



Parental Attachment Dimensions and Parenting Stress: The Mediating Role of Parental Reflective Functioning

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Published online: 5 March 2018

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Abstract

Research suggests that parental reflective functioning—the parent’s capacity to envision the mind of his/her child—may play an important role in the intergenerational transmission of attachment and reflective functioning. Studies also suggest the importance of this capacity for the transition to parenthood, and particularly parents’ capacity to deal with parenting stress. This study focused on the potential mediating role of PRF dimensions in the relationship between parental attachment dimensions (attachment anxiety and avoidance) and parenting stress, using data from a 1-year longitudinal study in biological first-time parents ($N = 106$). Structural equation modeling showed that parents’ use of prementalizing modes of reflecting upon their child (PM) fully mediated the relationship between attachment anxiety and three parenting stress dimensions (marital relationship, role restriction, and social isolation) across a 1-year interval, while attachment avoidance was indirectly related to these parenting stress dimensions through PM. Further, PM partially mediated the relationship between parental attachment anxiety and avoidance and a fourth dimension of parenting stress, lack of trust in parental competence. In addition, multi-group analyses revealed some interesting gender differences. Implications of these findings for the conceptualization of the relationship between parental attachment, PRF, and parenting stress are discussed.

Keywords Parental reflective functioning · Parenting stress · Attachment · Psychopathology · Intervention

Introduction

The transition to parenthood is a major life event that involves substantial physiological, psychological, and social adjustments, which can be accompanied by considerable distress (Parfitt and Ayers 2014). Parenting stress, in particular, seems to develop when the parent perceives they have a lack of resources to meet the demands of being a parent and to successfully cope with these adjustments (Deater-Deckard 1998; Deater-Deckard and Scarr 1996). Parenting stress has been shown to negatively influence parenting characteristics such as sensitivity, child investment, quality of parenting, dyadic pleasure, and cooperation between parents (Creasey and Jarvis 1994; Crnic et al. 2005; Foster

et al. 2008; McMahon and Meins 2012; Nelson et al. 2009). Similarly, it seems to negatively influence child development, as expressed in higher levels of behavioral problems and child negativity (Casalin et al. 2014; Crnic et al. 2005; de Cock et al. 2017; Fallucco et al. 2016). Further, parenting stress is often associated with poor parental mental health, as observed in increased risk for postpartum depression (Leigh and Milgrom 2008; Thomason et al. 2014). Consequently, it is critically important to investigate factors contributing to parenting stress, especially for first-time parents, as the transition to parenthood is considered a high risk period which may result in adverse outcomes for both parent and child (Cowan and Cowan 1995; Epifanio et al. 2015; McKenzie and Carter 2013; Parfitt and Ayers 2014).

Many previous studies have examined the relationship between the transition to parenthood and parenting stress, and suggest that parenting stress can be understood as the result of everyday difficulties in being in a family with children (reviewed by Deater-Deckard 2004). In addition, parenting stress seems to arise in the context of relationships (with self, partner, child) and its severity depends upon the quality of those relationships (Abidin 1992; de Cock et al. 2017; Halpern-Meekin and Turney 2016). A considerable

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body of research has focused on the quality of the relationship between parents, with relationship dissatisfaction being associated with higher parenting stress (Deater-Deckard 1998; Deater-Deckard and Scarr 1996; Parfitt and Ayers 2014).

Although parenting stress seems to be an inevitable aspect of parenthood, this may be especially true for individuals with attachment insecurities (i.e., high attachment anxiety and/or avoidance) who are prone to experiencing high levels of stress and arousal, especially in the context of the parent–infant relationship (Mills-Koonce et al. 2011; Vasquez et al. 2002). Attachment anxiety is related to fears of abandonment and rejection, whereas attachment avoidance reflects discomfort with closeness and intimacy (Bartholomew and Horowitz 1991; Brennan et al. 1998). Research points to the importance of these parental attachment dimensions on parenting stress (Mazzeschi et al. 2015; Rholes et al. 2006; Vieira et al. 2012). In addition, important gender differences in the relationship between parental attachment and parenting stress can be expected (Blatt 2004). In Western societies, men typically exhibit higher levels of attachment avoidance, while women have higher levels of attachment anxiety (Blatt 2004; Zuroff and Fitzpatrick 1995), probably as a result of societal emphasis on the need for self-definition in men and the capacity for relatedness in women (Luyten and Blatt 2013). Further, gender incongruence (i.e., high attachment anxiety in men and high attachment avoidance in women) has been hypothesized to be associated with increased risk for maladjustment and psychopathology because of incongruent sociocultural expectations (Luyten and Blatt 2013). Therefore, one could expect that gender incongruence in the attachment dimensions would be associated with higher parenting stress. However, to date, no study has investigated this hypothesis.

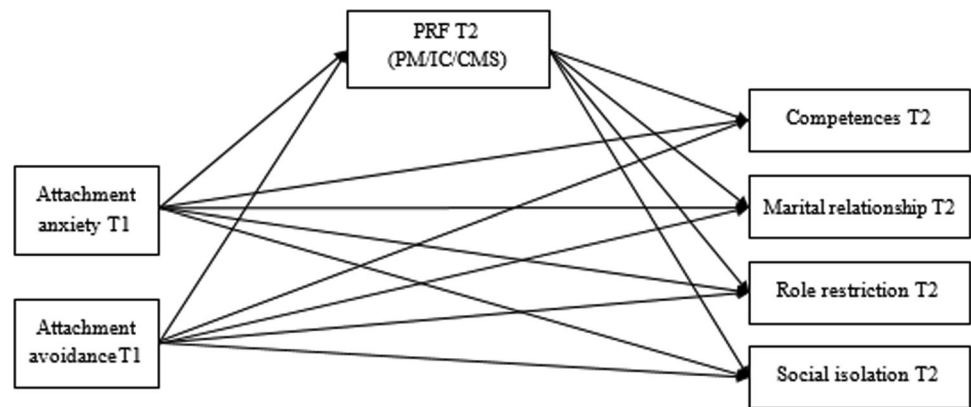
Within contemporary attachment theory, there has been much attention to the role of parental reflective functioning (PRF) for understanding the transition to parenthood, and particularly parents' capacity to deal with parenting stress. PRF refers to the parent's ability to reflect upon his/her own and his/her child's internal mental experience, and to understand the child's behavior as being driven by underlying mental states, such as thoughts, feelings, desires, and intentions (Slade 2005). This capacity to envision mental states in relation to one's child can be distorted in several ways. In this regard, recent theories have identified three important dimensions of PRF. A first dimension refers to a pre-mentalizing mode of experiencing the subjectivity of the child as expressed by a tendency to make maladaptive and malevolent attributions about the child, often in combination with an inability to enter the child's internal subjective world (pre-mentalizing modes; PM). The second dimension refers to the extent the parent's believes he/she

understands the child's mind (certainty of mental states; CMS), whereas the third dimension involves the extent to which the parent is genuinely interested in the mental states of the child (interest and curiosity in mental states; IC) (Luyten et al. 2017a, b). Overall, PRF is considered a key feature of adaptive parenting, as it is thought to enable the parent to understand why their child behaves in certain ways (Turner et al. 2008), which is also an essential capacity needed to cope with the inevitable stresses of parenthood.

In this regard, McMahon and Meins (2012) reported that mothers who used more mental-state words to describe their child (indicative of high PRF) reported less parenting stress. Also, Rutherford et al. (2013) found that mothers' interest and curiosity in mental states (IC), a key dimension of PRF, was related to increased stress tolerance while soothing a crying infant in a simulated baby paradigm. Conversely, mothers who tend to make negative attributions about the child's behavior (PM)—characteristic of low PRF—showed decreased stress tolerance (Rutherford et al. 2015) and seemed to experience higher levels of parenting stress (Deater-Deckard 1998; Hassall et al. 2005). Relatedly, Duncan et al. (2009) suggested that parents' own skills and capacities to regulate their thoughts and emotions are crucial with regard to the level of parenting stress and the coping strategies available to them when facing stressors in their caregiving role. Indeed, PRF may be especially important in regulating and modulating experiences of distress, as it may enable parents to reflect on their own and their child's experiences. In turn, this understanding may facilitate affect regulation because it helps the parent to put his/her own experience into perspective (Grienemberger et al. 2005; Slade et al. 2005). Hence, PRF may foster feelings of efficacy in dealing with potentially distressing situations and interactions. By contrast, parents with poorer PRF may lack feelings of control and efficacy, and may increasingly believe that interactions spiral out of control, leading to even higher levels of parenting stress and feelings of parental incompetence.

Studies have suggested that PRF is also closely related to parental attachment (Arnott and Meins 2007; Fonagy et al. 1991; Slade et al. 2005), indicating that PRF might mediate the relationship between parental attachment and parenting stress. However, although attachment and PRF might be causally linked, the so-called 'loose coupling hypothesis' suggests that this may not necessarily be the case (Sharp and Fonagy 2008). More specifically, in securely attached parents, PRF can vary considerably, and parental attachment security is not necessarily related to high levels of PRF. Parental insecure attachment, on the contrary, is almost invariably related to lower PRF, and to consequent heightened distress and decreased wellbeing in both parent and child (Luyten et al. 2017a, b).

Fig. 1 Theoretical mediation model of PRF in the relationship between parental attachment and parenting stress



Based on the extant literature reviewed above, we investigated the role of PRF in the relationship between parental attachment dimensions and parenting stress, using data from a two-wave prospective study from infancy to toddlerhood among biological first-time parents and their children ($N = 106$). We expected that insecure attachment dimensions (i.e., attachment anxiety and avoidance) would be related to increased parenting stress both cross-sectionally and longitudinally, and that PRF dimensions (i.e., prementalizing modes, interest and curiosity in mental states, and certainty about mental states) would mediate these longitudinal relationships (Fig. 1). We expected the strongest mediation effects for pre-mentalizing modes (PM), as the tendency of parents to attribute malevolent mental states to their children can be expected to be associated with considerable stress, as attributing such improbable mental states might lead parents to increasingly see the child as obstructing the caregiver-child relationship. Yet, a lack of interest in the child's mental states (IC) or being overly uncertain (CMS) might also cause parenting stress, as both could be expected to lead to parents struggling to understand their child's behaviors and experiences. Finally, we explored whether these relationships were similar or different for mothers and fathers.

Method

Participants

Participants were first-time parents of a healthy, biological child aged 8–13 months. At time 1 (T1), 92 couples were contacted, of whom 84 completed the questionnaires. Eight couples did not meet the inclusion criteria, so the final sample consisted of 76 couples (82.60%). 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 and 72.8% for mothers and fathers, respectively). The 76 infants (45 girls [59.2%] and 31 boys [40.8%]) were a mean 10.11 months old ($SD = 1.24$; range 8–13) at T1. Hence, overall, the study sample represented a relatively homogeneous group of parents, consisting mainly of middle-class, well-educated parents. This was also reflected by study variable mean scores within the normal (nonclinical) range.

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 infants were a mean 21.81 months old ($SD = 1.31$; range 19–26). The mean age of mothers was 29.69 ($SD = 2.72$; range 24–40) and of fathers 32.83 ($SD = 4.42$; range 26–48) years. Comparison of parents who participated at T2 and those who did not, revealed no significant differences with regard to parental gender, age, or educational level, nor child gender or age. In addition, no significant differences were found with regard to PRF and parenting stress. Together, this indicates that there was no attrition bias in this study.

Procedure

This study was conducted between November 2009 and December 2010 by undergraduate students at a large university in central Belgium. Students who followed a methodology course were trained and instructed to recruit couples who met the following inclusion criteria: (a) Dutch-speaking, (b) heterosexual couples who were (c) first-time parents of a healthy, biological child aged 8–13 months. Couples were recruited through the students' social network, play gardens and child care services. Eligible participants were told they would participate in a study about the characteristics of young parents and their relationship with their child. Participation was voluntary and full anonymity was guaranteed. Couples who agreed to participate provided written informed consent, and were then asked to complete a booklet with questionnaires. Approximately one year later, the same parents were contacted by regular mail and/

or email, and were invited to participate in the second wave of the study by completing a second booklet with questionnaires. Parents that did not complete the booklet within two weeks, were encouraged to complete the set of questionnaires by up to three follow-up phone calls, after which they were considered dropouts. The study was approved by the Ethics Committee of KU Leuven (Belgium).

Measures

Parental attachment dimensions were assessed at T1 by 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 et al. 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 and shown good temporal stability of the anxiety and avoidance subscales (Sibley et al. 2005; Sibley and 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 T1 and T2 by the Parental Reflective Functioning Questionnaire (PRFQ; Luyten et al. 2017a), an 18-item self-report questionnaire scored on a 7-point Likert scale. The PRFQ includes three theoretically consistent and clinically meaningful subscales: *prementalizing modes* (PM), with 6 items that assess prementalizing modes reflecting the repudiation of or defense against mentalizing (e.g., “My child sometimes gets sick to keep me from doing what I want to do” or “My child cries around strangers to embarrass me”); *certainty about mental states* (CMS), with 6 items reflecting either being overly certain of mental states of the child (hypermentalizing) or overly uncertain (hypomentalizing) (e.g., “I always know what my child wants” or “I can always predict what my child will do”); and *interest and curiosity in mental states* (IC), with 6 items reflecting curiosity about the mental states of the child (e.g., “I am often curious to find out how my child feels” or “I like to think about the reasons behind the way my child behaves and feels”). Recent studies suggest that different dimensions of PRF may be associated with different developmental outcomes (Rutherford et al. 2015, 2013). Studies currently underway provide initial evidence for the reliability and validity of the PRFQ as a brief multidimensional measure of PRF. More specifically, Luyten et al. (2017a) showed that

the three subscales of the PRFQ provide good internal consistency (with Cronbach’s alphas of .70, .82, and .75 for PM, CMS, and IC, respectively); were not, or only modestly, related to demographic features; and were generally related in theoretically expected ways to parental attachment dimensions, emotional availability, parenting stress, and infant attachment status in the Strange Situation Procedure (Ainsworth and Bell 1970). In the present study, Cronbach’s alphas for PM, CMS, and IC were .73, .73, and .72, respectively.

Parenting stress was assessed at T1 and T2 by the the Dutch version of the Parenting Stress Index (PSI; Abidin 1995), the Nijmeegse Ouderlijke Stress Index (de Brock et al. 1992). The PSI originally included 14 subscales to assess parenting stress and both parent and child functioning. In this study, only the parenting stress subscales were used: competence (13 items; e.g., “I can’t make a decision without help”), role restriction (7 items; e.g., “I feel restricted by my obligations as a parent”), social isolation (6 items; e.g., “I am less interested in other people than before”), and marital relationship (7 items; e.g., “Raising a child has given more relational conflicts than expected”). We focused on these four dimensions separately, as each taps into different areas of parenting stress (Östberg et al. 2007). Respondents were asked to rate each item on a Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Studies have supported the reliability and validity of the PSI (de Brock et al. 1992). In our study, Cronbach’s alphas were .85, .83, .60, and .73 for competence, role restriction, social isolation, and marital relationship, respectively.

Data Analyses

First, descriptive statistics and zero-order correlations among parental attachment dimensions, PRF dimensions, and parenting stress were computed. Second, given the clustered nature of the data (i.e., measures of the parents are nested within the parental couple), we investigated whether adding a couple-variable would increase the explained variances of the estimates. However, the Intraclass Correlation Coefficients showed design effects < 2, which justifies structural equation modeling (SEM) with nested data (Muthén and Satorra 1995; Muthén 1999). In addition, between-level couple variances were non-significant with exception of the “marital relationship” and “social isolation” subscale, which is understandable given the nature of these subscales (describing the couple relationship). Within-level couple variances, in contrast, were all significant. Therefore, SEM was used to investigate longitudinal mediational effects of PRF on parenting stress. Parenting stress was operationalized by the parenting stress subscales instead of using a total score because of the relevance of

each individual dimension. Additionally, the sample size in this study favored the use of less complex models (e.g., models without latent variables; see <http://davidakenny.net/cm/fit.htm>).

Multiple SEM models were evaluated in AMOS following contemporary guidelines for the testing of mediational models (Baron and Kenny 1986; Belsky et al. 2007; Cole and Maxwell 2003; Hayes 2009; Soenens et al. 2010), starting with a base model that included all direct paths between the predictor (i.e., parental attachment anxiety and avoidance at T1) and dependent (i.e., parenting stress at T2) variable. In a second step, a full mediation model was tested with only indirect effects through PRF at T2 (i.e., without direct paths from parental attachment dimensions to parenting stress subscales). 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 and Kenny 1986). Finally, a partial mediation model was tested by adding all direct paths to the second model with indirect effects. Partial mediation is suggested when this final model fits better than the second model (Cole and Maxwell 2003). To make inferences about the indirect effect, a Sobel test was used to calculate the significance of the mediation effect (Baron and Kenny 1986; Sobel 1982). Modification indices were used to evaluate potential modifications, using a step-by-step approach by omitting nonsignificant paths if this increased the model fit. Multi-group analysis (MGA) was used to investigate whether estimated parameter values of the model changed according to gender of the parent. We compared the fit of each model by inspecting several fit indices according to conventional criteria: The chi-square to *df* ratio is recommended to range from 5.0 to 2.0 to provide an acceptable fit for the model (Hooper et al. 2008). The comparative fit index (CFI) and Tucker-Lewis index (TLI) should be $\geq .90$ for an acceptable fit and $\geq .95$ for a good fit (Hu and Bentler 1999). The root mean square error of approximation (RMSEA) should be $\leq .08$ for an acceptable fit (Byrne 1998) and $\sim .06$ for a good fit (Hu and Bentler 1999). The confidence interval for the RMSEA should be between 0 and .07 to provide a good fit (Hooper et al. 2008; Steiger 2007). Statistical analyses were carried out using SPSS version 22.0 and AMOS 18.0.

Results

Associations among Parental Attachment Dimensions, PRF, and Parenting Stress

Zero-order correlations among the study variables were calculated for mothers and fathers separately (Table 1). The findings warranted the testing of PM at T2 as a potential

mediator between parental attachment dimensions at T1 and parenting stress at T2. More specifically, mothers' attachment anxiety and avoidance at T1 were significantly related to PM at T2. For fathers, a significant positive correlation was found between attachment anxiety at T1 and PM at T2; however, only a marginal positive correlation was found between attachment avoidance at T1 and PM at T2. For both mothers and fathers, PM at T2 was significantly positively correlated with all domains of parenting stress, except for a marginally significant correlation with marital relationship at T2 in mothers. Further, PM at T2 could be both a mediating and an intervening variable: parental attachment anxiety and avoidance were often but not always directly related to parenting stress dimensions. No significant correlations were found between other subscales of the PRFQ (IC and CMS at T2) and parental attachment dimensions, except for a significant positive correlation between attachment anxiety at T1 and CMS at T2 in fathers. However, CMS at T2 was not related to any of the parenting stress subscales, excluding this variable as a possible mediator.

The Mediating Role of PRF

Structural equation modeling (SEM) was used to investigate longitudinal mediational effects of PM on parenting stress. The first model (*base model*), with only direct paths, did not provide a good fit to the data, $\chi^2(6) = 130.94$, $p < .01$, $\chi^2/df = 21.82$, CFI = .39, TLI = $-.52$, RMSEA = .45 (CI = .38–.51). In this model, paths from attachment avoidance to parenting stress were nonsignificant, and thus removed. As there was a small trend for the path from attachment anxiety to role restriction ($p = .13$), we decided to retain it in the base model. Further, AMOS suggested adding covariances between all error variances. The revised model yielded a better fit to the data, $\chi^2(4) = 4.72$, $p = .32$, $\chi^2/df = 1.18$, CFI = 1.00, TLI = .99, RMSEA = .04 (CI = .00–.16); $\Delta\chi^2(2) = 126.22$, $p < .001$. In this model, direct paths were significant from attachment anxiety to competence ($\beta = .42$, $p < .01$), marital relationship ($\beta = .26$, $p < .01$), role restriction ($\beta = .26$, $p < .01$), and social isolation ($\beta = .34$, $p < .01$).

The second model (*indirect effects model*) with only indirect effects did not have an acceptable fit to the data, $\chi^2(8) = 14.58$, $p = .07$, $\chi^2/df = 1.82$, CFI = .98, TLI = .93, RMSEA = .09 (CI = .00–.16). All indirect paths were significant: from attachment anxiety and avoidance to PM at T2 ($\beta = .31$, $p < .01$ and $\beta = .20$, $p = .06$, respectively) and from PM at T2 to competence ($\beta = .54$, $p < .001$), marital relationship ($\beta = .40$, $p < .001$), role restriction ($\beta = .47$, $p < .001$), and social isolation ($\beta = .49$, $p < .001$). Sobel tests for the indirect effect between attachment anxiety and competence ($z = 2.75$, $p < .01$), marital relationship ($z = 2.51$, $p < .05$), role restriction ($z = 2.64$, $p < .01$), and social

Table 1 Zero-order correlations, means, and standard deviations among study variables (mother and father reported data separately)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	M (SD)
1. Attachment anxiety_T1	–																2.10 (0.71)
2. Attachment avoidance_T1	.67**/.52**	–															2.09 (0.61)
3. PM_T1	.52**/.24°	.31**/.19	–														1.68 (0.51)
4. CMS_T1	–.03/.05	–.06/.07	–.10/.02	–													3.57 (1.11)
5. IC_T1	.09/–.01	–.09/.06	–.09/–.16	.21/–.16	–												5.87 (0.69)
6. PM_T2	.49**/.37**	.53**/.24°	.52**/.38**	.07/.02	–.19/.03	–											1.63 (0.70)
7. CMS_T2	.22/.31*	.21/.04	.18/–.16	.44**/.56**	.18/–.14	.18/.16	–										3.65 (1.00)
8. IC_T2	–.16/–.11	–.14/–.05	–.13/–.31*	.07/–.24°	.57**/.58**	–.15/–.23°	.01/–.16	–									5.87 (0.72)
9. Competence_T1	.60**/.37**	.28**/.23	.48**/.37**	–.16/–.25°	.03/–.11	.32**/.26°	–.04/–.15	–.29*/–.11	–								1.89 (0.59)
10. Role restriction_T1	.36**/.18	.23**/.34*	.25**/.36**	.15/–.21	.14/–.10	.33**/.14	.09/–.23	–.15/–.12	.60**/.69**	–							2.60 (0.90)
11. Social isolation_T1	.48**/.24°	.26**/.21	.31**/.26°	.15/–.42**	.34**/–.16	.21/.25°	.18/–.11	–.13/–.28	.58**/.51**	.71**/.63**	–						2.27 (0.66)
12. Marital relationship_T1	.33**/.50**	.25**/.44**	.17/.28*	.04/–.11	.25**/–.24°	.22/.47**	.15/–.08	.05/–.27°	.47**/.63**	.62**/.64**	.58**/.54**	–					2.21 (0.77)
13. Competence_T2	.39**/.43**	.13/.29*	.48**/.22	–.17/–.07	.07/.15	.29**/.78**	.06/.08	–.22/–.21	.67**/.44**	.34**/.35*	.38**/.40**	.30**/.50**	–				1.67 (0.53)
14. Role restriction_T2	.38**/.16	.36**/.16	.29**/.08	–.03/–.13	–.01/–.08	.47**/.47**	.16/–.07	–.21/–.31*	.50**/.34*	.76**/.51**	.55**/.48**	.44**/.52**	.32**/.55**	–			2.49 (0.82)
15. Social isolation_T2	.30**/.41**	.12/.25°	.25**/.15	.21/–.23	.13/–.08	.38**/.60**	.19/.05	–.07/–.27°	.31**/.43**	.59**/.38**	.67**/.64**	.30**/.54**	.32**/.78**	.60**/.58**	–		2.15 (0.73)
16. Marital relationship_T2	.05/.42**	.08/.35*	.07/.15	.12/–.08	.07/.10	.24**/.54**	.18/.06	.13/–.11	.11/.37**	.38**/.42**	.34**/.45**	.36**/.64**	.30**/.66**	.40**/.62**	.65**/.74**	–	2.11 (0.81)

Data are shown for mothers (N = 53) / fathers (N = 53). Reported means are for mothers and fathers combined as there were no significant mean-level differences between mothers and fathers
T1 time 1, T2 time 2, PM pre-mentalizing modes, CMS certainty of mental states, IC interest and curiosity in mental states
° $p < .10$; * $p < .05$; ** $p < .01$ (two-tailed test)

isolation ($z = 2.66$, $p < .01$) were all significant. Sobel tests for the indirect effect between attachment avoidance and parenting stress subscales were marginally significant (competence: $z = 1.84$, $p = .06$; marital relationship: $z = 1.77$, $p = .08$; role restriction: $z = 1.81$, $p = .07$; social isolation: $z = 1.82$, $p = .07$).

The *final model*, with both direct and indirect paths, did not provide a good fit to the data, $\chi^2(0) = .00$, CFI = 1.00, RMSEA = .34, as it was a fully saturated model with zero degrees of freedom RMSEA. We removed nonsignificant paths in a step-by-step manner, resulting in a model with a better fit, $\chi^2(6) = 5.74$, $p = .45$, $\chi^2/df = .96$, CFI = 1.00, TLI = 1.00, RMSEA = .00 (CI = .00–.12). In this final model (Fig. 2), direct paths from attachment anxiety and avoidance to competence were significant ($\beta = .28$, $p < .01$ and $\beta = -.18$, $p < .05$, respectively). All indirect paths remained significant: from attachment anxiety and avoidance to PM at T2 ($\beta = .31$, $p < .01$ and $\beta = .20$, $p = .06$, respectively) and from PM at T2 to competence ($\beta = .49$, $p < .001$), marital relationship ($\beta = .40$, $p < .001$), role restriction ($\beta = .47$, $p < .001$), and social isolation ($\beta = .49$, $p < .001$). This final model provided a significantly better fit to the data compared with the previous model with only indirect effects, $\Delta\chi^2(2) = 8.83$, $p < .05$. Sobel tests for the indirect effect between attachment anxiety and competence ($z = 2.61$, $p < .01$), marital relationship ($z = 2.51$, $p < .05$), role restriction ($z = 2.64$, $p < .01$), and social isolation ($z = 2.66$, $p < .01$) were all significant. Sobel tests for the indirect effect between attachment avoidance and parenting stress subscales were marginally significant (competence: Sobel $z = 1.80$, $p = .07$; marital relationship: $z = 1.77$, $p = .08$; role restriction: $z = 1.81$, $p = .07$; social isolation: $z = 1.82$, $p = .07$).

Gender Differences

Multi-group analysis (MGA) was used to investigate whether estimated parameter values of the model changed according to gender of the parent. The fully unconstrained model provided the best fit to the data for both mothers and fathers, $\chi^2(12) = 20.00$, $p = .07$, $\chi^2/df = 1.67$, CFI = .97, TLI = .91, RMSEA = .08 (CI = .00–.14), with critical ratios for structural weights and residuals being significant ($p = .03$ and .001, respectively), allowing differences in path loadings and residuals across mothers and fathers. However, the critical ratio for structural covariances was nonsignificant ($p = .06$), supporting the invariance of these parameters across mothers and fathers. Pairwise parameter comparison indicated that the intercept of competences and the path from attachment anxiety, attachment avoidance, and PM at T2 on the one hand to competence on the other significantly differed across mothers and fathers. Furthermore, parameter estimates for mothers and fathers

Fig. 2 Final model with significant indirect and direct paths (mothers and fathers together). 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). ° $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed test)

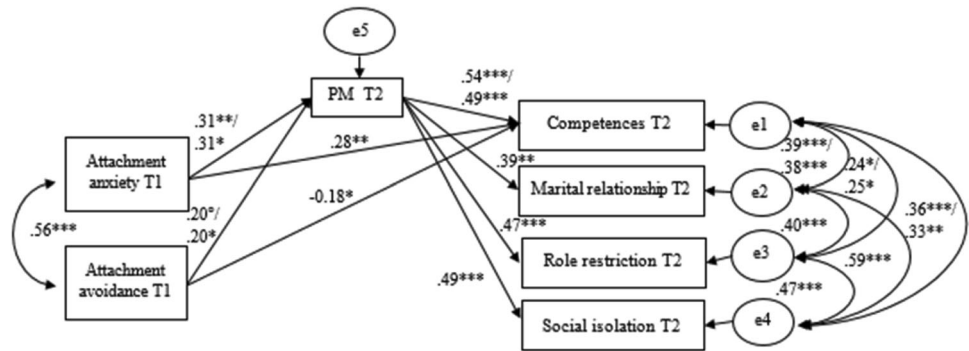


Fig. 3 Final model with significant indirect and direct regression weights for mothers. Standardized regression weights are given for the path coefficients. Full lines represent significant paths, dotted lines paths at trend level, and dashed lines non-significant paths. ° $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed test)

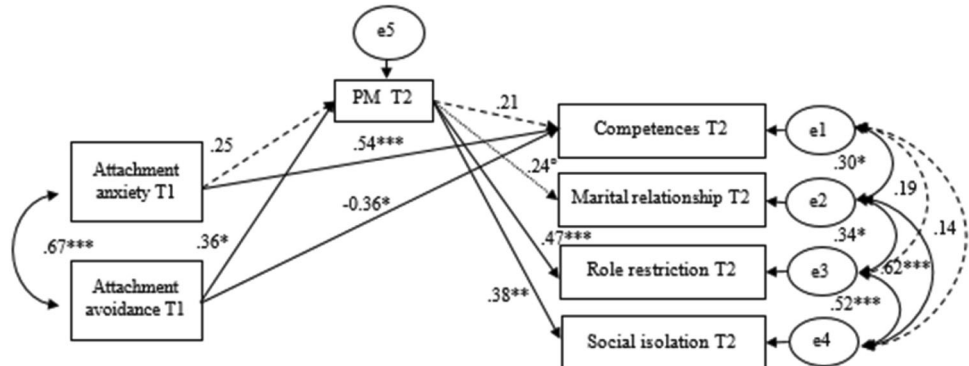
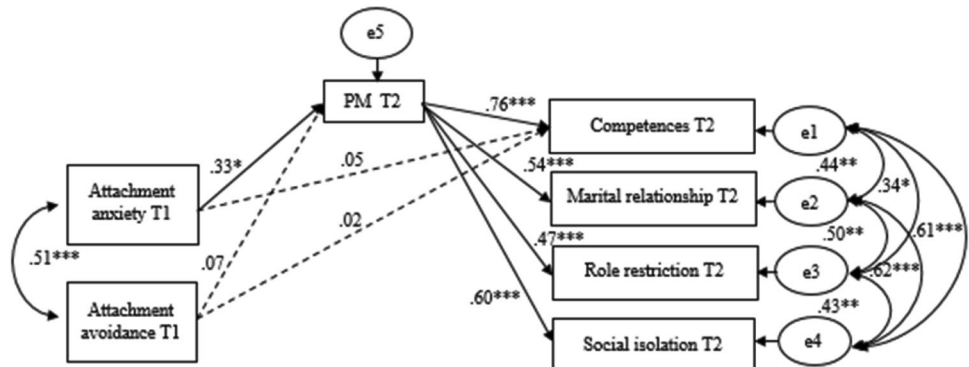


Fig. 4 Final model with significant indirect and direct paths for fathers. Standardized regression weights are given for the path coefficients. Full lines represent significant paths and dashed lines non-significant paths. * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed test)



separately showed that, in Fig. 3, the paths from attachment anxiety to PM at T2 ($\beta = .25$, $p = .11$), and from PM at T2 to competence ($\beta = .21$, $p = .14$) became nonsignificant, indicating an intervening effect of PM in the relationship between attachment avoidance and parenting stress (from attachment avoidance to PM at T2: $\beta = .36$, $p = .02$, and from PM at T2 to marital relationship: $\beta = .24$, $p = .07$; role restriction: $\beta = .47$, $p < .001$; and social isolation: $\beta = .38$, $p = .003$), although the path from PM to marital relationship was only marginally significant. Furthermore, there was a direct effect between both attachment anxiety and avoidance, and competence in mothers ($\beta = .54$, $p < .001$ and $\beta = -.36$, $p = .03$, respectively). A Sobel test for the indirect

effect between attachment avoidance and role restriction ($z = 1.98$, $p < .05$) was significant, for social isolation ($z = 1.83$, $p = .07$) there was a trend towards significance, and for the marital relationship ($z = 1.43$, $p = .15$) the Sobel test was not significant.

In Fig. 4, the path from attachment avoidance to PM at T2 ($\beta = .07$, $p = .64$) and competence ($\beta = .02$, $p = .77$), and from attachment anxiety to competence ($\beta = .05$, $p = .54$), became nonsignificant after MGA, suggesting full mediation of PM in the relationship between attachment anxiety and parenting stress dimensions (with significant paths from attachment anxiety to PM at T2: $\beta = .33$, $p = .03$, and from PM at T2 to competence: $\beta = .76$, $p < .001$;

marital relationship: $\beta = .54$, $p < .001$; role restriction: $\beta = .47$, $p < .001$; and social isolation: $\beta = .60$, $p < .001$). Sobel tests for the indirect effect between attachment anxiety and parenting stress subscales were significant for competence and social isolation ($z = 2.13$, $p < .05$ and $z = 2.04$, $p < .05$, respectively), for marital relationship and role restriction ($z = 1.99$, $p = .05$ and $z = 1.90$, $p = .06$, respectively) trends towards significance were found.

Discussion

Although many studies have explored the relationship between parental attachment and parenting stress (Mills-Koonce et al. 2011; Rholes et al. 1995; Vasquez et al. 2002; Vieira et al. 2012), none has focused on the putative role of PRF in the relationship between parental attachment and parenting stress. Yet, recent research indicates the importance of PRF and related constructs such as maternal mind-mindedness in the experience of parenting stress (McMahon and Meins 2012; Rutherford et al. 2015; Rutherford et al. 2013). Therefore, we attempted to disentangle both cross-sectional and longitudinal relationships among PRF, parental attachment, and parenting stress in early parenthood. More specifically, this study aimed to understand the potential role of PRF in parenting stress by investigating PRF as a potential mediator in the relationship between parental attachment and parenting stress.

As expected, significant positive associations were found among parental attachment, PRF, and parenting stress dimensions, although the correlational patterns were slightly different for mothers and fathers, and significant associations were mainly found for PM. In line with our theoretical expectations, PM in particular mediated the relationship between insecure attachment dimensions and parenting stress, although results differed somewhat for attachment anxiety and avoidance. More specifically, PM fully mediated the relationship between attachment anxiety and parenting stress with regard to marital relationship, role restriction, and social isolation, whereas parenting stress concerning parental competence was partly mediated by PM. Attachment avoidance, on the other hand, was only indirectly positively related to parenting stress. Interestingly, in the final model, a direct and negative association between attachment avoidance and parental competence emerged, suggesting that higher levels of attachment avoidance were related to less concern about parental competence. This is consistent with a broad array of naturalistic and experimental research demonstrating the tendency of avoidant-attached individuals to deny and underreport negative emotions and distress, whereas anxious-attached people tend to exaggerate their distress and thus typically tend to report high levels of distress (Collins 1996; Fraley and Shaver 1998; Maunder et al.

2006; Mikulincer and Shaver 2007; Nygren et al. 2012; Vieira et al. 2012).

Hence, insecure attachment (characterized by high levels of attachment anxiety or avoidance) is typically associated with serious impairments in PRF, expressed in maladaptive and inaccurate PRF (i.e., high PM), which then gives rise to parenting stress, most probably because parents increasingly fail to understand their child. Low levels of IC and CMS, by contrast, seem not necessarily associated with parenting stress, although one can imagine that extremely low scores on these dimensions of PRF might also be quite maladaptive. But at least in this relatively well-functioning group of parents, it was particularly PM that seemed to be associated with parenting stress. In more at-risk samples, different results may be obtained. Yet, it may also be that IC and CMS reflect more adaptive dimensions of PRF that are related to other, more positive features of parenting. For instance, Rutherford et al. (2015; 2013) found that IC and PM were related to persistence and stress tolerance during a simulated baby paradigm in which parents had to comfort an inconsolably crying infant. Therefore, results of this study must be interpreted with caution, and more research in larger groups oversampling for at-risk parents is needed to further clarify the results found in this study, particularly with regard to the IC and CMS subscales. Nevertheless, our findings seem to support and strengthen the idea of PRF being a multidimensional construct with each dimension tapping into different features of parental or child psychological functioning.

Finally, MGA revealed some interesting gender differences in line with formulations concerning the influence of gender incongruence (i.e., a higher risk for maladjustment in men with high attachment anxiety, and in women with high attachment avoidance, because of incongruent socio-cultural expectations) (Blatt 2004; Luyten and Blatt 2013). Indeed, in our sample, higher levels of parenting stress in mothers were associated with higher levels of attachment avoidance (via PM), whereas in fathers this was the case for higher levels of attachment anxiety. In addition, the maternal model—compared with the final joint model—showed a higher negative loading of the path from attachment avoidance to competence, again pointing toward the importance of attachment avoidance in understanding maladjustment in women.

Limitations and Implications for Research

Limitations of the study should be acknowledged. First, measures of parental attachment dimensions, PRF and parenting stress were assessed within parental couples (i.e., mothers and fathers separately), which suggest a possible interdependency of data. However, as mentioned in the data analyses section, addition of a couple-variable was not

indicated and thus justified the use of SEM with nested data. Nevertheless, future research in larger samples using actor-partner interdependency models, for instance, is needed.

Second, although comparison of parents who participated at T2 and those who did not, did not reveal any significant differences, results must be interpreted with caution due to potential attrition bias. In addition, the sample size was relatively small, which may have led to limited statistical power, particularly in exploring potential gender differences. Although the results were statistically and theoretically consistent, the results of the MGA analysis should be considered exploratory and interpreted with caution due to limited statistical power.

Third, in this study, we focused only on PRF as a possible mechanism explaining the relationship between parental attachment and parenting stress. However, PRF is unlikely to be the single most important factor influencing parenting stress and should be considered in the context of a variety of factors (parental psychopathology, family structure, life events, genetic predisposition), including child features (i.e., temperament) (Deater-Deckard 2004; Sharp and Fonagy 2008). In addition, parenting stress itself can also influence PRF, leading to even more parenting stress. Recent research on the impact of arousal on mentalizing capacities showed that distress activates the attachment system and the use of hyperactivating or deactivating attachment strategies (associated with attachment anxiety and avoidance, respectively), in turn causing impairments in mentalizing, which can be accompanied by the use of pre-mentalizing modes (Fonagy and Luyten 2009; Luyten and Fonagy 2015; Schneider-Hassloff et al. 2015). Further research with multi-wave studies is needed to specify these evocative person–environment interactions and to identify the contributions of each of these parameters.

Fourth, the study sample was relatively homogeneous, comprising mainly middle-class, well-educated parents, in which a higher frequency of secure attachment (i.e., low levels of attachment anxiety and avoidance) is reasonable to assume. Correspondingly, results revealed that many of the parents had scores in the normal (nonclinical) range on the study variables. Yet, even within this relatively well-educated and well-functioning group, the effects of distortions in PRF could be clearly demonstrated, with PM seeming to be a sensitive indicator differentiating between vulnerable and nonvulnerable parents with regard to the prerequisites of experiencing parental stress, such as less confidence in their parental competence, more relational problems, greater social isolation, and less freedom in choosing activities other than parenting. Studies in larger groups oversampling for at-risk parents are needed before generalizations can be made to clinical samples, and to further clarify the role of the different PRF dimensions.

Nevertheless, findings of this study suggest that PRF should be targeted in prevention and intervention programs, particularly as it may interact with insecure parental attachment, in predicting parenting stress, and both parental and child mental health. Specifically, both parental attachment anxiety and avoidance were associated with parenting stress, mainly because they were associated with a tendency to attribute hostile mental states to one's child (PM). Hence, these findings suggest that PRFQ, and PM in particular, should be addressed in intervention programs. To date, several intervention programs that specifically address parental attachment and PRF have been developed for different populations (Baradon et al. 2008; Borelli et al. 2012; Goyette-Ewing et al. 2003; Kalland et al. 2015; Nijssens et al. 2012; Pajulo et al. 2012; Sadler et al. 2013; Sadler et al. 2006; Slade 2007; Slade et al. 2005; Sled et al. 2013; Suchman et al. 2010, 2011, 2012). The common aim of these interventions is to enhance the parent's capacity for PRF, to improve the parent–infant relationship, and to decrease the risk for the intergenerational transmission of psychopathology. More specifically, these interventions help parents to maintain a more mentalizing stance by focusing on increasing the parent's interest and curiosity in their own and their infant's mental states (IC) rather than focusing solely on expressed behaviour, by helping them to recognize the opacity of mental states (CMS) and by addressing the presence of pre-mentalizing modes (PM) (Luyten et al. 2017b). Both randomized trials and naturalistic studies have provided promising evidence for the effects of these interventions on both children and parents (Kalland et al. 2015; Ordway et al. 2014; Sadler et al. 2013; Suchman et al. 2011). Yet, it largely remains to be determined whether their effects are primarily mediated through addressing PRF. In this regard, the PRFQ could be an easy to use screening tool to assess levels of PRF in future studies.

Author Contributions L.N. designed and executed the study, analyzed the data, and wrote the first draft of the paper. D.B. assisted with the data analyses and collaborated in the writing and editing of the final manuscript. S.C. and N.V. collaborated with the design and writing of the study. P.L. designed the study, assisted in data analyses and in the writing and editing of the final manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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.

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