence in Self and  
22 Others scale; no significant correlation was found with the Discomfort with Closeness scale.

23

## 24 Discussion

25 The main purpose of the present study was to conduct an initial exploration of whether there were  
26 differences between mothers' and fathers' PRF. The study included fathers, in contrast to the majority of previous  
27 research on PRF, which focused primarily on mothers (Stover and Kiselica, 2014).

1           The data from the current study showed that the dimensional structure of the PRFQ was adequate for both  
2 mothers and fathers, with slight differences between them. Moreover, the invariance across gender was confirmed  
3 by the data, suggesting that both parents interpreted the individual items, as well as the underlying latent construct,  
4 in the same way and, at the same time, allowing us to compare their scores.

5           Looking at parents' gender variability, a significant effect emerged on the PRFQ subscales, with mothers  
6 scoring higher than fathers in terms of interest in the child's thoughts and feelings and in genuine curiosity about the  
7 child's states of mind that underlie his/her behavior. The data indicating slightly better PRF in mothers than fathers  
8 support the few previous quantitative studies that have examined RF in fathers (Arnott and Meins 2007; Esbjørn et  
9 al., 2013; Madsen et al., 2007; Stover and Kiselica, 2014). In particular, when assessing mind-mindedness (a  
10 different construct based on parents' ability to understand their child's internal states during parent-child interaction  
11 sessions), Arnott and Meins (2007) found that fathers made more inappropriate comments than mothers about their  
12 6-month-old infants' internal states during a free-play laboratory session. The authors suggested that this  
13 dissimilarity may be the manifestation of a genuine difference between mothers and fathers with respect to how they  
14 engage in mind-minded interactions with their child, and that fathers may be less skilled than mothers in accurately  
15 reading their infants' internal states.

16           The finding of a slight difference between mothers' and fathers' level of RF, with mothers scoring higher,  
17 has several possible explanations. The results seem to confirm the different relationships that mothers and fathers  
18 have with their children, with fathers generally showing less emphasis on insight into their children's emotional  
19 states and being more focused on stimulating and exploratory play interactions with their children (Grossmann,  
20 Grossmann, Kindler, & Zimmermann, 2008; Lamb and Lewis, 2004; Steele and Steele, 2005). Next, the observed  
21 effect of parental gender on PRF could be influenced by the different amounts of time frequently spent by mothers  
22 versus fathers with their children, possibly resulting in mothers (who traditionally spend more time than fathers with  
23 their children) having more extensive knowledge of their child's mind (Arnott and Meins, 2007).

24           In this study, differences in PRF related to the children's gender also emerged. Parents showed higher  
25 scores for pre-mentalizing modes with daughters than with sons, suggesting that parents with daughters struggled to  
26 understand and interpret their child's mental experience accurately. However, parents did not show differences  
27 related to their children's gender in the extent to which they were interested in and curious about knowing and  
28 understanding their children's mental states, or in the extent to which they were unable to recognize the opaqueness

1 of the children's mental states (i.e., certainty about mental states). As Sharp and Fonagy (2008) noted, a parent's  
2 capacity to engage in accurate and appropriate mentalizing of their child is influenced not just by their own RF but  
3 also by the child's characteristics, especially their temperament. The scientific literature reports differences between  
4 males and females in self-regulatory capacity. Tronick and Cohn (1989) reported that in early infancy, mother–son  
5 dyads spent more time in coordinated states than mother–daughter dyads. In a study examining the developmental  
6 course of self-regulation in a cohort of children from 4 to 13 years of age, Raffaelli et al. (2005) found evidence that  
7 girls exhibited significantly greater self-regulatory capacity than boys, at all ages. Because mutual affect regulation  
8 and attunement are assumed to characterize dyadic interactions from birth onwards, the finding in our study of  
9 parents' higher pre-mentalizing modes with daughters than with sons could be connected to the different self-  
10 regulatory capacities of boys versus girls. This data testifies to the importance of more studies investigating child  
11 characteristics that could affect PRF.

12 Furthermore, Pre-Mentalizing was the only PRFQ subscale affected by the child's age group. Specifically,  
13 our data indicate that parents of older children (aged 8–10 years) used significantly more repudiation or defense  
14 against mentalizing than parents of younger children (aged 3–5 years). As Borelli, StJohn, Cho, and Suchman  
15 (2016) argue, the older child's increased capacity to control how much or what type of emotions to express can  
16 affect PRF more negatively than in the child's earlier developmental stages, when his/her needs are more basic and  
17 transparent. Moreover, the increasing number of experiences in the child's life that occur outside the context of  
18 parenting can influence some parents' capacity to use PRF to understand the child's behavior in terms of mental  
19 states. The child's acquisition of more strategies to self-regulate and increasing verbal competence could thus both  
20 facilitate and hinder his/her parents' attunement to his/her needs and thus their capacity to mentalize the child's  
21 mental states (Rutherford, Wallace, Laurent, & Mayes, 2015b). The data from the present study seem to indicate  
22 changes in parents' PRF concurrent with changes in their children's developmental needs.

23 Finally, the study aimed to address the correlation between PRF and mothers' and fathers' attachment  
24 styles. Our findings were similar for mothers and fathers, showing some evidence that the PRFQ is related to the  
25 measure of attachment. Parents' higher levels of interest in thinking about their child's internal experience and in  
26 taking the child's perspective were correlated with higher levels of secure attachment (Confidence in Self and  
27 Others on the ASQ). In contrast, parents' greater struggle to understand and interpret their child's mental experience  
28 accurately (i.e., increased pre-mentalizing modes) was associated with the four scales of the ASQ that represented

1 particular aspects of insecure attachment (Feeney et al., 1994); specifically, pre-mentalizing modes correlated with  
2 ASQ scales assessing both the anxiety (about abandonment) dimension of attachment style (Need for Approval and  
3 Preoccupation with Relationships) and the avoidance (of intimacy) dimension (Discomfort with Closeness and  
4 Relationships as Secondary).

5         The different operationalization of the constructs between this study and the few previous ones available  
6 permit only a tentative comparison. Fonagy et al. (1991) reported that the ratings of the coherence scale in the AAI  
7 were the strongest predictor of parents' RF. Slade et al. (2005) showed that mothers' PRF assessed with the PDI  
8 when their baby was 10 months old was highly predicted by maternal pre-birth attachment state of mind. In contrast,  
9 in the present study, a lower effect size resulted from the correlation between both parents' PRF and secure  
10 attachment style. The observed differences in the effect sizes could be due to the way PRF and attachment style  
11 were assessed. To the best of our knowledge, only two studies to date has investigated the association between  
12 PRFQ and parents' attachment avoidance and anxiety in current close relationships assessed with a self-report,  
13 showing an effect size similar to that reported in the present study (Rostad and Whitaker, 2016; Luyten et al., 2017).  
14 Self-report measures of attachment emphasize conscious appraisals and evaluations rather than coherence, whereas  
15 previous studies reported how the coherence of adult attachment narratives was the best predictor of parents' RF.  
16 Furthermore, previous studies showed that the overall mental organization of attachment as assessed by the AAI do  
17 not converge with attachment styles as assessed with self-report (De Haas, Bakermans-Kranenburg, & van  
18 IJzendoorn, 1994; Roisman et al., 2007). Therefore, the coherence of adult attachment narratives may be better  
19 associated with PRFQ subscales. As no study has yet investigated the association between PRFQ and parents' states  
20 of mind as assessed with the AAI, future research is needed to better comprehend this issue.

21         Notably, the current study detected a positive correlation between the certainty the parent had about their  
22 child's mental states and the security of attachment style; this correlation was observed for both mothers and fathers.  
23 Rostad and Whitaker (2016) found a positive correlation between the PRFQ's Certainty about Mental States  
24 subscale and positive parenting practices. As the authors commented, parents participating in the study either  
25 overestimated their knowledge of their children's mental states in order to feel better as parents, or reported higher  
26 certainty as a result of an effective increased awareness of their children's needs. Additionally, Luyten et al. (2017)  
27 found that Certainty about Mental States subscale was relatively independent of attachment avoidance and anxiety.  
28 Future studies are needed to better comprehend these issues.

## 1 **Limitations and Research Directions**

2           The study is exploratory in nature and findings need to be replicated before firm conclusions can be drawn.  
3 Future research should confirm the observed effects of parental gender, child's gender, and child's age on PRF, and  
4 also investigate to what extent the observed differences could be influenced by the amount of time spent by each  
5 parent with their children and whether the child is the first-born, as the parents' responses to the items on the PRFQ  
6 might be influenced by being first-time parents. Furthermore, the homogeneity of the sample in terms of  
7 socioeconomic status did not allow consideration of this factor in concert with parental mentalizing capacity.  
8 Moreover, further studies are necessary to understand the basis of the observed differences in PRF related to  
9 children's gender, which could reflect the influence of various factors (neurobiological, temperamental, and  
10 experiential).

11           The current study had other limitations in that only self-report measures were used. The use of  
12 observational methods would be more desirable, and these should be integrated with self-report measures and  
13 attachment narratives in future studies. In addition, the study had a cross-sectional design; a longitudinal study  
14 investigating changes in PRF as children grow older could deepen our comprehension of the connection between  
15 PRF and changes in the child's developmental needs.

16           To date, there is a discrepancy between the wide diffusion of mentalizing as a theoretical concept and the  
17 limited amount of research on PRF, due in part to the time-consuming nature of existing tools that has restrained  
18 their use outside research settings (Katznelson, 2014). This study adds to the data from previous studies that have  
19 used the PRFQ, a new self-report questionnaire assessing PRF, which is quick to administer and assess (Rutherford  
20 et al., 2013, 2015a, 2017; Rostad and Whitaker, 2016). In the present study, the PRFQ was a valid and reliable  
21 measure of PRF in mothers and fathers. It was sensitive both to the different characteristics of the relationships  
22 between parents and their sons compared with their daughters and to changes in the developing needs of the child.  
23 Furthermore, higher PRF correlated with each parent's higher levels of secure attachment style. These qualities  
24 could make the PRFQ very valuable for screening and large scale-studies (Camoirano, 2017). Furthermore, the  
25 differences in PRF related to parental gender and to children's gender and age should be taken into account in  
26 further studies aimed both at assessing PRF in general or clinical populations and at evaluating the efficacy of  
27 parenting interventions targeted at enhancing PRF, such as the Circle of Security (Pazzagli, Laghezza, Manaresi,  
28 Mazzeschi, & Powell, 2014; Powell, Cooper, Hoffman, & Marvin, 2013).



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**Compliance with Ethical Standards**

**Research Involving Human Participants and/or Animals**

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.

**Informed Consent**

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

**Author Contributions**

CP:collaborated with the design and execution of the study, assisted with the data analyses, and wrote the paper. ED: analyzed the data, wrote the results, and collaborated in the writing and editing of the final manuscript. VR: collaborated with the execution of the study, and in editing of the final manuscript. CM: collaborated with the design and execution of the study, and collaborated in the writing and editing of the final manuscript. PL: collaborated in the writing and editing of the final manuscript.

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10

PRFQ across mothers and fathers

1 Table 1

2 *Test of measurement invariance of the PRFQ across parents' gender*

	$\chi^2$	<i>df</i>	<i>p</i>	$\Delta\chi^2$	$\Delta df$	<i>p</i>	RMSEA	TLI	CFI	$\Delta CFI$
CFA mothers ( <i>n</i> =385)	280.49	132	<.001				.054	.951	.966	
CFA fathers ( <i>n</i> =385)	449.74	132	<.001				.079	.899	.913	
M1: configural invariance	730.22	264	<.001				.068	.933	.942	
M2: equality of thresholds	848.50	351	<.001	95.53	87	.249	.061	.946	.938	.004
M3: equality of thresholds and factor loadings	872.36	366	<.001	13.93	15	.531	.060	.947	.937	.001

3 *Note.* CFA = Exploratory and confirmatory factor analyses; RMSEA = Root Mean Square Error of Approximation;

4 TLI = Tucker-Lewis Index; CFI = Comparative Fit Index.



PRFQ across mothers and fathers

- 1 Table 2.
- 2 *Cronbach's  $\alpha$  coefficients for mothers and fathers*

	Mothers		Fathers	
	$\alpha$ (95% CI)		$\alpha$ (95% CI)	
PRFQ_PM	.61(.55-.67)	Excluding item 6, $\alpha$ =.67	.65(.59-.70)	Excluding item 6, $\alpha$ =.69
PRFQ_CM	.78(.75-.81)	Excluding item 11, $\alpha$ =.81	.67(.62-.72)	Excluding item 11, $\alpha$ =.71
PRFQ_IC	.51(.44-.59)	Excluding item 14, $\alpha$ =.62	.64(.58-.69)	Excluding item 14, $\alpha$ =.70

- 3 *Note:* CI = confidence interval; PRFQ\_PM= Pre-Mentalizing; PRFQ\_CM = Certainty about Mental States;
- 4 PRFQ\_IC = Interest and Curiosity.

PRFQ across mothers and fathers

1 Table 3.

2 *Analysis of variance for parents' gender*

	$F_{(1,758)}$	$p$	$\eta p^2$	Mothers		Fathers	
				$M$	$SD$	$M$	$SD$
PRFQ_PM	2.99	.084	.004	1.84	0.85	1.98	0.95
PRFQ_CM	0.01	.912	.001	4.01	1.24	4.01	1.04
PRFQ_IC	21.74	<.001	.028	6.08	0.77	5.79	0.90

3 *Note:* PRFQ\_PM= Pre-Mentalizing; PRFQ\_CM = Certainty about Mental States; PRFQ\_IC = Interest and Curiosity.

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PRFQ across mothers and fathers

1 Table 4.

2 *Analysis of variance for child's gender*

	$F_{(1,758)}$	$p$	$\eta p^2$	Boys		Girls	
				$M$	$SD$	$M$	$SD$
PRFQ_PM	7.64	.006	.010	1.80	0.88	2.02	0.92
PRFQ_CM	0.04	.834	.001	4.00	1.10	4.02	1.19
PRFQ_IC	0.66	.418	.001	5.96	0.84	5.91	0.86

3 *Note:* PRFQ\_PM= Pre-Mentalizing; PRFQ\_CM = Certainty about Mental States; PRFQ\_IC = Interest and Curiosity.

4

PRFQ across mothers and fathers

1 Table 5.

2 *Analysis of variance for child's age group*

	$F_{(2,758)}$	$p$	$\eta p^2$	Preschool (1)		First cycle (2)		Second cycle (3)		Bonferroni's post hoc
				$M$	$SD$	$M$	$SD$	$M$	$SD$	
PRFQ_PM	4.34	.013	.011	1.79	0.85	1.87	0.88	2.04	0.95	1<3, 1=2 and 2=3
PRFQ_CM	1.54	.216	.004	3.93	1.09	4.12	1.06	4.00	1.24	1=2=3
PRFQ_IC	2.63	.073	.007	6.02	0.79	5.84	0.88	5.93	0.88	1=2=3

3 *Note:* PRFQ\_PM= Pre-Mentalizing; PRFQ\_CM = Certainty about Mental States; PRFQ\_IC = Interest and Curiosity.

4

PRFQ across mothers and fathers

1 Table 6.

2 *Pearson's correlations between mothers' and fathers' PRFQ subscales and the five ASQ dimensions*

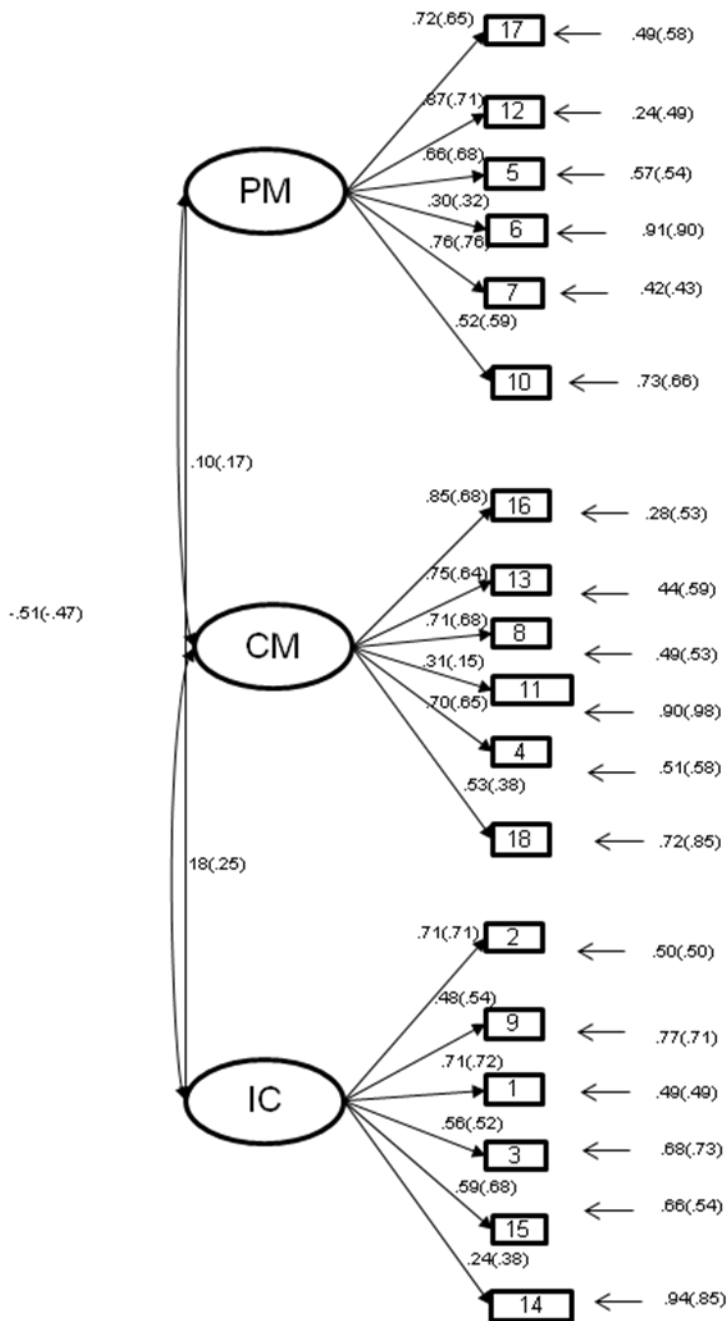
	1	2	3	4	5
<b>Mothers</b>					
PRFQ_PM	-.096	-.212**	.223**	.188**	.408**
PRFQ_CM	.191**	-.001	-.012	-.015	-.060
PRFQ_IC	.141**	-.021	-.035	-.014	-.129*
<b>Fathers</b>					
PRFQ_PM	-.101*	-.054	.138**	.175**	.239**
PRFQ_CM	.187**	-.009	-.010	-.079	.037
PRFQ_IC	.209**	.084	-.055	.018	-.108*

3 \* p < .05; \*\* p < .01

4 *Note:* Attachment Style Questionnaire (ASQ) dimensions: 1=Confidence in Self and Others; 2=Discomfort with  
 5 Closeness; 3=Need for Approval; 4=Preoccupation with Relationships; 5=Relationships as Secondary. PRFQ\_PM=  
 6 Pre-Mentalizing; PRFQ\_CM = Certainty about Mental States; PRFQ\_IC = Interest and Curiosity.

7

Figure 1. PRFQ 3 factors model



Note: PM = PRFQ Pre-Mentalizing; CM = PRFQ Certainty about Mental States; IC = PRFQ Interest and Curiosity. Fathers' values in brackets