

**Paternal and Maternal Reflective Functioning
in the West Australian Peel Child Health Study**

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Abstract

Whilst past research on the care of infants has been mostly with mothers, in recent times there has been a renewed attention to the father-infant relationship. This study examined differences between mother and father parental reflective functioning (PRF) or parental mentalizing, i.e., the parental capacity to reason about their own and their children's behaviors by taking into consideration intentional mental states. Data was collected from 120 couples with a one-year old child who were participants in the West Australian Peel Child Health Study. Parental mentalizing was assessed using the Parental Reflective Functioning Questionnaire ([PRFQ; Luyten, Mayes, Nijssens, & Fonagy, 2017](#)). Results showed that mother and father mentalizing with their children was independent and that mothers scored slightly higher levels of mentalizing than fathers. Paternal mentalizing was weakly associated with family income and father education, and was more strongly associated with family functioning than maternal mentalizing. Implications for theorizing on parental reflective functioning and fatherhood more generally are discussed.

Key Words: Mentalizing, Reflective Functioning, Paternal, Maternal, PRFQ

Introduction

The factors that contribute to a child's healthy development are a complex interaction of parental and child characteristics, the nature of the relationship that develops between them, and social contextual influences ([Bronfenbrenner & Morris, 1998](#); [Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000](#); [Sameroff, 2009](#); [Shonkoff, Boyce, & McEwen,](#)

[2009](#)). Four decades of research have investigated sensitive maternal responsiveness toward the child from infancy as one key construct in this intricate development (see: [Beijersbergen, Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2012](#); [Bretherton, 2013](#); [King, Priddis, & Kane, 2015](#); [Verhage et al., 2015](#)). Ainsworth's seminal research in the 1970's, yielded the definition of a sensitive mother as one who accurately perceives and interprets the infant's attachment signals and who responds to them promptly and adequately. Infants naturally respond to such care co-operatively and become secure and well socialized. Babies who experience relatively insensitive parenting were found to develop fussy, demanding, uncooperative and generally more difficult behaviours ([Ainsworth, Blehar, Waters, & Wall, 1978](#)).

Based on longitudinal research spanning over 30 years, Sroufe ([2005](#)) concluded that early attachment security provides an "organising core in human development that is always integrated with later experience and never lost" (p. 365). This statement is supported by evidence from numerous studies that indicate that children with secure attachments are more likely to have greater social-emotional competence, more developed cognitive abilities, and positive physical and mental health outcomes ([Ranson & Urichuk, 2008](#); [Sroufe, Coffino, & Carlson, 2010](#)). The Strange Situation Procedure ([SSP; Ainsworth et al., 1978](#)) enabled an empirical assessment of attachment security and outcome research from attachment predictors. Mutual sensitivity and responsiveness were posited by Ainsworth et al. ([1978](#)) to be a cornerstone of a secure attachment relationship as assessed by the SSP. While these influences have been confirmed, the implications for intergenerational transmission of attachment security resulted in a wave of further research which ultimately showed that the mechanism is not straightforward ([De Wolff & van IJzendoorn, 1997](#); [Verhage et al., 2015](#)).

In order to further explain the development of secure attachment patterns beyond that provided by maternal sensitivity, one field of research has focussed on mentalizing – a

parental ability closely related to but different from sensitive responsiveness ([Slade, Grienenberger, Bernbach, Levy, & Locker, 2005](#)). Mentalizing or reflective functioning refers to the capacity of an individual to recognize his/her own mental states, as well as the mental states of others ([Bateman & Fonagy, 2016](#)). Mental states include thoughts, feelings and intentions, as well as understanding the complexity of these mental states and their influence on behaviour. This ability enhances understanding of both self and other, and facilitates the formation of social relationships ([Fonagy, Gergely, Jurist, & Target, 2006](#)). Mentalizing is a developmental achievement that is heavily influenced by attachment patterns with early caregivers and their capacity to mentalize ([Fonagy, Bateman, & Luyten, 2012](#)). In the context of a parent-infant relationship, the capacity for parental reflective functioning (PRF) tends to be specific to that dyadic relationship and requires a capacity to intuit nonverbal mental states. Slade et al. ([2005](#)) suggested that it is through PRF that attachment patterns are passed from parent to infant. Caregivers, through mentalizing or specifically PRF, teach children about the child's own mental states as well as those of others; the quality and nature of the mental states attended to are, in turn, likely to influence the behaviours in the caregiver-child relationships ([Bateman & Fonagy, 2016](#)).

Sensitivity and attachment research has largely focussed on the infant-mother interaction ([Verhage et al., 2015](#)). When fathers have been the focus of research, evaluation of the father-child relationship has traditionally received much less attention than other aspects of fathering and has therefore been less clearly understood. In particular, researchers have called for investigation into the nature and quality of father-child interaction ([Palkovitz, 2002](#)). The study of fatherhood has changed markedly over recent decades ([Lamb, 2000](#); [Lamb, Pleck, Charnov, & Levine, 1985](#); [Nash, 1965](#); [Pleck, 2010](#)), particularly in the investigation of fathers' influence on child development ([Fitzgerald, Bocknek, Hossain, & Roggman, 2015](#); [Fitzgerald & Bradley, 2012](#); [Lamb, 2010](#); [Lewis, 2012](#)). The role and

definition of fatherhood can fluctuate widely and is largely dependent on cultural and societal influences ([Blankenhorn, 1995](#); [Bocknek, Hossain, & Roggman, 2014](#); [Lupton & Barclay, 1997](#); [Park & Brott, 1999](#); [Vogel, Bradley, Raikes, Boller, & Shears, 2006](#)). Evident in this expanding literature is the remarkable and increasingly diverse socio-economic circumstances and structural position of fathers within families ([Cabrera, Fitzgerald, Bradley, & Roggman, 2014](#); [Hofferth, Pleck, Stueve, Bianchi, & Sayer, 2002](#)). In addition to the father role changing over time and being culturally specific, the role changes for individual fathers as their circumstances alter and their children develop. The specific interest area of infant mental health has in recent times highlighted the growing evidence base around the influence of fathers and father-infant relationships on child development and the importance of such understanding for the public, for policy makers, for researchers and program development and for practitioners ([Fitzgerald et al., 2015](#)).

Over the past two decades, research evidence has emerged to support a *fathering vulnerability* hypothesis, i.e. that father-child relationship quality tends to be more positively related to family functioning or couple relationship than the mother-child relationship ([Cummings, Merrilees, & George, 2010](#); [Kouros, Papp, Goeke-Morey, & Cummings, 2014](#); [Lundy, 2002](#); [NICHD Early Child Care Research Network, 2000](#); [For an exception see, Ponnet et al., 2013](#)). The relatively limited time that most fathers independently care for their children could be a contributing factor here. During early infancy when mothers often provide the majority of care and fathers return to work, men tend to develop the father-child relationship mostly with the mother present, whereas women tend to develop an independent relationship with their children. *A spillover hypothesis*, suggests that healthier couple relationships lead to more positive parenting (e.g. [Carlson, Pilkauskas, McLanahan, & Brooks-Gunn, 2011](#); [Erel & Burman, 1995](#)). Conversely, there is the possibility of a *compensatory effect*, whereby a concern regarding a partner's lack of engagement with the

child inclines a parent to engage more positively with the child ([Goodman, Lusby, Thompson, Newport, & Stowe, 2014](#)). There has been conflicting evidence regarding the mediating role of child gender in the link between marital and parenting quality ([Cummings et al., 2010](#)). Father-son relations have generally been more positively related to marital satisfaction than father-daughter relations ([Bernier, Jarry-Boileau, & Lacharité, 2014](#); [for exceptions see: Erel & Burman, 1995](#)).

Attachment research that has included mothers and fathers has revealed the important role the father can play in providing a secure relationship for the child, which in many ways is comparable to mothers. Research with the Adult Attachment Interview ([AAI; George, Kaplan, & Main, 1985](#)) has shown mother and father adult attachment classifications to have similar distributions ([van IJzendoorn & Bakermans-Kranenburg, 1996](#)). Similarly, the proportions of mother-infant and father-infant secure attachments based on the SSP have been found to be similar ([van IJzendoorn & Bakermans-Kranenburg, 1996](#); [van IJzendoorn & De Wolff, 1997](#)). These comparable distributions of attachment security patterns indicate that in these ways fathers are not dissimilar to mothers.

Recent meta-analyses have shown the effect size of association between caregiver attachment representations and secure parent-child attachment is also similar for mothers and fathers ([Verhage et al., 2015](#)). Comparable previous analysis of multiple studies ([van IJzendoorn & De Wolff, 1997](#)), has shown that a large proportion of children (38%) had a secure attachment with only one parent and for approximately half of these children the secure attachment was with the father. Results from studies of mothers and fathers with the SSP ([Ainsworth et al., 1978](#)) generally indicate that an infant's attachment relationship with each parent is independent ([K. Grossmann et al., 2002](#); [Lamb, 1978](#); [Main & Weston, 1981](#)). Main and Weston ([1981](#)) found indications that the effects of an insecure attachment with either a mother or father are mitigated by a secure attachment with the other parent.

Specifically, in the case of children with insecure relationships with their mothers, secure relationships with fathers can have a protective effect against detrimental outcomes associated with insecure attachment ([Kochanska & Kim, 2013](#)). Some evidence also supports the additional and unique benefits of a child having a secure relationship with both the mother and father ([Verschueren & Marcoen, 1999](#)).

Prompted by concerns of the validity of attachment measures with fathers, complementary assessments of the father-child relationship have been developed. These include a measure of sensitive and challenging play ([K. Grossmann, Grossmann, Kindler, & Zimmermann, 2008](#); [K. E. Grossmann, Grossmann, Huber, & Wartner, 1981](#)), and the stimulation of risk taking or activation in the relationship ([Paquette & Dumont, 2013](#)). These aspects of relating appear to access features of the father-child relationship that help us better understand the influences of fathers on child development. Novel measures such as these have also helped broaden our conceptualisation of the role and impact of fathering.

A limited amount of research has examined comparative data between mothers' and fathers' capacities in mentalizing, in which a difference is usually, but not always found ([Arnott & Meins, 2007](#); [Fonagy, Steele, Steele, Moran, & Higgitt, 1991](#); [Pajulo et al., 2015](#)). A general deficit in mentalizing is inclusive of the symptoms of alexithymia, a condition characterised by difficulties with identifying and expressing one's feelings. Although specifically accounting for the experience of the self, alexithymia has been found to also be associated with difficulty recognising mental states of others ([Moriguchi et al., 2006](#)). A meta-analysis of alexithymia studies ([Levant, Hall, Williams, & Hasan, 2009](#)) showed that women typically demonstrate a higher capacity of mentalizing than men. In this context, it has been argued that lower levels of mentalizing and particularly the capacity to be aware of and describe emotions are normally found in men (the so-called 'normative male alexithymia hypothesis'; [Levant, 1992](#); [Levant et al., 2009](#)) where it is considered that gender role

socialization may lead to less emphasis on mentalizing in men compared to women, at least in men who have been reared to endorse more “traditional” male values.

In the context of parent-child research, mentalizing has been mostly defined through measures of PRF scored from coding of parent-infant play and interaction – or of narrative material such the Parent Development Interview ([PDI; Slade, Aber, Bresgi, Berger, & Kaplan, 2004](#)). Research with many of the attachment measures, such as the SSP and PDI are rich with detail, however, the intensive nature of the instruments lead to smaller than desirable numbers of participants. Evidence also suggests that mentalizing is multi-dimensional ([Luyten, Fonagy, Lowyck, & Vermonte, 2012](#)) and the current measure of PRF from the PDI provides only a single global score. There is a need for complementary measures of PRF that are brief and can be used in large population studies.

More recently, self-report instruments to assess PRF have been developed. Mother and father PRF comparisons have been recently reported in a study of self-reports from mothers and fathers prenatally ([Pajulo et al., 2015](#)). Prenatal PRF was rated on a seven category rating scale, with higher scores representing optimal mentalizing. In this study mothers’ total mean score was higher than that of the fathers’ ($p = .003$), suggesting these pregnant women tended to self-report a greater capacity for mentalizing with regards to their unborn children compared to their male partners. Interestingly, this scale was found to represent three factors, with mothers scoring higher for “reflecting on the fetus-child” and “the dynamic nature of the mental states”, whereas no difference was found between ratings of “opacity of mental states”.

The Parental Reflective Functioning Questionnaire ([PRFQ, Luyten et al., 2017](#)) is a self-report measure of parent-infant mentalizing ([Fonagy et al., 2016](#); [Luyten et al., 2017](#); [H. J. V. Rutherford, Goldberg, Luyten, Bridgett, & Mayes, 2013](#)). This questionnaire consists of three 6-item subscales, which represent different aspects of mentalizing: *interest and curiosity*

in mental states (interest/curiosity), *certainty of mental states* (certainty), and *pre-mentalizing* ([Luyten et al., 2012](#)). Interest and curiosity in a child's mental state indicates explicit mentalizing that involves teasing out thoughts and feelings that underlie behaviour. Lack of certainty can also be an indication of optimum mentalizing, as reasonable uncertainty allows for openness to alternative perspectives and is akin to acknowledging the opacity of mental states. Alternatively, a high level of certainty of mental states can be an indication of pseudo-mentalizing, which can appear to be mentalizing, however, it tends to be self-serving or farfetched, detrimentally inaccurate or intrusive. The term pre-mentalizing refers to a lack of mentalizing, which is characteristic of normative early childhood distortions and can be problematic non-mentalizing in later childhood and adulthood. These non-mentalizing modes of thinking include psychic equivalence (such as concrete understandings), teleological reasoning, and pretend mode, which is when mental states are not based in reality.

The authors of the PRFQ ([Luyten et al., 2017](#)) anticipated that interest and curiosity in mental states would enhance PRF performance and, therefore, be associated negatively with pre-mentalizing scores. Certainty about their understanding of other's mental states might be related to higher pre-mentalizing scores. In this study, the associations between the PRFQ subscale dimensions were examined from data collected in a birth-cohort study of mother-child, father-child dyads ([Cooke, 2015](#)). Our second aim was to compare parental mentalizing capacity between mothers and fathers, and associations of PRF with parenting self-efficacy ([Kohlhoff & Barnett, 2013](#)) and the perception of the father role ([Hofferth & Anderson, 2003](#)).

Specifically, it was expected that (a) mothers would score higher on parental mentalizing than fathers; (b) higher levels of curiosity and interest would be associated with lower pre-mentalizing, and higher certainty with higher pre-mentalizing (c) father mentalizing would be related to the quality of family relationships or family functioning.

Methods

Participants & Procedure

Parents with 12-month-old children and who were engaged with the Western Australian, Peel Child Health Study ([PCHS; Cooke, Marais, Cavanagh, Kendall, & Priddis, 2015](#)) were invited to participate in this study of parental mentalizing. Ethics approvals were obtained from the relevant university ethics committees (Curtin University Human Research Ethics Committee: HR 02/2008, and Murdoch University Human Research Ethics Sub-Committee: Permit Number: 2007/238). The PCHS recruited 451 families over a period from September 2009 to January 2012. Medical practitioners identified families with a pregnancy, and following consent, each family was recruited just prior to the 18th week of pregnancy.

When the child was approximately 12 months of age, 211 (48%) mothers and 137 (44%) fathers completed a set of one-year follow-up questionnaires, and of these, 120 couples (62 male and 58 female children) provided the matching data required for inclusion in the final analyses of this study (see below for more details). See Table 1 for participant demographic descriptive statistics.

Measures

Demographic Features

The Peel Child Health Study collected comprehensive data from parents at numerous time periods across pregnancy and the child's first year. Participant ($n = 120$ couples) and non-participant ($n = 319$ mothers and 190 fathers) groups were analysed for differences in a range of demographics ([For detailed description of Peel Study and participants see: Cooke, 2015](#)). No statistical differences ($p > .05$) were found between participants and non-participants for categories of age, father education, parent occupation, parent country of birth and birth order of the child. The participant group differed ($p < .05$) from the non-participants

group with a higher proportion of: mothers with a degree or higher education, families with high income, and couples who planned their pregnancy. Proportions of mothers and fathers (120 couples) in demographic categories are presented in Table 1.

Father Time with Child

Fathers reported the number of hours they spent on average each day caring and ‘being together’ with their children. Responses were categorized by weekdays and weekend days as per Table 2.

Non-Parental Care

Mothers reported non-parental care as the total hours per week over the past month, not including occasional babysitting. In this sample approximately half of the mothers reported non-parental care (58, 46.6%) with a weekly mean of 15.4 hours (SD = 10.4).

Family Assessment Device

The General Functioning subscale (GFAD) of the McMaster Family Assessment Device (FAD) is a popular self-report questionnaire of family functioning ([Epstein, Baldwin, & Bishop, 1983](#)). The GFAD consists of 12 items (see Appendix B) with four response categories labeled *strongly agree*, *agree*, *disagree* and *strongly disagree*. Item scores are summed into an overall general score of family functioning, with higher scores representing healthier family functioning. The GFAD items represent each of the six subscales of the FAD, which were developed to assess the six dimensions of the McMaster Model of Family Functioning: Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement and Behaviour Control ([Epstein et al., 1983](#); [Kabacoff, Miller, Bishop, Epstein, & Keitner, 1990](#); [Miller, Ryan, Keitner, Bishop, & Epstein, 2000](#)). A number of studies have used the GFAD with mothers and fathers from non-clinical samples (e.g., [Kabacoff et al.,](#)

1990; [Stevenson-Hinde, Curley, Chicot, & Jóhannsson, 2007](#)). However, some studies have found conflicting results regarding the agreement between mothers' and fathers' ratings, indicating the need to consider their scores separately rather than combined to form an aggregated family score ([Cooke et al., 2015](#)). The reliability coefficient was high for both mothers (Cronbach's alpha: .93) and fathers (Cronbach's alpha: .91).

Parenting Self -Efficacy

The Parenting Self- Efficacy scale (PSE) is a four item self-report of a parent's attitudes or beliefs regarding their ability to care for their infant ([Weston, Soriano, & Lixia, 2006](#)). This scale was used in the Longitudinal Study of Australian Children ([Zubrick, Lucas, Westrupp, & Nicholson, 2014](#)) and uses items from the US Early Childhood Longitudinal Study-Birth Cohort, for parents of children aged 9 months and older ([National Center for Education Statistics, 2004](#)). Items consist of statements such as "I feel that I am very good at calming this child when he/she is upset or crying" and are rated on a ten-point scale with a score of one labelled as "not how I feel at all" and ten as "exactly how I feel". A PSE score is calculated by averaging the item values providing a score out of ten, with high scores indicating high parenting self-efficacy. High parenting self-efficacy has been found to associated with more effective parenting and better child adjustment ([Jones & Prinz, 2005](#)). The PSE scale demonstrated satisfactory internal consistency with Chronbach's alpha for both mothers (.81) and fathers (.85).

Fathering Role

The 8-item Role of Father scale ([Hofferth, 2003; Hofferth & Anderson, 2003](#)) was created partly from items drawn from the Role of the Father Questionnaire ([Palkovitz, 1984](#)) and was used in Child Development Supplement to the Panel Study of Income Dynamics ([PSID, 2014](#)). This scale provides a self-report of fathering motivation from his level of

agreement to statements of parenting or fathering attitudes. Fathering attitudes that are gender equitable and supportive of father involvement have been found to be associated with greater child caregiving and responsibility ([Hofferth, 2003](#); [McGill, 2011](#)).

The scale consists of statements that are rated from 1 (Strongly Disagree) to 4 (Strongly Agree) with scores reversed such that high scores reflect positive attitudes towards fathering. A total score for the Role of the Father is obtained by summing the scores of all items. Examples of items in this scale include “A father should be as heavily involved in the care of his child as the mother,” and “In general, fathers and mothers are equally good at meeting their children’s needs.” The scale has been factor analysed and reported to be sufficiently described by one factor, with internal consistency of .70 ([Hofferth & Anderson, 2003](#)) and in this study .77.

Parental Reflective Functioning Questionnaire

The Parental Reflective Functioning Questionnaire ([PRFQ; Luyten et al., 2017](#)) is a brief, multidimensional self-report measure that assesses parental reflective functioning. It consists of 18 items assessing three dimensions of mentalizing: pre-mentalizing (e.g., “My child cries around strangers to embarrass me”), certainty about the mental states of the infant (e.g., “I always know what my child wants.”), and interest and curiosity in the mental states of the infant (e.g., “I am often curious to find out how my child feels”). Items are scored on a seven-point scale ranging from “strongly disagree” to “strongly agree”. The scores on subscales are not aggregated to give a single PRF score.

Exploratory and confirmatory factor analyses have provided evidence for the stability of these three dimensions of mentalizing across mothers and fathers. These PRFQ subscales have also been shown to have good internal consistency and to be related in theoretically predicted ways with parental attachment, emotional availability, parenting stress, child attachment status ([Fonagy et al., 2016](#); [Luyten et al., 2017](#)), mother’s tolerance of infant

distress ([H. J. Rutherford, Booth, Luyten, Bridgett, & Mayes, 2015](#); [H. J. V. Rutherford et al., 2013](#)) and parental involvement ([Rostad & Whitaker, 2016](#)). A prenatal PRF scale has been developed that is based closely on the PRFQ ([Pajulo et al., 2015](#)) and correlates strongly with PRF scored on the Pregnancy Interview ([Slade, Grunebaum, Haganir, & Reeves, 2011](#)). Internal consistency for PRFQ subscales in the current study were: Pre-Mentalizing $\alpha = .71$, Certainty of Mental States $\alpha = .76$, Interest and Curiosity in Mental States $\alpha = .72$.

Data Analysis

Due to violation of normal distribution and to allow for measures being of an ordinal or nominal scale, Spearman's correlations were used to assess the strength of associations between PRFQ subscales and with demographics and scale scores. Differences between correlation coefficients were analysed using Fisher r-to-z transformation for independent samples. T-tests and ANOVAs were used to compare differences between means, with probability (p) levels of less than .05 deemed statistically significant and effect sizes calculated as a standardized measure of the magnitude of differences between means ([Cohen, 1988](#)).

Results

Demographic Characteristics

No significant differences were found on any of the PRFQ subscales mean scores for the categorical variables of parents age, first child or not, occupation, country of birth, and planning of pregnancy. The only categorical variable with a mean difference was related to child gender ($F = 6.35 (1,117), p = .013$), such that mothers' certainty of mental states was higher for boys ($M = 4.17; SD = 1.04; 95\% CI: 3.91$ to 4.44) compared to girls ($M = 3.70; SD = 1.02; 95\% CI: 3.43$ to 3.97), with an effect size of $d = .46$.

With regard to level of education, the only significant correlations found were that higher levels of fathers' interest and curiosity ($\rho = .26; p = .01$) and certainty of mental states scores ($\rho = .22; p = .02$) were associated with higher levels of fathers' education. Although mothers' PRFQ scores were not significantly associated with their level of education, the correlations were positive and not significantly weaker than that of the fathers'.

Family income was significantly correlated only with fathers' pre-mentalizing scores, such that higher levels of income were associated with lower levels of pre-mentalizing ($\rho = -.21; p = .03$). Scores for interest and curiosity in mental states showed a weak positive, nearing statistically significant, correlation with family income for both mothers ($\rho = .17; p = .08$) and fathers ($\rho = .18; p = .06$).

Relationship between mother and father mentalizing

A relatively similar pattern of associations was found between the three PRFQ subscales for both mothers and fathers (Table 3). With increasing interest and curiosity in mental states there was a corresponding decrease in pre-mentalizing, and this was similar for both mothers and fathers. Certainty of mental states was weakly correlated in a positive direction with interest and curiosity for mothers and fathers. Pre-mentalizing was weakly associated with certainty of mental states for mothers but not for fathers. An examination of correlations between mother and father PRFQ scores shows only father pre-mentalizing was weakly and negatively associated with mother interest and curiosity. All other correlations between mother and father PRFQ subscale scores were non-significant.

Comparisons of mentalizing subscale paired means showed that mother and father couples differed in levels of pre-mentalizing and levels of interest and curiosity in mental states (Table 4). Father pre-mentalizing scores were higher than mothers' pre-mentalizing scores by a difference of 0.40 ($t[118] = 4.95, p < 0.001; 95\% \text{ CI } [0.24, 0.56]$), with an effect

size of $d = .63$. Father interest and curiosity scores were lower than mothers' interest and curiosity scores by a difference of -0.28 ($t[119] = -2.38, p = 0.019$; 95% CI $[-0.50, -0.05]$), with an effect size of $d = .31$. Mother and father mean scores of certainty in mental states did not differ significantly ($d = .09$).

Parental Characteristics

Fathers' time with their children during the week did not correlate significantly with any of the father or mother PRFQ subscale scores. Greater amounts of weekend time with their children was significantly associated with higher levels of father interest and curiosity in mental states ($\rho = .24; p = .009$) and lower levels of pre-mentalizing ($\rho = -.31; p = .001$).

Mothers who reported using regular non-parental care for their children scored slightly higher for pre-mentalizing ($M = 1.54, SD = 0.52$) than mothers using no non-parental care ($M = 1.35, SD = 0.56$), with a mean difference in scores of 0.19 ($p = .065$; 95% CI $[-0.01, 0.38]$); representing an effect size of $d = .35$. A similar mean difference was found for mother interest and curiosity and for father pre-mentalizing indicating higher levels of mentalizing for parents not regularly using childcare, although these differences were non-significant. The number of non-parental care hours (rated by those mothers who reported any regular non-parental care) was not associated with any mother or father PRFQ subscale scores.

Fathers' rating of a positive fathering role was strongly associated with higher father interest and curiosity and lower father pre-mentalizing (Table 5). No association was found for fathering role with father certainty of mental state or with any mother PRFQ scales.

Parenting self-efficacy was correlated with all mother and father PRFQ subscales relatively similarly, with higher PSE associated with higher interest and curiosity as well as certainty of mental states, and with lower pre-mentalizing (see table 5). There was a

difference between the mother and father correlations between PSE and interest and curiosity such that the association was stronger for fathers ($z = 1.63$; $p = .103$).

Higher levels of father interest and curiosity in mental states was associated with higher father ratings of family functioning (GFAD) and higher pre-mentalizing was associated with lower GFAD (Table 5). No mother PRFQ subscales were significantly associated with mother rated GFAD. There was a notable difference between the positive association of father interest and curiosity with GFAD scores and the negative association of mother interest and curiosity with GFAD scores, which was statistically significant ($z = 3.48$; $p < .001$). The difference between correlations of parent pre-mentalizing with GFAD showed a clear trend towards significance ($z = -1.39$; $p = .08$).

Discussion

This study examined differences between mothers' and fathers' mentalizing as part of a birth cohort population study in Western Australia with a sample of parents (120 couples) with a one-year-old child (62 male and 58 female). Associations between the PRFQ and selected sociodemographic factors were explored. Maternal and paternal scores on the three subscales of the PRFQ were compared and then comparisons made on particular parenting factors.

PRFQ and Sociodemographic Factors

The exploratory analyses with this non-clinical sample showed no relation between mentalizing as measured by the PRFQ and parent age, prior experience of parenting, occupation, parent country of birth or planning of the pregnancy. Some dimensions of father mentalizing were weakly associated with higher education and income. This was not so, however, for mothers. Examination of PRFQ subscale means indicated fathers with higher education and with higher levels of income had less pre-mentalizing - a trend that was not

evident in the prenatal study of PRF by Pajulo et al ([2015](#)), but that was reported by Luyten et al. (2016). Since the PRFQ relies on written items, the interpretation and ability of the parent to comprehend the items may influence responses on the PM subscales, but this then should be observed on the other two subscales as well. It may also be possible that the association between higher education and income reflects a social learning process, i.e.; that fathers with higher levels of education tend to be less prone to make malevolent attributions about their children's minds ([Fonagy, Luyten, & Allison, 2015](#)).

PRFQ scores for mothers and fathers

It was predicted that mothers would demonstrate a higher capacity of mentalizing than fathers, which on the PRFQ means that mothers pre-mentalizing scores would be lower than fathers and curiosity and interest in mental states higher. Results suggested that mother and father couples indeed differed in levels of pre-mentalizing and levels of interest and curiosity in mental states (Table 4). Father pre-mentalizing scores were significantly higher than mothers' pre-mentalizing scores reflecting a moderate effect size. This is similar to results with theory of mind research, where women have been found to have greater capacity to think in terms of mental states ([Baron-Cohen, 2002](#)) and with findings of normative male alexithymia, where men have been found to have lower awareness of emotions and less capacity to describe them compared to women ([Levant et al., 2009](#)). The fathers in this study were found to have less interest and curiosity in mental states and more pre-mentalizing than mothers (i.e., grossly inaccurate assumptions about their infants mind).

A possible explanation for mothers' higher levels on the subscale scores for curiosity in mental states and lower for pre-mentalizing than fathers' scores is that the mother role typically demands more time alone with the child compared with fathers, and therefore mothers tend to have greater opportunity to develop their mentalizing ability. Consistent with this possibility, the fathers in this study who spent more time with their children on weekends

scored lower levels of pre-mentalizing. A study of working mothers with full-time child-caring fathers could test if the parent/provider roles were reversed that fathers might show higher mentalizing than mothers. As shown in this study, low levels of father pre-mentalizing and greater interest and curiosity were strongly associated with a positive rating of the fathering role, indicating the possibility that greater commitment to and interest in the parenting role facilitates improved mentalizing. Similarly, both mother and father parenting self-efficacy were relatively strongly associated with higher levels of mentalizing and lower pre-mentalizing. These correlations with specific parenting measures support the construct validity of the PRFQ.

The current study found no direct associations between mothers' and fathers' mentalizing subscale scores. This is concordant with previous studies indicating that mother-infant and father-infant relationships are generally independent and relationship specific ([Arnott & Meins, 2007](#)), but contrary to propositions that men and women self-select partners with similar characteristics ([Simons & Conger, 2007](#); [Vandenberg, 1972](#)) or that the characteristics of the child may influence parental mentalizing. The differences are consistent with the Finnish study that recently reported results on prenatal parental mentalizing. In that study, Pajulo et al ([2015](#)) found mothers had significantly higher reflective functioning scores than did fathers on a self-report prenatal variant of the PRFQ. These gender-based differences raise questions as to the influence of partners upon each other within a parenting relationship and a possible *compensatory effect* ([Goodman et al., 2014](#)). For example, in the current study, mothers who self-reported with higher interest and curiosity in mental states may be compensating for the fathers with mentalizing deficits, and fathers with low pre-mentalizing may be positively influenced by the mother-child relationship. Further longitudinal research is needed to investigate these issues.

Comparisons between PRFQ subscale scores

It was predicted that higher level of curiosity and interest would be associated with lower pre-mentalizing. The results were consistent with this prediction and provide support for these two interrelated aspects of parental mentalizing. With increasing interest and curiosity in mental states there was a corresponding decrease in pre-mentalizing, and this was similar for both mothers and fathers. Certainty of mental states was only weakly correlated at most with either of the other two subscales and no difference was found between mean levels of mother and father certainty, which were generally moderate. The findings for the certainty subscales might be explained by the nature of this non-clinical sample of parents, who may have relatively high confidence in their understanding of their children. High levels of certainty in mental states are indicative of overly implausible, destructively inaccurate or intrusive attributions of mental states, which would be more likely observed with clinical samples such as those with personality disorders. Therefore, from this analysis with a non-clinical sample, the certainty of mental states scale appears to be less useful than the other scales in the assessment of parental mentalizing.

Associations between PRFQ scores and parenting factors

Maternal pre-mentalizing was slightly higher for those who used regular non-parental child care compared to those who did not. A higher level of pre-mentalizing indicates the likelihood of negativity and difficulty in the parent-child relationship (e.g., annoyance, confusion, embarrassment, misinterpretation). The reasons for this association are not investigated in this study but may be related to the reasons for utilizing non-parental care, the impact of the care itself, or the transitions between non-parental care and the home.

The finding of mothers' increased certainty of mental states with boys compared to girls may be in response to characteristics that are more common with boys. Mothers may be responding in accordance with an expectation that boys will externalize difficulties whereas girls tend to internalize problems and therefore the behavior of boys might be perceived as

providing more evidence of their mental states. Also, perhaps mothers project their sense of understanding their male partners onto their relationship with their sons. Mother certainty of mental states with boys may be a similar effect to the finding of parents showing increased psychological control of boys ([Sturge-Apple, Davies, Boker, & Cummings, 2004](#)).

Father levels of higher mentalizing capacity (greater interest and curiosity and higher pre-mentalizing) were found to be relatively strongly associated with paternal perception of family functioning as predicted, whereas no such association was found between mothers' ratings. This finding is consistent with the vulnerable father hypothesis ([Cummings et al., 2010](#)) and suggests paternal mentalizing is either more influential or influenced by other family relationships than maternal mentalizing. The similarly strong associations between father mentalizing and fathering role indicates the parenting role is an important factor to be considered when assessing or intervening in father-child relationships. Unfortunately the mother role was not assessed in this study – the association between mentalizing and a comparable parenting-role measure for mothers would be informative. Another consideration is that poor family functioning could be limiting opportunities for paternal caregiving and responsibility, which in turn could limit responsiveness and opportunities to develop sensitivity to their infant and mentalizing ([Allen & Hawkins, 1999](#); [Fagan & Barnett, 2003](#); [Lewis, 2003](#); [Lundy, 2002](#); [Schoppe-Sullivan, Brown, Connon, Mangelsdorf, & Sokolowski, 2008](#)).

The findings of higher father PSE, family functioning and father role associations with higher mentalizing are consistent with findings of fathers' higher PSE and partnership satisfaction being associated with positive child social-emotional development and behaviour ([Sierau, Lehmann, & Jungmann, 2011](#)). Further studies designed to examine the causal pathways of parental influence on child development are required to determine if father mentalizing is an independent factor in fathers' effect on children.

Limitations

The main strength of this study is the focus on a rarely examined aspect of the father-infant relationship, that of paternal reflective functioning. Yet, the measures in this study are limited to self-report questionnaires and results cannot be generalized beyond the characteristics of the sample, namely English-speaking heterosexual couples with a one-year-old child and representing families with a slightly higher family income and maternal education than non-participants from the broader pool of participants. The design of the study and the analyses used were limited to examining relationships and differences between groups, and further longitudinal research is clearly needed.

Conclusions

Much of the analysis in this study supports findings from previous research: the independence of mother and father mentalizing with their children; the higher level of mentalizing among the mothers compared to fathers; the association of both father's role and parenting self-efficacy with the quality of parent-child relationships; and the association between fathers' but not mothers' perceptions of family functioning and parent-child relationships. The fact that these findings are consistent with those of other studies using more traditional measures of mentalizing provides additional construct validity support for the PFRQ. Finally, the implications for the findings with exploratory measures have been discussed and further research directions suggested. Paternal mentalizing is suggested to be a key capacity for developing close father-infant relationship and supporting optimal health and development of children.

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Table 1. Participant demographic characteristics

		Mother N = 120	Father N = 120
Parent Age at 18 Week	Under 28	26%	18%
	28-38	70%	66%
	Over 38	4%	16%
ANZSCO* Occupation Category	Managers / Professionals	46.2%	27.6%
	Technicians or Trade Workers / Community or Personal Service Workers	17.9%	43.8%
	Clerical or Administrative Workers / Sales Workers	28.2%	7.6%
	Machinery Operators or Drivers / Labourers	7.7%	21.0%
	< Year 12	8.7%	6.7%
Education Level	Year 12	13.9%	10.6%
	Certificate / Diploma	33.9%	62.5%
	≥ Degree or higher	43.5%	20.2%
Country of Birth	Australia	72.9%	75.9%
	Not Australia	27.1%	24.1%
Birth Order	First Child	31.4%	25.0%
	Parent has an older child(ren)	68.6%	75.0%
		Mother report for family N = 120	
Sex of Child	Male	52%	
	Female	48%	
Couple's Planning of Pregnancy	Planned	81.7%	
	Unplanned	18.3%	
Family Annual Income AU\$	\$60,000 or less	13.8%	
	\$60,001 to \$78,000	16.5%	
	\$78,001 to \$104,000	23.9%	
	Over \$104,000	45.9%	

* ANZSCO: Australian and New Zealand Standard Classification of Occupations

Table 1. Father time with child

Average per day on	Less than 1 hour	About 1 hour	About 1 to 2 hours	About 3 to 5 hours	More than 5 hours
Weekdays	2.7%	2.7%	31.0%	44.2%	19.5%
Average per day on	Less than 1 hour	About 1 to 5 hours	About 6 to 10 hours	About 11 to 20 hours	More than 20 hours
Weekends	1.7%	10.4%	34.8%	34.8%	18.3%

Table 3. Spearman Correlation table of mother and father PRFQ

	Father PM	Father CM	Father IC	Mother PM	Mother CM
Father Pre-Mentalizing					
Father Certainty of Mental States	-.025				
Father Interest and Curiosity	-.503 ^{***}	.168 ⁺			
Mother Pre-Mentalizing	.109	-.114	-.075		
Mother Certainty of Mental States	-.017	.129	-.017	-.247 ^{**}	
Mother Interest and Curiosity	-.204 [*]	-.055	.046	-.362 ^{***}	.200 [*]

Note: ⁺ $p \leq 0.05$; ^{*} $p \leq 0.05$; ^{**} $p \leq 0.01$; ^{***} $p \leq 0.001$

N = 120 couples

Table 4. PRFQ mean scores for mothers and fathers

	Mother	Father
	Mean (SD)	Mean (SD)
Pre-Mentalizing	1.43 (0.53)	1.83 (0.73)***
Certainty of Mental States	3.95 (1.06)	3.86 (0.94)
Interest and Curiosity	5.59 (0.92)	5.31 (0.88)*

Note: * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 5. Spearman's correlations between PRFQ subscales and family functioning, parenting self-efficacy and fathering role.

	Father PRFQ PM	Father PRFQ CM	Father PRFQ IC
Father Family Functioning (GFAD)	-.276**	.127	.354***
Father Parenting Self- Efficacy (PSE)	-.362***	.317***	.403***
Fathering Role	-.408***	.116	.400***

	Mother PRFQ PM	Mother PRFQ CM	Mother PRFQ IC
Mother Family Functioning (GFAD)	-.094	.141	-.102
Mother Parenting Self- Efficacy (PSE)	-.392***	.249**	.207*
Fathering Role	-.071	.023	-.005

Note: * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$