EMERGING PARENTAL SENSITIVITY: THE TRANSITION TO PARENTHOOD THROUGH THE LENS OF FAMILY SYSTEMS THEORY

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PREFACE

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text. It is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University of similar institution except as declared in the Preface and specified in the text. The thesis does not exceed 60,000 words excluding bibliography and figures.

SIGNED: DATE:

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ABSTRACT

Parents' capacity to represent and sensitively respond to their children as individuals, is a particularly pertinent ability during infancy. This thesis contributes to theoretical understanding of the nature of parental sensitivity during infancy. In particular, it examined whether parental mind-mindedness and coherence, dimensions theoretically related to sensitivity, are (i) measurable during pregnancy, (ii) conceptually distinct, and (iii) meaningfully associated with observed sensitivity.

Results from two studies are presented. The first, a prospective longitudinal study, involved interviews with and observations of 201 first-time parents during late pregnancy and at 4 and 14 months postpartum. Drawing on this data, I established that both expectant mothers and fathers can construct mind-minded and coherent descriptions of their unborn infants during pregnancy. However, there was no evidence that these prenatal constructs had a direct or indirect effect on parents' sensitivity during infancy. These results were added to the second meta-analytic study that showed expectant mothers' (but not fathers') thoughts and feelings about their unborn infant were related to their observed parenting in the postnatal period.

In line with the gendered meta-analytic results, further differences emerged between mothers' and fathers' talk and behaviour within the prospective longitudinal study. Specifically, mind-mindedness was more stable than sensitivity for mothers whilst the reverse was evident for fathers. Compared with mothers, fathers' talk and behaviour was more susceptible to influence from other members of the family system. Couple relationship quality influenced both fathers' prenatal coherence and gains in their mind-mindedness over time. Infant affective responses were also important for fathers' mind-mindedness, whilst maternal parental efficacy alongside infants' receptive vocabulary were associated with fathers' sensitivity. Unexpectedly, infant gender was an important influence on parents' behaviour: mothers' sensitivity at 4 months appeared to stimulate fathers' sensitivity towards their daughters at 14 months. By following both mothers and fathers and in line with family systems theory, assessing whether partners contribute to the emergence of their co-parents' sensitivity, this thesis provides a rich portrayal of the transition to parenthood in the 21st century.

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When his first-born son Doddy reached the age of 4 months, Charles Darwin stopped referring to him as "*it*" and instead started recognising him as an individual with a mind, using phrases such as "*decidedly looking at my finger*" and "*recognises*" his mother (Conrad, 1998). Whilst this level of engagement may not have been typical of the Victorian father, these linguistic shifts perhaps highlight an emerging awareness of his son as a sentient being with his own thoughts, feelings and desires. In order to understand how parents' proclivity to both represent and interact with their infants as unique individuals emerges across the transition to parenthood, it is important to consider the context caregivers find themselves in. Just as a river, an organic, dynamic and complex system, cannot be adequately understood if only a section or attribute is focused upon (Sprey, 2000), a social process, such as the adjustment to parenthood, cannot be fully understood by measuring a specific factor of one individual at a single point in time. To develop a holistic understanding of the emergence of key parent capacities, an appreciation is needed of how the transition started, the factors that continue to shape the process and the necessary role that others play in this journey.

In this chapter, I first introduce family systems theory and its pertinence for considering the transition to parenthood. Second, in light of seminal research examining this transition, I reflect on key developments that suggest a new study in this area is timely, in particular noting both the importance of the current societal context for expectant parents and burgeoning research on prenatal influences on parent behaviour. Following this, I further discuss the concept of 'parenting' before placing the spotlight onto parental sensitivity, a construct that is especially pertinent in infancy. Finally, I discuss influences on parent behaviour, noting three key sets of factors that have widely been identified as influencing parents' behaviour: characteristics of the parent, the infant and the couple. Taken together, these three components of the family system set the scene for the key questions guiding this thesis.

1.1. Why Family Systems Theory?

Whiteman, McHale and Soli (2011) argue that the perspectives that are most beneficial to family scholars are those that focus on dimensions of relationships, identify how such dimensions and characteristics change and explore variation in relationships. Whilst "*not frequently the focus of empirical scrutiny in sibling research or family research more generally,*" a family system approach, in combination with others (e.g., attachment, Rothbaum, Rosen, Ujiie, & Uchida, 2002) is advocated to look at changing family dynamics (Whiteman et al., 2011, p.134). Different theoretical perspectives become valuable at

different times in the family life cycle and a family system perspective appears particularly suited to an examination of the transition to parenthood.

Traditionally used to understand biological systems, the central tenets of systems theory have been successfully applied in social theory and practice, first by family therapists and later by developmental psychologists (Minuchin, 1985). Guiding family system theory is the principle that an individual can only be understood by considering their context, as individuals within systems are necessarily interdependent and a member of a number of different subsystems (i.e., parent-parent, parent-child, child-sibling). Specific processes and rules govern interactions between individuals, both within and across different dyadic subsystems and these become well established over time and come to shape individual members of the family system over time (Cox & Paley, 1997). Whilst features of any system may be relatively stable, an adaptive system is one that evolves in response to environmental demand and over time.

When a couple become parents for the first time, their family system expands and becomes more complex. New parents must learn how to interact with each other as co-parents in a way that is different from their romantic relationship, resulting in three transitions "his, hers and theirs" (C. Cowan et al., 1985). In addition to this, parents must learn how to interact with their infant and establish boundaries between these three subsystems (i.e., mother-infant, father-infant, mother-father). Other relationships connected to the couple change at this time, such as those with the new grandparents or aunts and uncles. These relationships and the community in which new parents find themselves can either facilitate or hinder an adaptive transition to parenthood, with the behaviour of others acting as a support or stressor. Cox and Paley (1997) note that normative transitions in family life cycles are not defined by a single event, but are periods of time when individual and family functioning are at risk with systems coming under pressure. Thus, it seems not only appropriate but necessary to examine the transition to parenthood through the lens of family systems theory, as it ensures multiple factors and players are considered when trying to understand new parents' behaviour, which in turn may help to identify areas for intervention.

Indeed, a family systems framework has already been usefully applied to study the transition to parenthood. In their landmark Becoming a Family Project, C. Cowan and Cowan (1992) followed 72 heterosexual couples across the transition to parenthood. Through the use of detailed interviews, questionnaires and observations, their study made important theoretical and clinical contributions, especially through their development of a couples therapy program (P. Cowan, Powell, & Cowan, 1998; Pruett, Pruett, Cowan, & Cowan,

2017). C. Cowan and Cowan (1992) established that over and above postnatal factors, prenatal functioning, including individual psychological health and couple relationship quality, was a key influence on postnatal individual and couple functioning. Of particular interest to the current study, was the prominence of the egalitarian parenting ideology endorsed by the majority of the families. The couples in the Becoming a Family Project became parents for the first time decades ago with a "*pioneer spirit*" and predicted more equal familial roles in a hope to become "*leaders at the frontier of modern family life*" (C. Cowan & Cowan, 1992, p. 95). Yet despite such optimism, the reality of life with an infant was, for the majority, disappointingly traditional. In particular, even though during pregnancy the majority of parents predicted that mothers would be more involved in childcare, both parents were struck by the greater asymmetry between mothers and fathers at 6 and 18 months post-partum. This proved important as higher levels of paternal involvement were associated with higher self-esteem, less parenting stress and greater satisfaction in the couple relationship at 6 months for both mothers and fathers. However, by 18 months, higher levels of paternal involvement were only related to mothers' satisfaction in the couple relationship. Speculation as to why these families found it so difficult to enact their preferred ideology included the presumed association between childcare and women's work, the notion of 'maternal instinct', negative feedback given to men and, perhaps most importantly, economic inequalities.

These 'pioneers' made the transition to parenthood between 1979 and 1980 and almost 40-years later it might be expected that this well-trodden path is a well-understood route. Yet the context that couples now find themselves in is inherently different, specifically with regards to shifts in father involvement, gender roles and other generational changes. Despite some attitudes and behaviours being resistant to change, their impact on the individual or family is not necessarily the same. It is not the case that the findings and conclusions from the Becoming a Family Project can simply be extrapolated to today because societal changes mean that this life event is no longer the same. Indeed, family systems theory, which also guided the Cowan's study, necessarily points to the importance of time and place. Consequently, it is important to be aware of the changing circumstances expectant parents find themselves in so that conclusions and subsequent implications are applicable to the relevant context. Thus, through the adoption of similar principles and benefitting from a wealth of research that preceded it, the New Fathers and Mothers Study (New FAMS) followed a much larger sample of 201 first-time parents across the transition to parenthood

and in doing so provides a window into this life changing experience for the 21st century couple.

1.2. Why the need for the New Fathers and Mothers Study?

When the Cowans began their study, the concept of the 'involved' father was in its infancy, for both researchers and parents alike. The 1970s saw the rise of the 'new nurturant' father who was actively involved in the day-to-day care of their children (Lamb, 2000). Such ideas are reflected in the ideals espoused by the couples in the Becoming a Family Project. Prior to this, the paternal role of moral guide, breadwinner or sex role model (Pleck, 1984) restricted fathers' involvement to the extent that they embodied religious ideals, provided financial support or projected masculine traits. Fathers are now more likely to be involved in the lives of their children (Bianchi, Robinson, & Melissa, 2006). However, involvement varies in terms of quantity and quality. Time spent with children may be seen in absolute or relative terms and looked at over different time periods (i.e., weekday versus weekend). Lamb, Pleck, Charnov and Levine (1985) argued for the need to distinguish between parental engagement (e.g., playing, feeding), availability (e.g., presence) and responsibility (e.g., making key care decisions). Raley, Bianchi and Wang (2012) combined measures of quantity and quality in their analysis of 14,000 individuals who took part in the 2003-2007 American Time Use Survey. Fathers in married dual-earner couples completed significantly more childcare and couples were more similar in the amount of time they contributed as the wives' contribution to the couple's earnings increased (though overall women still did more childcare). Broken down further, fathers were more likely to participate in solo child care if their wives were employed and as their wives contributed more to the household income, they provided more physical care (e.g., nappy changing). As their wives worked longer hours, fathers were also more likely to take on more parental responsibility (e.g., arranging childcare), but were less likely to engage in more recreational activities (e.g., play). This latter finding is of particular interest in light of the enduring finding that, on average, fathers are more likely than mothers to be playmates (Parke, 2013). As similarity in work status between genders increases within society, so does the potential for more egalitarian parental arrangements.

Second, ideas surrounding traditional gender roles continue to be eroded (Scott, Treas, & Richards, 2004). Launched in 1983, the nationally representative British Social Attitudes survey has made it possible to monitor changes in attitudes to gender roles. In the 1980s almost half of those surveyed agreed that "*A man's job is to earn money; a woman's*

job is to look after the home and family," whilst in 2012 only 13% endorsed this traditional separation of roles. There was also evidence of generational replacement, with each age cohort less likely to endorse traditional views, which suggests this trend will continue (Scott & Clery, 2013). Furthermore, recent changes to parental leave are symbolic and signal the value of father involvement. From 5th April 2015, new parents in the UK have been able to divide the 50 weeks of statutory parental leave and the 30 weeks of shared parental pay (e.g., Children and Families Act, 2014). A year on from the policy change, a survey of 200 companies highlighted the extremely low take-up (~1%) of shared leave amongst employees (MFC, 2016). However, of the 1,000 parents also surveyed, 87% of fathers agreed that they would like to take longer paternity leave to facilitate greater involvement in parenting. The policy is in its infancy and so its long-term impact remains to be seen, but it could be argued that the role of provider and nurturer are no longer seen as mutually exclusive or restricted to one gender. Clearly New FAMS is well-timed and provides a valuable opportunity to explore whether or not more equal parental roles are adopted by new parents who live in a society that more explicitly supports such notions.

These changes notwithstanding, there is still a commonly held view that the burden of care should fall more heavily upon mothers (Scott & Clery, 2013). In line with this, in the UK mothers are most likely to take parental leave and are more likely than fathers to alter work patterns after becoming a parent (OECD, 2016). Economic arguments tend to dominate this decision, fuelled by gender inequalities in the labour market that mean that families are better off financially if women stay at home (Talmi, 2013). The tensions surrounding mothers' work-family balance have not been resolved in 2017. Once they become a parent, mothers appear to take on a 'second-shift' (Hochschild & Machung, 2012). For example, in addition to formal employment, men reported spending on average eight hours per week on housework and 10 hours per week caring for family members whilst women reported 13 hours per week on housework and 23 hours per week caring for family members (Scott & Clery, 2013). Overall, it appears the time fathers spend with their children in relation to mothers has increased but fathers still typically spend a higher proportion of this time in interactive 'fun' activities than mothers (55% versus 40%) and continue to assume less responsibility (e.g., making key decisions, arranging or attending doctors' appointments) (Roeters & Gracia, 2016). However, it is important not to generalise as subtle differences emerge across different groups. For example, in a nationally representative sample of American fathers, African-American fathers spent less time with their children than non-Hispanic White fathers (12.76 versus 15.35 hours per week) but had greater responsibility for

routine care of children (Hofferth, 2003). Nevertheless, it appears there is merit in the argument that "*the maternal parenting role is more mandatory and more clearly scripted by our culture, whilst paternal parenting is still more discretionary and less clearly scripted and proscribed by the culture*" (Parke, 2013, p. 126). Whilst some might argue changes have stalled (Hochschild & Machung, 2012), it should be remembered that the couples in New FAMS are beginning the transition to parenthood from a different starting point from their own parents.

Third, generational differences require a new perspective on the transition to parenthood. Women are now more likely to delay first-time parenthood (if indeed they choose to become mothers: as an example, 18% of women born in 1970 remain childless as they come to the end of their childbearing years), with the average age of first-time mothers in England and Wales increasing from 23.7 years in 1971 to 28.6 years in 2015. Fertility rates for women over 40 years old have more than trebled since 1981 and more babies are now born to this group than to women under the age of 20 years (ONS, 2016a). Individuals move for education or work purposes and so are now less likely to settle in the area in which they grew up, leading some to argue that first-time parents are more isolated and have less familial or community support available to them (Nolan, 1997). Also, the percentage of couples getting divorced before their 15th wedding anniversary has risen from 20% in 1968 to 32% for couples married in 1998 (ONS, 2015).

Caregivers are also now more exposed to a combination of messages that depict child wellbeing as exceedingly vulnerable and parents as the masters of influence (E. Lee, Bristow, Faircloth, & Macvarish, 2014). Hays (1996) argued that despite acknowledging fathers' involvement, mothers remain the focal parent and are expected by society to achieve an ideal that requires more time, emotion and energy than previously expected. Motherhood today is not only 'intensive' but also often competes with paid work (ONS, 2013) such that women experience greater work-family conflict (Bianchi & Milkie, 2010). Such time strain in combination with dominant messages about intensive motherhood may result in mothers feeling more pressured in the time that they spend with their children. Illustrating this point, Roeters and Gracia (2016) found as parental working hours increased, fathers found interacting with their children less stressful whilst mothers found it more stressful. In 2017, it appears that Cowans (1992, p. 93) argument that "*the ideology of the new egalitarian couple is way ahead of the reality*" still stands. However, the implications of this gap need to be understood for parents and children.

The transition to parenthood is also now taking place after substantial methodological and theoretical advances in the field and a growing emphasis on the importance of the prenatal context (Glover & Capron, 2017). As discussed earlier, the Cowans (1992) emphasised the importance of prenatal thoughts and feelings, in particular in relation to both individual mental health and the couple relationship. Since these conclusions were drawn, the mechanisms through which these thoughts and feelings may impact subsequent adjustment have become better understood. For example, studies have established that one of the mechanisms through which prenatal anxiety exerts an influence on infant development is via maternal hormones acting on the developing foetus (Buss et al., 2012). The negative impact of perinatal mental health problems is not just restricted to the family, as each one-year cohort of births in the UK has been estimated to cost the health, social and public sector £8.1 billion (Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014). As such, research elucidating the mechanisms through which prenatal mental health problems exert an influence on child outcomes can help inform intervention and prevention programmes.

Furthermore, there is growing interest in whether and how parents' thoughts and feelings about their unborn infant might influence postnatal parent behaviour and child adjustment (Glover & Capron, 2017). As yet, however, the literature in this growing research area has yet to be synthesized and so the magnitude of the importance of prenatal thoughts and feelings about the infant for parent behaviour (and by implication child outcomes) remains unknown. Contributing to this evidence base, and mindful of the importance of a family systems inspired approach, this thesis provides a unique contribution to the field by considering the thoughts and feelings of both expectant mothers *and* fathers and how partners' expressions of these thoughts influence one another and subsequent behaviour. From this basis, and in a bid to bring clarity to the question of the importance of prenatal thoughts and feelings about the infant for parent behaviour, the final chapter of this thesis uses meta-analysis to assess the strength of the association between these measures and postnatal parent behaviour. The findings from this meta-analysis have the potential to inform discussions about the content of prenatal screening and antenatal classes.

1.3. Mothering and Fathering or Parenting?

As noted above, the changing role of the father is reflected in different levels of involvement in family life. Mirroring this, initial research interest in fathers was focused quite narrowly on the quantity of time spent with children and questions typically centred on the construct of 'fathering' in opposition to 'mothering'. Fagan, Day, Lamb and Cabrera (2014) convincingly argue that researchers should move beyond a search for specific

mothering and fathering dimensions and instead recommend the adoption of a gender-neutral model to consider parent constructs. Such a model necessarily leads to new questions being addressed, for example stimulating inquiry into the cumulative or distinct impact of mothers' and fathers' behaviour, cognitions and emotions on parent and child adjustment (e.g., Malmberg et al., 2016).

Fagan et al. (2014) highlight that the majority of studies that examine mothers and fathers separately already employ similar measures to assess parenting quality, but differences emerge in the measurement of quantity. The choice of methods reflects the historical tendency to equate fathers' involvement with absolute hours whilst mothers' employment status is often used as a proxy of maternal involvement (the assumption being that time not in employment is spent performing childcare). The use of similar parenting questionnaires has prompted examination of measurement equivalence. A recent large-scale study in Finland found a lack of measurement invariance in the factor structure of reports of parent behaviour gathered from adolescents, mothers and fathers (Janssens et al., 2015). These findings emphasise that when considering measurement researchers should not rely on single informants.

Importantly, although researchers have established that the strength of the associations between parenting behaviour and child outcomes might differ according to parent gender, the associations are typically in the same direction, which challenges the notion that child outcomes are affected differently by the same type of maternal or paternal parenting behaviour (Lucassen et al., 2011). Research with 'non-traditional' families also highlights the importance of parenting constructs rather than parent gender (Golombok, 2015). Reflecting the focus within the field, Fagan et al.'s (2014) argument mainly relates to behavioural dimensions of parenting rather than emotional or cognitive components. New FAMS makes an important contribution to the field by looking at both mothers and fathers during the perinatal period and using the same instruments with both parents to measure a variety of constructs at both representational and behavioural levels. As a result, this thesis can explore interactions between specific parenting constructs (both within and across individuals), as well as their different correlates and change in nature or importance over time.

A focus on constructs or dimensions is also seen in the movement away from the search for a grand, overarching theory of parenting (Baumrind, 1991). Grusec and Davidov (2010) argue that parenting is domain specific, stating that particular dimensions may be important for certain child outcomes and, as a result, there are no 'good' or 'bad' parents.

Instead, a parent may be relatively good in some domains and less so in others. The field has moved towards seeing 'optimal' parenting as a multifaceted construct, consisting of a number of different behaviours, emotions and cognitions, which are impacted by characteristics of the parent, infant, wider familial and social network and national governmental policies (Bronfenbrenner, 1986). It is now recognised that specific styles and behaviours of parents may be beneficial for different aspects of child development, for example, parental scaffolding is more specifically associated with child executive function than is quality of parental talk (Hughes & Ensor, 2009). Researchers have shown specific parent behaviours are associated with different child outcomes according to genetic susceptibilities (Belsky & Pluess, 2009) or ethnicity (Ispa et al., 2004). For example, alongside universal associations between maternal intrusiveness at 15 months and increased infant negativity at 25 months, maternal intrusiveness appears negatively associated with child engagement for European American but not African American or less acculturated Mexican American mothers. It is also important to note that different parent behaviours may be important at different points in development. For example, Vallotton, Mastegeorge, Foster, Decker and Ayoub (2017) found maternal sensitivity had a strong overall effect on infant vocabulary but this reduced over time and by 36 months the effect was similar in magnitude to the effect of maternal stimulation. Such nuances are often lost in media reports and indeed, in the language within some academic papers.

1.4. "Parenting": what do we mean?

While the term 'parenting' only became common in the public domain from the 1970s (E. Lee et al., 2014), developmental psychologists have been interested in the behaviour and social-cognitive processes of parents/caregivers for a very long time (O'Connor, 2002). In the influential "Handbook of Parenting" (Bornstein, 2002), five volumes are dedicated to different caregiver characteristics, the factors that influence parenting and, crucially, the impact that these have upon both parents and children.

Observations, interviews and questionnaires capture variability in dimensions associated with the parent-child relationship (e.g., warmth, conflict), or characteristics of the individual (e.g., inconsistency, emotional over-involvement), or their social-cognitive processes (e.g., goals, representations) (O'Connor, 2002). Observational methods are widely viewed as the 'gold standard' approach to assessing parent-infant interactions, because they offer both greater objectivity and richer detail. Illustrating this point, in a review of the predictive value of diverse parenting measures on child outcomes, Zaslow et al. (2006) found

video-based ratings of maternal support and reduced hostility were much stronger than self-report questionnaires as predictors of pre-schoolers' co-operation and achievement. Although the most resource consuming method of assessing parenting, observations appear superior and so, where feasible, warrant inclusion in studies such as New FAMS that focus on early childhood.

This notwithstanding, in a recent review Lotzin et al. (2015) highlighted the importance of choosing a well validated coding scheme to examine observations. In their search, over 500 tools had been used only once or published without peer review. Observations provide a window into certain contexts and may, in some instances, lack ecological validity or the potential to measure specific parenting practices (e.g., corporal punishment). Likewise, in their review of self-report parenting measures, Morsbach and Prinz (2006) acknowledge concerns surrounding the validity of questionnaire responses; in particular, caregivers may respond in a socially desirable way, might have a different understanding of parenting terms or be concerned that their answers might be disclosed to third parties. However, questionnaires are time-efficient and widely used. Morsbach and Prinz (2006) suggest that the validity of answers can be improved if researchers ensure participants clearly understand the question, use strategies to enhance behaviour recall, improve estimation quality, use an appropriate response format and allow participants to complete the questionnaire themselves on a computer. Trade-offs between methods require careful consideration but evidence gathered using a range of methods across a variety of informants over time (i.e., multi-method, multi-informant, multi-time point) is considered to be of particularly high value in developmental research (Copeland & White, 1991) and is adopted in New FAMS.

1.5. Parent Sensitivity

One construct of particular and longstanding interest to developmental psychologists is parental sensitivity, defined as the ability to notice, interpret and respond in a timely and appropriate manner to children's signals (Ainsworth, Bell, & Stayton, 1974). Infants are inherently dependent on their caregivers for protection and rely on proximity seeking behaviours to ensure their needs are met. The responses infants receive to their proximity seeking behaviours provide early lessons in their social development (Bowlby, 1953, 1969). Moreover, infancy is a time of rapid development in multiple domains and the acquisition of new skills heralds new opportunities to develop additional abilities. Thus, the extent to which parents are attuned to infant cues and can modify their understanding of their infant is, arguably a particularly salient construct to consider in infancy. It should be noted that the

following review of sensitivity focuses on research that is particularly relevant to this thesis and New FAMS.

The sensitivity construct, though typically examined within Western industrialised societies, has been argued to be applicable across the globe (Mesman et al., 2016). Mesman et al. (2016) found high agreement between mothers' and attachment theorists' perception of the 'ideal' mother and the items mothers identified as key were those related to sensitivity (e.g., perceiving and interpreting infant signals). Crucially, the sample of 751 mothers were from 26 cultural groups and, not surprisingly, there was stronger agreement between women from similar cultures. Indeed, the origin of the construct stems from cross-cultural research, as Ainsworth's understanding of maternal caregiving in rural Uganda and later observations in Baltimore, in the United States of America, led to the development of the sensitivity and secure base construct (Ainsworth, 1963; Ainsworth & Bell, 1970). Decades later, Posada et al. (2002) found similar associations between maternal sensitivity and infant attachment security in samples from Bogatá, Colombia, and Denver, in the United States. In a meta-analysis of 34 studies, Bilgin and Wolke (2015) reported no difference in the combined mean effect size of maternal sensitivity received by premature and full-term samples indicating that, in addition to culture, gestational age is not an important determiner of sensitivity. Therefore, a study examining the emergence of parental sensitivity has universal relevance.

The focus on the sensitive mother reflects the continued maternal bias in the field. Mothers often receive higher sensitivity ratings than fathers (e.g., Barnett, Deng, Mills-Koonce, Willoughby, & Cox, 2008 found mothers were higher at 6-months), but this is not always the case (e.g., Braungart-Rieker, Garwood, Powers, & Wang, 2001 found a lack of difference in parental ratings at 4 months). Moreover, despite not showing an overall preference for one parent or another on the basis of gender, infants preferentially seek their mothers rather than fathers for comfort when they are distressed (Lamb, 1976). That is not to say that fathers are unable to soothe their distressed infant, but perhaps due to practical considerations the infant may have learnt to associate comfort with their mothers due to the tendency for mothers to spend more time with the infant than fathers (Umemura, Jacobvitz, Messina, & Hazen, 2013). Arguably, this in turn may create a cycle whereby the primary caregivers, typically mothers, continue to gather expertise tuning into their infants' cues, which in turn may further reduce opportunities or inclination for the other parent to develop their own sensitivity.

1.6. How do Psychologists Measure Sensitivity?

Parent sensitivity has been operationalised and measured in a variety of ways. Using videoed observations of parent-child interactions (e.g., free-play) researchers have rated sensitivity by adapting the observational coding scheme developed by Ainsworth et al. (1974). Thus, schemes vary in the scores used (e.g., global versus composite), the setting in which they can be applied (e.g., naturalistic, play) and the age range for which they are appropriate. An important deviation from the original construct and measure of sensitivity has been the inclusion of warmth (e.g., CARE-Index; Crittenden, 2001). In their systematic review, Mesman and Emmen (2013) argue that whilst sensitivity and warmth are moderately correlated, they emerge from different motivational systems and show different links to child outcomes. As a result, it is recommended researchers should rate parental warmth and sensitivity separately and be mindful of their choice of coding scheme when interpreting results. In light of this, and the proliferation of coding schemes, the original Ainsworth Sensitivity Scale (1974) was used in New FAMS at multiple time points to code the observations of both mother-infant and father-infant interactions.

Further reflection on Ainsworth's concept of a sensitive parent suggests it is important to go beyond behavioural indices to consider parental cognitions, especially when trying to understand the development of infant attachment (Leerkes, Gedaly, & Su, 2016). Crockenberg and Leerkes (2011) argue that measures of affect, cognition and physiology allow researchers to test three models. The first 'pathways model' proposes that all of these measures relate directly or indirectly to observed sensitive behaviour. The second 'moderation model' proposes that the strength of the association between observed sensitivity and infant attachment may vary according to the three measures. The third 'latent factor' model proposes that each measure, alongside observed sensitive behaviour, is an indicator of sensitivity. Current research, for example examining mind-mindedness (Zeegers, Colonnesi, Stams, & Meins, 2017), appears to support the pathways model.

1.7. Distinguishing between *what* Parents say and *how* they say it

How parents talk about their children and their relationships with them has been identified as an important index of parent-child interaction quality. The introduction of the Adult Attachment Interview (AAI) has increased understanding of adult's representations of their own attachment relationships and their subsequent importance for their own relationship with their child (Fonagy, Steele, Moran, Steele, & Higgit, 1993). Central to the coding of AAI is interviewee coherence, which is the extent that the interviewee can provide a detailed, clear and consistent account of their own important relationships in a resolved manner and

with acknowledgement of multiple perspectives (George, Kaplan, & Main, 1985). Stemming from this work, Koren-Karie and Oppenheim (1997) developed the Insightfulness Assessment (IA) to tap into parents' ability to think coherently about the motives that may govern their child's behaviour and in doing so also hoped to explicitly capture Ainsworth's conception that a sensitive parent is able to "*see things from the child's point of view*" (1971). The IA requires parents to first watch video footage of themselves interacting with their child in different scenarios and then take part in an interview that prompts them to reflect on their child's mental state. After coding the interview (for example coding; insight into child's motives, flexibility of thought and coherence of thought), parents are classified as positively insightful, one-sided, disengaged or mixed (Oppenheim, Koren-Karie, & Sagi, 2001). Observed parent sensitivity has been found to differ according to parents' insightfulness classification. For example, mothers categorised as positively insightful were more sensitive during interactions with their 12-month-olds than mothers classified as disengaged or one-sided (Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002). This finding has been replicated in a sample of mothers with children with Autism Spectrum Disorder (Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2009).

Interested in the notion that parental coherence was related to parenting behaviours, Sher-Censor and Yates (2010) adapted the IA scheme to code the coherence of parents' five-minute descriptions of their child and their relationship. Typically, parents' narratives are dichotomised as either coherent or incoherent. This modification provides researchers with a more efficient method of assessing coherence (in that lengthy interviews are not needed) but also creates an opportunity to capture parental coherence prenatally (note that as the IA requires footage of parent-child interactions the method rules out the possibility of antenatal assessment.) Despite this possibility, to date, researchers have yet to test whether parental coherence can be successfully coded from fathers' speech samples or from descriptions collected during pregnancy. Addressing this gap, Chapter 3 of this thesis presents the results of the first study of *both* expectant mothers' and fathers' coherence. Similar to sensitivity, parental coherence is thought to be a universal construct, with studies with the AAI and Working Model of the Child Interview establishing cross-cultural validity of these principles (Sümer, Sakman, Harma, & Savaş, 2016; van Ijzendoorn & Bakermans-Kranenburg, 1996). This is in contrast to expressed emotion, the original construct measured from parental speech samples that inherently changes in form and meaning according to the cultural norms surrounding parenting and child behaviour (Peris & Miklowitz, 2015; Sher-Censor, 2015).

Further evidence for the utility of coding parental coherence from five-minute speech samples comes from a study involving an ethnically diverse sample of 250 mothers of 4-year-olds in which higher levels of narrative coherence (but not expressed emotion) was associated with variation in observed child behavioural problems (Sher-Censor & Yates, 2015). In a follow-up study, Sher-Censor, Khafi and Yates (2016) found child self-regulatory skills moderated the association between parental coherence and age 6 externalising problems. That is, maternal incoherence was associated with increased levels of externalising problems only when the child also exhibited poor self-regulatory skills. The researchers suggest that this association may operate by disrupting parenting, specifically parents low in coherence may ignore signals, withdraw or become over-attentive to their child, which in turn increases the potential for disruptive behaviour. The extent that parental coherence, as measured using Sher-Censor's (2015) scheme, is associated with parent behaviour has not been directly addressed. In a stringent test of the importance of parents' coherence for later parenting, Chapter 4 addresses whether prenatal coherence predicts parents' observed sensitivity during infancy and early toddlerhood.

Also stimulated by Ainsworth's (1971) notion that highly sensitive parents have both an appreciation of and respect for their infant's point of view, in an innovative development Meins (1997) argued that parents differ in the extent to which they acknowledge a child has a mind and can reflect upon this in an appropriate manner. This construct of 'mind-mindedness', defined as the propensity to view another as an agent with their own thoughts, feelings and desires, has received substantial research attention (McMahon & Bernier, 2017). Studies have demonstrated a link between parental mind-mindedness and infant attachment security (Meins, Fernyhough, Fradley, & Tuckey, 2001), pre-schooler social cognition (Lundy, 2013), school readiness (Bernier, Perrier, & McMahon, 2017) and child disruptive behaviour (Hughes, Aldercotte, & Foley, 2017; Meins, Centifanti, Fernyhough, & Fishburn, 2013).

Parental mind-mindedness can be measured during parent-child interactions by noting the frequency with which parents refer to the child's mental states or take on the voice of the child during an interaction (Meins & Fernyhough, 2015). These comments are coded as appropriate in nature if they accurately reflect the child's behaviour or apparent mood (e.g., "do you want that?" – as a child reaches for a ball) or non-attuned when parents misinterpret their child's inner states (e.g., "you don't want that" – taking a toy away when a child is clearly engrossed in play). The non-attuned category also captures mind-related comments that invoke the past or future but are unrelated to the current situation. Alternatively, parents

can be asked to describe their child; from transcripts of these speech samples reference to mental child attributes (e.g., cognitions, emotions and desires) can be expressed as a proportion of all attributes (e.g., non-mental attributes: behavioural, physical and general), to create a representational measure of parental mind-mindedness. The first of these approaches is most commonly used in studies of infants, whilst the second approach is most commonly used in studies of pre-schoolers or school-aged children, yet in both cases, scores are generally expressed as a proportion of all comments / attributes in order to take individual differences in talkativeness into account (McMahon & Bernier, 2017).

A key contrast between observational and representational measures of mind-mindedness is that they assess parental propensity to tune into their child's thoughts and feelings either when talking *to* their child or when talking *about* their child. Thus, while the observational measure captures a key element of 'in the moment' interactions, the indirect representational measure provides a more global index of parents' views of their children. Interestingly however, meta-analytic findings from data drawn from 1261 children (Devine & Hughes, 2017a) reveal that representational and observational measures of mind-mindedness display similar positive associations with pre-schoolers' false-belief understanding. Likewise, while reports of positive associations with parents' sensitivity typically involve observational measures of mind-mindedness (McMahon & Bernier, 2017; Zeegers et al., 2017), similar findings have been reported in the only infant study to adopt the representational measure (Farrow & Blissett, 2014). Recent research provides evidence to suggest the universality of the construct, with mind-mindedness mediating the association between maternal mental state talk and child theory of mind across very different samples, such as families of pre-schoolers living in the UK and in Hong Kong (Hughes, Devine, & Wang, 2017). Whilst it does not follow that the measures can be viewed as equivalent or interchangeable, the similarity of associations with key constructs coupled with the greater efficiency afforded by the representational measure highlights its potential utility as a research tool.

As is the case with the research outlined above looking at parents' coherence, understanding of both paternal and prenatal mind-mindedness, until now, remains limited but the representational measures provides a clear means through which to examine this. To date, just one study has examined mind-mindedness across the transition to parenthood. Arnott and Meins (2008) invited 25 pregnant couples to "describe their baby at 6 months" and then observed the parents interacting with their infant in the lab upon reaching this age. In general, both mothers and fathers struggled to provide prenatal descriptions of their infants; as a result, mentalistic attributes were simply coded as either present or absent; but this

categorisation did not predict postnatal ratings of mothers' appropriate or non-attuned mind-mindedness. Instead, the frequency of appropriate mind-related comments during interactions with their infant at 6 months was related to the extent to which pregnant women were able to say anything at all about their baby. In contrast, expectant fathers who made more predictions showed higher levels of both appropriate and non-attuned comments during play interactions at 6 months. In addition, expectant fathers who made a mentalistic comment were more likely to use appropriate mind-related comments during later interactions and a positive trend was also seen for non-attuned comments. However, the small sample size constrained the examination of variability in expectant parents' proclivity to be mind-minded. The large sample of expectant mothers and fathers in New FAMS therefore provides an opportunity to test the utility of this measure during pregnancy and to establish whether, as Arnott and Meins (2008) argue, it is the ability to predict anything at all about an infant during pregnancy that is important for later parent behaviour. Furthermore, it should be noted that Arnott and Meins (2008) examined predictive relations between a representational measure of prenatal mind-mindedness and an observational measure of post-natal mindedness. Thus, by adopting the representational measure at all time-points the current study compares like with like and as such a clear indicator of change over time.

Mind-mindedness is theorised as a facet of close relationships and is not thought to be associated with any demographic factors, such as parental education (Meins, Fernyhough, & Harris-Waller, 2014). Yet, describing an unborn infant is a more abstract exercise that might be more subject to influence by education and less influenced by the nascent parent-infant relationship. Indeed, as will be discussed in Chapter 7, there is some controversy as to whether the bond a parent has with their foetus is necessarily important for postnatal parent and child functioning (Walsh, Hepper, Bagge, Wadephul, & Jomeen, 2013). The question of whether parents' characteristics exert a stronger influence on prenatal mind-mindedness will be addressed for the first time in Chapter 3. The extent to which prenatal mind-mindedness predicts later parent sensitivity (examined in Chapter 4) or postnatal mind-mindedness (examined in Chapter 5) makes the understanding of the correlates of prenatal mind-mindedness particularly pertinent, especially for intervention purposes. New FAMS provides the first account of the representational measure of mind-mindedness across three time points over the perinatal period. The current study presents the opportunity to test the relational account of mind-mindedness, in particular for the first time whether representational mind-mindedness (i) increases across the first year of life and (ii) is influenced by both parent and child characteristics during infancy. This in turn sets the stage to examine both prenatal and

postnatal mind-mindedness as predictors of parents' sensitivity in Chapter 6. This is important as researchers have documented that sensitivity and mind-mindedness are related to key child outcomes (McMahon & Bernier, 2017; van der Voort, Linting, et al., 2014). However, unlike previous research, New FAMS tests whether these findings apply equally well to (a) mothers and fathers and (b) measures captured during pregnancy and postnatally.

To summarise, for the first time, through the use of parental speech samples, it is possible to measure different dimensions of prenatal talk that are theoretically related to sensitivity, namely what parents say about their infant (i.e., how mind-minded they are) versus how they talk (i.e., how coherent their speech is). In doing so, this thesis provides novel contributions to the field as it: (i) is the first study to adapt the narrative coherence scheme to be used prenatally; (ii) includes both mothers and fathers; (iii) provides the first comparison of mind-mindedness and coherence; (iv) examines the development of mind-mindedness across infancy; and (iv) examines relations between coherence, mind-mindedness and sensitivity.

1.8. Sensitivity and Child Outcomes: Moving Beyond Attachment Security

Sensitivity varies across individuals and has documented links to attachment security (Ainsworth et al., 1974). In a seminal meta-analysis, van Ijzendoorn (1995) sought to test the theory that attachment representations are transmitted across generations. It was hypothesised that as representations operate at the level of cognition, adults' internal working models of attachment (i.e., representations as measured by the AAI) influence infant attachment security (i.e., as measured by the strange situation) via variation in the quality of their interaction with their infant. The lack of 100% concordance between adult and infant attachment security is referred to as the 'transmission gap'. While parental sensitivity specifically was identified as a construct that may help explain the transmission of attachment, sensitive responding only partially explains the association between parent and infant attachment (Verhage et al., 2016). Put simply, observed parental sensitivity is not the only mechanism through which attachment representations might be transmitted across generations. Adding further weight to this argument, van der Voort, Juffer and Bakermans-Kranenburg (2014) conducted a meta-analysis that showed that parental sensitivity was an important predictor of attachment security, which in turn was linked to later child social competence and externalising problems. However, interventions aimed at increasing sensitivity and subsequent child attachment security showed only modest success rates. Thus, children's outcomes are neither static nor the product of one single facet of the parent or the environment. As previously alluded to, the highly sensitive parent does not equate to the

'perfect' parent and so researchers, clinicians and policy makers should not focus on merely targeting one specific parent behaviour or cognitive style but be mindful of the target of interest (i.e., the sample and outcome). Accordingly, whilst the main outcome of interest in the current study is parental sensitivity, it should be noted that this is just one of several important parent dimensions (note New FAMS also encompasses measures of autonomy support and mutuality). In this thesis, the multifaceted nature of parental influence is recognised by also including measures of mind-mindedness and coherence, constructs that above and beyond the contribution of sensitivity, have been found to be unique contributors to infant attachment security (Koren-Karie et al., 2002; Laranjo, Bernier, & Meins, 2008; Meins et al., 2001).

It is also worth noting that there is more to the construct of sensitivity than attachment security and, as Meins (2017) recently argued, perhaps the predictive power of attachment security itself has been overrated. Researchers are increasingly employing more advanced statistical techniques to examine complex links between parental sensitivity and children's cognitive outcomes (e.g., Mills-Koonce et al., 2015). In line with this and with Fagan et al.'s (2014) argument to consider parenting constructs in a gender-neutral model, in a sample of 97 families, Malmberg et al. (2016) measured the contribution of mothers' and fathers' sensitivity at 10 months to child cognitive and linguistic outcomes at 18 and 36 months. Malmberg et al. (2016) reported that socio-demographic measures (e.g., educational level, occupational status and income) measured at 3 months post-partum were a stronger predictor of mothers' than fathers' sensitivity at 10 months; moreover these socio-demographic measures had a direct effect on child cognitive outcomes at 18 months. Interestingly, stronger associations were reported between fathers' than mothers' sensitivity and child outcomes at both 18 and 36 months and interaction effects were found between mothers' and fathers' sensitivity and child language development at 36 months. Specifically, when fathers had high levels of sensitivity, higher levels of mothers' sensitivity did not further contribute to increasing child language scores. However, when mothers had high levels of sensitivity, higher levels of fathers' sensitivity had an additional impact on child language scores. This emphasises the value of measuring dimensions from both mothers and fathers separately and, in the context of co-parenting, considering how both interact. It should be noted that Malmberg et al.'s (2016) sample was not typical, as fathers were the primary caregivers in 25 of these 97 families, and in turn fathers' primary caregiver status was associated with reduced maternal but not paternal sensitivity.

New FAMS is able to contribute to this ongoing debate by taking a step back to examine parental sensitivity and address new questions surrounding measurement, predictors, correlates, gender and developmental period. Importantly, these questions are addressed in a large sample, in a family systems inspired approach that considers a wider range of factors beyond socio-demographic characteristics, such as individual, couple and child characteristics (as outlined in further detail below) and importantly starts during pregnancy. Bornstein, Arterberry and Lamb (2014, p. 27) argue that "*infancy is the period during which, in the opinion of most developmentalists, parents exert their most important influences on development.*" As such, the aim of this thesis is to increase understanding of how sensitivity develops, and indeed whether it has precursors before birth, which has in turn important theoretical and clinical implications.

1.9. What Individual Characteristics Influence Parenting?

In a model of the determinants of parent behaviour that has stimulated decades of research, Belsky (1984) highlighted the importance of parents' personal psychological resources, which include psychological health and personality. Parents who experience postnatal depression have been found to be more likely to display negative parenting behaviours (e.g., irritability, hostility), whilst lower levels of positive parenting behaviours (e.g., responsiveness, engagement) are more common in depressed women with infants and those from lower socio-economic backgrounds (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Longitudinal studies have shown that children of postnatally depressed mothers are more likely to show long-term externalising problems, especially if the depression is chronic (Murray, Fearon, & Cooper, 2015). Researchers involved in the Avon Longitudinal Study of Parents and Children innovatively considered the impact of mothers' and fathers' prenatal mental ill-health on child outcomes. High levels of prenatal depression in mothers and fathers were associated with poorer developmental outcomes for the child at 18 months (Deave, Heron, Evans, & Emond, 2008) and with behaviour and emotional problems in pre-school and at 7 years (Ramchandani et al., 2008). Hanington, Heron, Stein and Ramchandani (2012) identified marital conflict as the mechanism linking depression and poorer child outcomes. Further analysis of these data indicates that the effects of paternal postnatal depression on child psychological problems are largely mediated by mothers' depression, paternal involvement and couple relationship quality, whilst the same mediation analysis for mothers' depression only explained a small proportion of the variance (Gutierrez-Galve, Stein, Hanington, Heron, & Ramchandani, 2015). The researchers argue that the effects of depression impact children through different mechanism for mothers (i.e., disrupting

parenting) and fathers (i.e., the family environment). However, a key drawback of these mediation results rests upon their reliance upon maternal reports of fathers' involvement and couple relationship quality and the lack of direct measures of parent-child interaction quality. These conclusions about the role of parent-child interaction quality therefore require further examination. New FAMS, with its rich data gathered from questionnaire, physiological and observational measures collected from both mothers and fathers, offers the promise of developing an in-depth understanding of the diverse mechanisms and pathways through which prenatal wellbeing impacts later child developmental outcomes. However, the substantial variability in parenting amongst depressed women and the weak association with sensitive parenting (Lovejoy et al., 2000) suggests that parent mental health should not be the only individual factor considered when examining predictors of parenting.

In particular, parents also differ in their parental self-efficacy, that is the confidence they have in their capacity to enact their role as a parent. In a systematic review, Jones and Prinz (2005) concluded that parental self-efficacy is associated with diverse dimensions of parenting throughout development. Efficacy increases over the transition to parenthood (e.g., Biehle & Mickelson, 2011), arguably in line with Bandura's (1977) notion that task performance rather than simply anticipation or vicarious experience contributes to feelings of mastery. Studies have also documented associations with other factors that in turn influence parenting. For example, Gross and Marcussen (2017) recruited 75 first-time parents during pregnancy and found, alongside prenatal efficacy and prenatal depression (but not anxiety), decreases in efficacy from pregnancy to 1 month postpartum significantly predicted symptoms of postnatal depression in both parents at 1 month and for fathers at 4 months. Others have noted that efficacy may mediate the association between parents' psychological resources and parenting (e.g., de Haan, Prinzie, & Deković, 2009). Taken together, these findings suggest it is important to take account of the multiplicity of interconnected individual influences on parents' behaviour. Using measures gathered from both mothers and fathers in New FAMS, each chapter of this thesis considers the impact of parents' wellbeing on both their own and their partners talk and behaviour. Finally, the unique role of both prenatal and postnatal wellbeing on mothers' and fathers' sensitivity at 4 and 14 months is considered in Chapter 6.

1.10. Do Expectations of Parenthood Influence Parenting?

Prenatal expectations of parenthood are of particular interest in the current study, as their contribution to parenting has, to date, rarely been examined. Indeed, where prenatal

measures are available, researchers have tended to focus upon the impact of prenatal expectations on parent and couple adjustment (which, by inference, may then influence parent behaviour). However, the New Families Project, which was designed to investigate changes in couple relationship quality also included observations of parents interacting with their pre-schoolers (Pratt, Kerig, Cowan, & Cowan, 1988). As part of this research project the Who Does What? questionnaire was developed in order to measure both parents' actual and ideal involvement. Mothers were more likely to be rated as authoritative in their interaction style with their 3-year-old if during pregnancy they were more satisfied with the division of labour in the family. Problems tend to arise when these prenatal expectations are negatively violated after birth, that is, when the inequalities of workload are greater than predicted. For example, Biehle and Mickelson (2012) found that although both expectant mothers and fathers each appeared to hold unrealistic expectations about the division of childcare and play, the direction of the discrepancy and the impact of this difference varied according to parent gender. Echoing earlier research (C. Cowan & Cowan, 1992), Biehle and Mickelson (2012) found that at 1 and 4 months post-partum, mothers had taken on more childcare and play duties than both they and their partners had anticipated prenatally. Fathers who under-estimated maternal involvement during pregnancy were more likely to show lower levels of depression and higher couple relationship satisfaction postnatally. In contrast, unmet maternal expectations about fathers' involvement in childcare (but not play) were associated with increased levels of maternal depression and lower couple relationship satisfaction. Importantly, it is the dissatisfaction with the division of roles that is problematic and not necessarily the nature of the division (C. Cowan & Cowan, 1988).

During periods of transition, family members reorganise the implicit rules that govern their behaviour patterns. As such, family systems theory is an appropriate lens through which to observe the impact of expectations on parenting. The necessary interdependence of members within the family system suggests that the expectations of one partner should influence the functioning and behaviour of the other. Illustrating this point, Holmes, Sasaki and Hazen (2013) followed 125 first-time parents from pregnancy until the infants' second birthday and examined individual, partner and infant factors that might influence couple relationship quality. They found that feelings of love towards their partner were stable or increased for 23% of mothers and 37% of fathers, whilst conflict remained stable or decreased for 20% of mothers and 28% of fathers. Infant characteristics were more important for fathers, with fathers of daughters and reactive infants reporting higher levels of relationship conflict than mothers. Furthermore, parents who experienced parenthood

contrary to their expectations reported lower levels of love across the transition. In contrast, when mothers experienced parenthood differently to how they expected only their partners reported increased levels of conflict.

More recent research has examined the impact of prenatal expectations on co-parenting quality and again highlighted the importance of considering all members of the family. McHale et al. (2004) interviewed 50 couples during pregnancy and later observed them in triadic play sessions with their 3-month-olds. Interestingly, high maternal pessimism about the future division of childcare and family life was only associated with low co-parenting cohesion during play when the infant was perceived as high in negative reactivity. Conversely, couples who perceived their infant as high in negative reactivity but reported high levels of prenatal marital quality were more likely to interact in a highly cohesive manner regardless of their expectations. This study suggests that the behaviour of individual mothers and fathers would also be influenced by the nature of expectations. In the largest sample to use the Who Does What? questionnaire across the transition to parenthood, New FAMS assessed parental (anticipated) involvement and satisfaction with involvement and also created indices of violations of expectations, in order to test in Chapter 6 whether individual and partner expectations predict unique variance in mothers' and fathers' sensitivity.

1.11. The Infants' Contribution?

Children are not passive social partners but instead influence their parents' behaviour, which in turn impacts the child and so on (e.g., Kochanska, 1995). Some infants can be more or less difficult to care for depending upon their temperament, that is their constitutionally based individual differences in emotional, motor, attentional reactivity and self-regulation (Rothbart & Bates, 1998). Evidence to support this hypothesis comes from a meta-analysis of 62 studies of 7,613 mother-child dyads in which Paulussen-Hoogeboom, Stams, Hermanns and Peetsma (2007) found higher levels of negative emotionality in infants (e.g., distress to novelty and limitations) were associated with less supportive parenting (e.g., sensitivity, warmth, synchrony). However, these results were accompanied by important caveats. Firstly, a file-drawer problem was evident, with only 45 null effects needed to overturn the finding. Secondly, the association between a more difficult temperament and less supportive parenting was much stronger for younger mothers of lower socio-economic status; indeed, the same infant temperament appeared to stimulate supportive parenting in mothers from higher socio-economic backgrounds. Illustrating this contrast, Kotlia, Schoppe-Sullivan and

Kamp Dush (2014) found, in a highly educated sample of first-time parents, mothers' engagement with their infant showed a sharper increase across the first year if they perceived their infant as lower in effortful control. A similar increase in engagement was seen in fathers who perceived their sons as high in negative affect.

Clearly, temperament should not be overlooked in a study focused upon the predictors of parenting. Mindful of the problem of relying on sole informants, in New FAMS both mothers and fathers reported on infant temperament and observational measures of infant affect were also taken from observations of infants with both parents. As a result, the contribution of infant behaviour to parents' mind-mindedness and sensitivity, as discussed in Chapters 5 and 6, are based on thorough assessments of infant capacities that have the potential to elicit different parental behaviours thus strengthening any conclusions drawn.

Child gender is another factor that has been shown to impact parents' behaviour, especially during infancy (Seavey, Katz, & Zalk, 1975). Studies focusing on the gender composition of the parent-child dyad have found interesting similarities and differences in parents' sensitivity. For example, Lovas (2005) observed parent child interactions at 19 months and found the highest ratings of parental sensitivity (coded using the Emotional Availability Scale) within mother- daughter dyads and the lowest ratings within father-sons dyads. In another study Deschênes, Bernier, Jarry-Boileau and St-Laurent (2014) found mothers' and fathers' parenting was more similar when they were parenting a boy than a girl, a finding the researchers explained in terms of the tendency for fathers to be more involved in the caregiving of their sons than daughters. Similarly, in their study of 97 heterosexual couples and their infants, Schoppe-Sullivan et al. (2006) found fathers and mothers were equally sensitive towards their sons but, compared to mothers, fathers were less sensitive towards their daughters. However, it should be noted that parent sensitivity was rated at different time points (father-infant interactions at 12 months and mother-infant interactions at 13 months) thus reducing the ability of a direct comparison. Furthermore, it is also well established that parents' language use is different in relation to their daughters and sons (Fivush, Brotman, Buckner, & Goodman, 2000) and that mothers use more mental-state talk during interactions with their children than do fathers (Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003).

Recent meta-analytic findings have reported similar associations between maternal mentalising and sensitivity in studies with a higher percentage of girls and those with a higher percentage of boys (Zeegers et al., 2017). This appears to suggest that child gender does not moderate the association between parent talk and behaviour. However, this meta-analysis was

based solely on maternal data and differences may emerge when examining fathers (i.e., perhaps due to greater variation in proclivity to use mental state descriptors or sensitivity) or when looking at a family level. Thus, in line with Schoppe-Sullivan and colleagues (2006, p. 14) recommendation that *"greater attention must be devoted to the largely unexplored role of infant gender in the development of parent-infant, especially father-infant relationships"*, the present study tests whether there are differences in the mean levels of mothers' and fathers' mind-mindedness and sensitivity according to child gender and whether the association between the two constructs is moderated by child gender.

1.12. How do Differences in Couple Relationship Quality Impact Parenting?

In their review of a decade of research, Bradbury, Fincham and Beach (2000) emphasised the importance of investigating couple functioning, as variation has a far-reaching influence on parenting and child outcomes. A host of measures have been used to assess both the quality of and satisfaction in romantic relationships, such as coding observed disagreements (Gottman & Notarius, 2000). C. Cowan and Cowan (1992) found new parents' couple relationship satisfaction dipped after the birth of their first-born, but returned to prenatal levels by around 18 months post-partum. Interestingly, the rate of divorce was significantly higher in the control group of childless couples. In their meta-analysis, Mitnick, Heyman and Smith Slep (2009) found that reports of steeper declines in couple relationship satisfaction for new parents were in part a function of methodological differences. Specifically, studies following prospective parents across the transition to parenthood report a small but significant decline in relationship satisfaction across the first two years of their infants' life. However, all couples followed in a prospective study of newlyweds also showed a reduction in satisfaction regardless of whether they became a parent or not (Mitnick et al., 2009). Furthermore, studies that focused on global ratings of relationship satisfaction showed greater declines than those who used more nuanced measures. New FAMS does not have a non-parental control group but, as recommended by Mitnick et al., does use the Couple Satisfaction Index (Funk & Rogge, 2007) to measure relationship quality and also includes a measure of conflict.

Family systems theory leads to two competing hypotheses that seek to explain the impact of variation in couple relationship quality on other relationships (Erel & Burman, 1995). The compensatory hypothesis suggests that when the valence of the emotion in one relationship is different from the dominant emotion in another, individuals are prompted to seek the opposite experience in their other relationship. For example, parents who feel

unsatisfied in their couple relationship may compensate for this by devoting more time and energy to their parenting and in doing so vicariously meet their need for love and support. In contrast, the spill-over hypothesis posits that feelings and behaviours are directly transferred to the parent-child relationship, such that a negative couple relationship leads to negative interactions with their children and vice versa. This latter idea has garnered most support in the literature (Erel & Burman, 1995), with a meta-analysis of 39 studies indicating a moderate association between couple conflict and parenting, especially acceptance and harsh discipline (Krishnakumar & Buehler, 2000). However, the two hypotheses are not necessarily mutually exclusive and both may help explain outcomes for different members of the same family (Kouros, Papp, Goeke-Morey, & Cummings, 2014). In their study of 200 parents of 13-year-olds, Kouros et al. (2014) found that when mothers reported higher levels of depression, fathers' (but not mothers') parenting quality was more vulnerable to same-day poor couple relationship quality and that next day parent-child interactions were more negative. Yet, in families where the father scored high on depression, for mothers the extent of same day spill-over was reduced and poor couple relationship quality predicted the improved quality of next day mother-child interactions.

Spill-over is not necessarily restricted to negative domains. Barnett et al. (2008) coded sensitivity from the interactions of 97 parents with 6-month-olds and asked parents to self-report on their relationship quality. They found that marital quality moderated the association between observed mother and father sensitivity. Specifically, if the father reported high levels of marital satisfaction, then higher paternal sensitivity was related to higher maternal sensitivity and vice versa. The authors argue that this reflects a 'contagion' whereby one parent's parenting influences the other and that the context of a high-quality relationship facilitates this. Taken together, and mindful of Fagan et al.'s (2014) arguments, these studies highlight the need to focus on both mothers and fathers over time, especially in the light of findings showing fathers' parenting to be more susceptible to negative changes in the couple relationship.

In addition to relationship quality, Chapter 6 brings together measures of numerous characteristics from different members of the other subsystems (i.e., the infant) to highlight the complex interactions evident within the family system that may interact to influence parents' sensitivity over time.

1.13. The Transition to Parenthood and the Emergence of Parental Sensitivity

Family systems theory offers a lens onto the three key questions that guide the remaining chapters: (i) Are there prenatal precursors to sensitivity? What mechanisms link these prenatal dimensions to observed sensitivity? (ii) How does the ability to represent and interact with one's infant change over time? (iii) To what extent do individuals influence the expression of their partners' thoughts, feelings and behaviours?

The following chapters aim to address these questions. Chapter 2 introduces the New Fathers and Mothers Study, within which this thesis is framed. Following this, four results chapters are presented. Chapter 3 introduces the novel application of the postnatal coherence and mind-mindedness coding schemes to prenatal speech samples. Chapter 4 examines links between these prenatal speech sample constructs and parental sensitivity at 4 and 14 months. Chapter 5 is devoted to key questions regarding stability, correlates, gender and partner differences in parental mind-mindedness across the transition to parenthood. Chapter 6 builds on these findings and examines, over and above key individual, couple and infant factors, the unique predictive value of parental speech sample constructs on parental sensitivity at 4 and 14 months. Chapter 7 aims to contextualise these findings in light of previous research and incorporates the results of Chapter 4 into a meta-analysis examining links between prenatal thoughts and feelings about the unborn infant and postnatal parenting quality. Finally, Chapter 8 offers a synthesis of commentaries on the results from each chapter and a discussion of common themes, implications and avenues for future research.

Chapter 2. The New Fathers and Mothers Study

This current study is framed within the New Fathers and Mothers Study (New FAMS), a multi-site longitudinal study that integrates physiological, cognitive and relationship perspectives to model paternal and maternal influences on executive function development in the first two years of life. Data for this thesis was drawn from the 201 families taking part in the British arm of the study (Cambridge), though New FAMS has also followed another 260 couples in the United States of America (New York) and the Netherlands over the transition to parenthood. A table outlining my specific contribution to New FAMS is detailed in Appendix 2.1.

The study design features of New FAMS arose from important lessons learnt from reviewing the literature. First and foremost, a study focused on the transition to parenthood should include both parents within the family system. By considering both mothers and fathers and adopting the same measures with both parents, at all times, a more complete understanding of parenting can be achieved. Second, the choice of measures should be theoretically informed. As noted by Zaslow et al. (2006), the efforts of collecting and coding parent-child observations are clearly favourable in generating more direct measures of the parent-child relationship. In turn, these observations should be coded with a scheme that captures the true nature of the sensitivity construct (Mesman & Emmen, 2013). It is also the case that questionnaire measures should be chosen with care and so New FAMS benefits from prior meta-analytic reviews (e.g., Funk & Rogge, 2007). Finally, in order to understand the emergence of parent sensitivity, it is important to join individuals as they begin their journey to parenthood, as such a prospective longitudinal design allows for an appreciation of time, the complexity of interactions between individuals and the contribution of the infant.

2.1. Recruitment

Ethical approval from a local NHS Research and Ethics Committee enabled the sample to be recruited primarily via antenatal hospital appointments (73% of the sample from 20-week ultra-sound appointments). The remaining couples were recruited from antenatal parenting classes, pregnancy yoga classes and ‘nearly new’ fairs. From September 2014 to May 2015, the New FAMS team (myself alongside Dr Rory Devine, Dr Anja Lindberg and Dr Wendy Browne) approached over 1,000 couples, of which 596 expressed an interest in the study and provided their contact details. All interested couples were emailed a screening questionnaire, 298 couples completed this and 221 were eligible to take part (see Figure 2.1). New FAMS has been identified as a shining example of recruitment by the regional NHS research and development department.

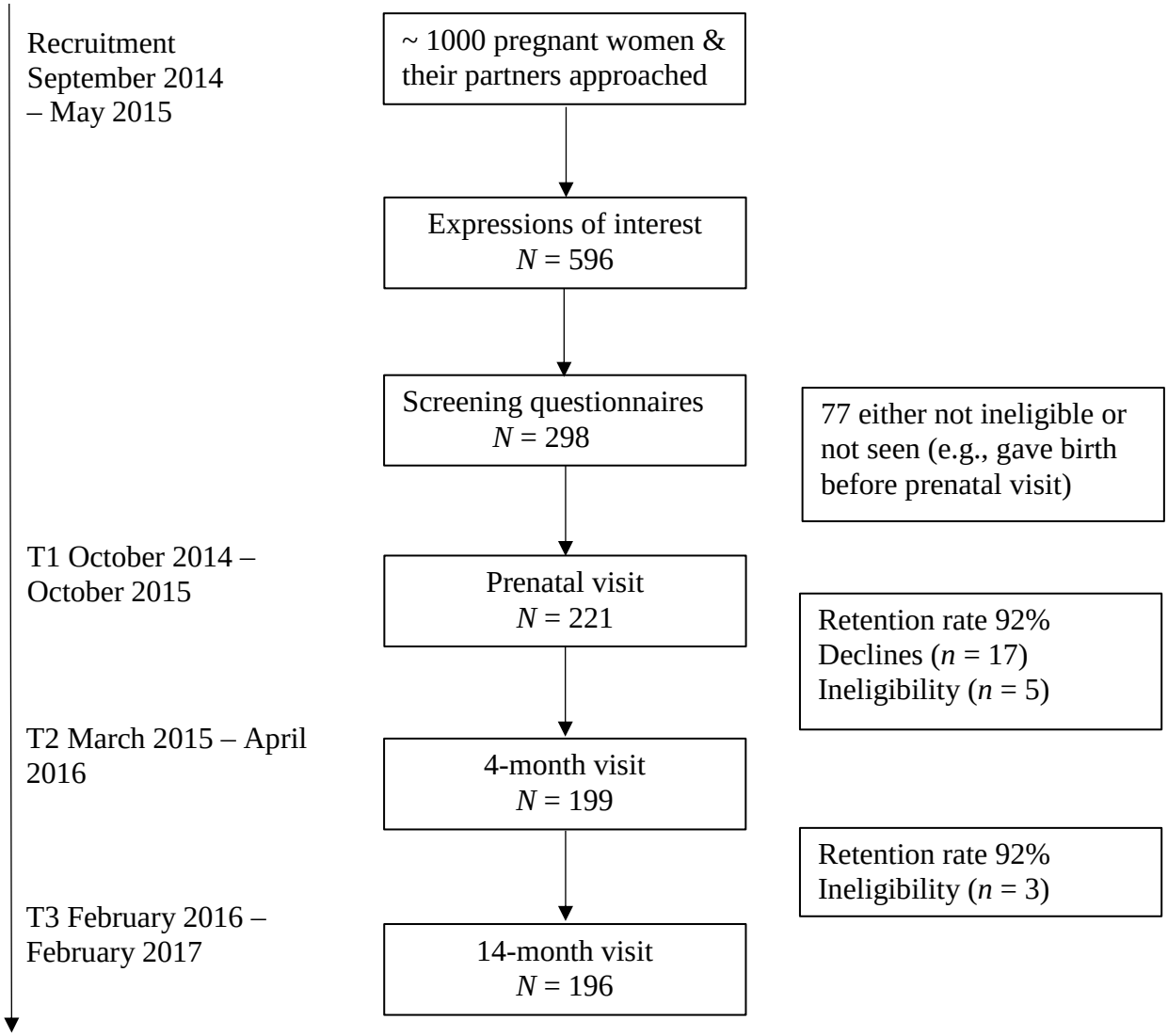


Figure 2.1. New Fathers and Mothers Study timeline, sample recruitment and retention.

2.2. Sample

2.2.1. Inclusion.

Couples in Cambridgeshire interested in taking part in New FAMS were screened to check for eligibility, using the following inclusion criteria: cohabiting heterosexual couples both expecting their first baby, aged 21 years or above, with English as their first language and an expected delivery of a healthy singleton baby. Please also note that no bilingual families were included due to concerns about the potential positive association between bilingualism and child executive function (a key outcome for the framing study).

2.2.2. Retention.

As shown in Figure 2.1, sample retention was extremely high (92%). Attrition, as expected, largely took place between the prenatal and 4-month wave (and was in part due to infant health complications, $n = 5$). The high rate of sample retention reflects the New FAMS team's commitment to ensure participants enjoyed taking part, were frequently contacted (e.g., newsletters, Christmas and first birthday cards) and had the opportunity to take part in engagement activities, for example, the now annual summer garden party.

2.2.3. Demographics.

Table 2.1 shows the demographic profile of mothers and fathers in this study. The majority of pregnancies were planned (6% unplanned pregnancies), with a small percentage of couples (11%) conceiving with the help of assisted reproductive technologies (note this group did not differ in terms of the main postnatal constructs assessed within this thesis). Just over half (60%) of the couples conceived within the first six months after making the decision to try although 20% couples took between 1 to 2 years and 10% over 3 years to conceive. 196 couples were seen when their infants (109 boys, 87 girls) were 4 months old, $M_{age} = 4.12$ months, $SD = 0.39$ months, range: 2.97 – 5.63 months and again when their infants were 14 months old, $M_{age} = 14.42$ months, $SD = 0.59$ months, range: 13.10 – 18.40 months. Note that 98.5% of the infants were aged between 13.10 months and 15.83 months and there were three outliers aged over 16 months who were retained to maximise sample size.

Table 2.1.
New Fathers and Mothers Study Sample Characteristics

	Mothers	Fathers
Mean age, years (*SD*)	32.34 (3.49)	33.99 (4.25)
Minimum age	22.8	25.3
Maximum age	43.06	46.38
Ethnicity		
% White British	79.4%	86.9%
Highest education level (%)		
Age 16	0.6%	5.0%
Age 18	10.9%	19.1%
Undergraduate degree	37.6%	30.9%
Post-graduate qualification	45.5%	38.3%
Other	5.5%	6.8%
Mean annual personal income	£31, 685.54	£41, 636.41
Income range	(£0 - 75,000)	(£10 – 150,000)

2.3. Procedure

At approximately 36 weeks gestation (T1: range 32 weeks – 40 weeks) both parents provided informed consent to take part in the study, which included providing consent for the team to contact the hospital to check for the safe delivery of a healthy baby (see Participant Information Sheet and Consent Form in Appendix 2.2 & 2.3). At T1 both parents separately completed online questionnaires and took part in a semi-structured interview, which started with parents providing a five-minute speech sample. Two months after the woman's estimated due date, a research midwife checked the details surrounding the birth; confirming the infant's date of birth, gender, weight, new-born physical condition (APGAR score) and any complications during delivery or after birth (e.g., Neonatal Intensive Care Unit admission). When the infant reached 4 months old (T2) and 14 months old (T3) both parents again provided informed consent to take part in a home visit. The home visit involved being filmed taking part in parent-child observations, a semi-structured interview which again included the five-minute speech sample and completed an online questionnaire. At T2 two home visits were completed separately with each parent to enable both mothers and fathers to be observed with their infant in the lap-play, distress provoking Still-Face paradigm and during a bath-time. To ensure comparability, visits were completed at similar times of the day for both parents and the parent-child observations followed the same order (play, still-face and bath-time). Mothers and fathers were seen equally first and second. At T3 families were visited once and mothers and fathers were observed during jigsaw play, 'Don't Touch' paradigm and during free-play. The visits and materials were counterbalanced so mothers and

fathers were equally observed completing the activities with their child first/second. At each time point parents received a gift-token of thanks and at T2 and T3 the infants also received a gift, along with the video from the previous home visit at T3.

2.4. Measures

2.4.1. Observations.

At 4 months parents were filmed playing with their infant on their lap for five minutes without toys. At 14 months parents were observed playing with their infant on the floor for four minutes. The 14-month play session involved toys as it was preceded by the 'Don't Touch' task, which involved the parent asking the child not to touch a set of attractive toys. Each video was coded by a trained coder using the Ainsworth Sensitivity Scales (1974). Mothers' and fathers' sensitivity was based upon parents' awareness, interpretation and response to their child's signals and rated on a 9-point global scale, with 5 anchor points (e.g., 1 = *highly insensitive*, 3 = *insensitive*, 5 = *inconsistently sensitive*, 7 = *sensitive*, 9 = *highly sensitive*). The coder provides a global score based upon the observation as a whole. Coders were trained by Professor Judi Mesman, a New FAMS collaborator and a leading expert in the field, and inter-rater reliability at each time point was acceptable (4 months: .78 < ICC <.94; 14 months: .70 < ICC <.91).

2.4.2. Interviews.

The Five Minute Speech Sample (Magana et al., 1986). At each time point parents provided a five-minute speech sample describing their infant and their relationship with their child. Specifically, during pregnancy they were instructed: *"I'd like to hear your thoughts and feelings about your baby, in your own words and without my interrupting with any questions or comments. When I ask you to begin I'd like you to speak for five minutes, telling me what you think your baby will be like and how the two of you will get along together."* At T2 and T3 they were instructed: *"I'd like to hear your thoughts and feelings about your baby, in your own words and without my interrupting with any questions or comments. When I ask you to begin I'd like you to speak for five minutes, telling me what kind of a person (child's name) is and how the two of you get along together."* The researcher informed the parent that they would remain silent during the speech sample. If the parent asked a question during the speech sample the researcher was instructed to point to the instructions, repeat them and give vague answers (e.g., "How long have I got left?" – "A couple more minutes"). The prenatal speech sample instructions were adapted so that parents were asked to describe what they think their baby might be like and how they think they will get along with them. These speech samples were audio-recorded, transcribed verbatim and coded for *mind-mindedness*,

using an adapted scheme from Meins and Fernyhough (2015) and *narrative coherence*, using an adapted scheme by Sher-Censor and Yates (2010). Double coding of 20% of the speech samples at each time point was completed to ensure reliability (further details are provided in Chapters 3 and 5).

2.4.3. Parent Factors.

Demographics. At the prenatal time point, parents provided information about their age, education level, ethnicity, marital status, employment status, job title, income (personal and household) and rated their perceived social standing on a 10-point ladder (Singh-Manoux, Adler, & Marmot, 2003). At each subsequent time point parents reported any changes to these background variables. Parents provided information about the nature of the pregnancy; including estimated due date/date of birth, use of assisted reproductive technologies and whether the pregnancy was planned.

Wellbeing. The participants completed the 6-item Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) (mother: prenatal $\alpha = .89$, 4 month $\alpha = .84$, 14 month $\alpha = .83$; father: prenatal $\alpha = .83$, 4 month $\alpha = .86$, 14 month $\alpha = .87$). A high score reflected greater satisfaction with life.

At each time point participants also completed a set of three questionnaires that tapped feelings of distress, depression and anxiety. Each questionnaire was known to have excellent psychometric properties and has been widely used in international research. Parents completed the 12-item General Health Questionnaire (GHQ; Goldberg et al., 1997) (mother: prenatal $\alpha = .79$, 4 month $\alpha = .79$, 14 month $\alpha = .79$; father: prenatal $\alpha = .83$, 4 month $\alpha = .82$, 14 month $\alpha = .81$); the 20-item Centre for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977) (mother: prenatal $\alpha = .79$, 4 month $\alpha = .89$, 14 month $\alpha = .85$; father: prenatal $\alpha = .85$, 4 month $\alpha = .85$, 14 month $\alpha = .87$); and the 6-item State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) (mother: prenatal $\alpha = .78$, 4 month $\alpha = .79$, 14 month $\alpha = .79$; father: prenatal $\alpha = .74$, 4 month $\alpha = .82$, 14 month $\alpha = .78$). In each case high scores were indicative of problems, for example high levels of anxiety.

Due to the strong within-person correlations for these three measures (see Appendix 3.4), Confirmatory Factor Analysis (CFA) in *Mplus* 7 (Muthén & Muthén, 2012) was pursued to create a measure of parents' mental health (i.e., anxious and depressive symptoms). Specifically, a one factor model for mothers and fathers in which total scores from the CESD, GHQ and STAI loaded onto a single latent factor at each time point was

specified. Note that the CFAs were performed on the raw scores of each indicator. The lead indicator intercept was set to 0 for each latent factor and freely estimated each latent factor mean (Geiser, 2013 – add ref). This measurement model provided a good fit to the data for mothers and fathers at each time point, χ^2 (214) = 341.161, $p < 0.001$, RMSEA = 0.038, CFI = 0.969, TLI = 0.960. Factor scores were used in the analyses.

Involvement. The 11-item Who Does What? questionnaire (P. Cowan & Cowan, 1990) asks parents to rate on a 9-point scale their actual and desired division of childcare tasks (e.g., 1 = *I do it all*, 5 = *We do this about equally*, 9 = *Other parent does it all*). A role involvement score provides an indication of relative parental involvement by taking an average of the 'how it is' scores. Fathers' scores were reversed so that participants who expect to divide the load would score an average of 5, whilst lower scores would reflect greater maternal involvement and higher scores greater paternal involvement (mother: prenatal $\alpha = .74$, 4 month $\alpha = .70$, 14 month $\alpha = .72$; father: prenatal $\alpha = .66$, 4 month $\alpha = .65$, 14 month $\alpha = .69$). A violated-expectations score was created by subtracting the expected involvement score (i.e., prenatal score) from the actual involvement score at 4 months. A negative score indicated a negative violation of expectation whilst a positive score indicated a positive violation of expectation. Specifically, a negative score indicated that mothers were doing more than expected and a positive score indicated that fathers were doing more than expected. Participants also provide a global rating of their overall satisfaction with the division of responsibilities. At 14 months, participants rated on a 9-point scale the division of household tasks (e.g., 1 = *I do it all*, 5 = *We do this about equally*, 9 = *Other parent does it all*).

Parental Self-Efficacy. During pregnancy and at 4 months, participants completed the 16-item Self Efficacy in Nurturing Role Questionnaire (Pedersen, Bryan, Huffman, & Del Carmen, 1989). This questionnaire was chosen as it had comparable pre- and postnatal versions that have both been well-validated. Parents rated on a 7-point scale the extent that each statement described them, for example, "I feel confident about my role as a parent". After reverse coding some items, a total score was computed (mother: prenatal $\alpha = .87$, 4 month $\alpha = .84$; father: prenatal $\alpha = .86$, 4 month $\alpha = .83$).

2.4.4. Infant Factors.

Temperament. At 4 months both parents completed the 19-item Infant Behaviour Questionnaire (Putnam, Helbig, Gartstein , Rothbart, & Leerkes, 2013). Parents were asked to rate on a 7-point scale how often they observed specific infant behaviours in the last week,

for example, when being dressed or undressed during the last week, how often did the baby squirm and/or try to roll away? Scores were reduced into two subscales; distress (mother $\alpha = .75$; father $\alpha = .78$) and duration of orientation (mother $\alpha = .74$; father $\alpha = .78$). Final scores represented an average across both mothers and fathers scores, distress ($r = .47$) and duration of orientation ($r = .19$).

At 14 months mothers completed the very short form Early Childhood Behaviour Questionnaire (Putnam, Gartstein, & Rothbart, 2006). Parents were asked to rate 36 items on a 7-point scale to indicate how often they observed specific infant behaviours in the last week, for example, "when s/he was upset, how often did your child cry for more than 3 minutes, even when being comforted?" Scores were averaged and reduced into three subscales; surgency ($\alpha = .63$), negative affect ($\alpha = .54$) and effortful control ($\alpha = .65$).

Infant Affect. Infant negative and positive affect was coded from observations of the Still-Face paradigm at 4 months using an adapted version of the 4-point global rating scales of the Infant Coding System (Mesman, Linting, Joosen, Bakermans-Kranenburg, & Van Ijzendoorn, 2013; Miller, McDonough, Rosenblum, & Sameroff, 2002). The five-minute still-face paradigm consists of three episodes; the baseline where the parent and infant interact as normal, the still-face where the parent ceases interaction and adopts a neutral face, and the reunion where normal face-to-face interaction is resumed (Tronick, Als, Adamson, Wise, & Brazelton, 1978). Reliability was established on 20% of the sample, positive affect ICC = .79 and negative affect ICC = .89. The Parent Child Interaction Coding Scheme (PARCHISY; Deater-Deckard, Pylas, & Petrill, 1997) was used to code infant positive and negative affect during the 4-minute 'Don't Touch' task at 14 months. Specifically, displays of infants' positive affect (e.g., smiles, laughter) and negative affect (e.g., frowns, cries) were rated on a 7-point global scale with a high score reflecting high levels (e.g., 1 = *no occurrence of behaviour*, 7 = *continual occurrence of the behaviour).* Reliability was established on 20% of the samples, positive affect ICC = .82 and negative affect ICC = .82. Both child and parent behaviours can be coded from these two paradigms, however only infant scores were used in this thesis.

Infant Vocabulary. At 14 months parents completed the short-form MacArthur-Bates Communicative Development Inventory (Fenson et al., 2007). Parents rated whether their infant understood and/or produced each of the 89 words listed. Two scores indicating infants' receptive and expressive vocabulary were created.

2.4.5. Couple Factors.

Relationship Quality. At each time point both parents completed the 16-item Couple Satisfaction Index (Funk & Rogge, 2007). The questionnaire was developed after conducting item response theory on the items from other well-validated relationship quality questionnaires. The questionnaire uses a variety of question formats to make the questionnaire less repetitive and requires participants to read each question carefully. A total score was computed after reversing some items so that a high score reflects more satisfaction in the couple relationship (mother: prenatal $\alpha = .91$, 4 month $\alpha = .92$, 14 month $\alpha = .95$; father: prenatal $\alpha = .93$, 4 month $\alpha = .96$, 14 month $\alpha = .96$). At each time point parents also completed an adapted version of the Conflict Tactics Scale (Straus, 1979). Participants were asked to report on a 5-point scale how often they or their partner took part in six different behaviours (e.g., sulked, compromised). A total score was computed after reversing some items so that a high score reflects more problems (mother: prenatal $\alpha = .48$, 4 month $\alpha = .58$, 14 month $\alpha = .50$; father: prenatal $\alpha = .49$, 4 month $\alpha = .49$, 14 month $\alpha = .56$). An aggregate measure of couple relationship quality was created by combining the *z*-scores from the Couple Satisfaction Index (Funk & Rogge, 2007) and Conflict Tactics Scale (Straus, 1979). Mothers' and fathers' Couple Satisfaction Index and Conflict Tactics Scale scores were strongly correlated at each time point (mother: prenatal $r = .41$, 4 month $r = .46$, 14 month $r = .38$; father: prenatal $r = .48$; 4 month $r = .37$, 14 month $r = .50$). Negatively worded items were reversed so that overall a high score reflected higher couple relationship quality.

2.5. Summary

In the United Kingdom 272,162 women became mothers for the first time in 2015 (ONS, 2016a). Along with their partners, 201 of these women within Cambridgeshire decided to share their journey to parenthood with researchers. Given the longitudinal and multi-method nature of the study, the above questionnaires were chosen based on both their excellent psychometric properties and brevity. Furthermore, to ensure high levels of retention and ethical considerations, it was not possible to collect observational data on couple relationship quality. Specifically, only questionnaire measures were used in order to ensure (i) the length of visits was kept reasonable (i.e., at 4 months each visit was at least an hour long and at 14 months at least two hours) and (ii) compliance with ethical requirements that stated researchers could not be left in sole responsibility of the infant.

In the following chapters figures are presented to illustrate the results of structural equation modelling. For clarity, mothers' scores are denoted by a purple outline and fathers' scores are denoted by a teal outline, while significant pathways are coloured black and nonsignificant pathways are coloured grey. For reasons of space, the descriptive statistics for the prenatal, 4-month and 14-month questionnaires and infant affect scores are presented in Appendices 2.5 – 2.9.

Chapter 3. Prenatal Speech Samples: Parental Mind-Mindedness and Narrative Coherence

During pregnancy, expectant parents construct ideas about their developing infant. These representations vary in content, valence and complexity both between individuals and over time. However, research to date on parental representations has been focused on mothers, used labour intensive methods and has not consistently measured potential correlates of parenting. The current chapter presents the novel application of two interview coding schemes that are theoretically related to parental sensitivity – mind-mindedness and narrative coherence – to the speech samples given by expectant mothers and fathers during the last trimester of pregnancy. First, the two constructs of mind-mindedness and coherence are reflected on and the possible associations between the two constructs are noted. Next, the process of adapting the coding schemes for use on speech samples gathered during pregnancy is discussed and the results from New FAMS are presented.

In one of the first studies to consider the importance of prenatal perceptions of the infant, Zeanah, Keener and Anders (1986) interviewed 35 expectant couples during the final stages of pregnancy and asked them to describe the impression they had of their infant's personality. Content analysis highlighted nine categories of parents' descriptions, with activity descriptors most common (described by 61% mothers and 64% fathers), followed by descriptions based on sociability (described by 35% mothers and 50% fathers) and affect (described by 42% mothers and 22% fathers). Expected or desired infant gender did not influence the nature of descriptions, however differences did emerge according to parent gender: mothers were more likely than fathers to describe infant emotionality or sensitivity (36% versus 12%). Whilst simple in its methodology, this study showed expectant parents are able to talk about what their infant might be like during pregnancy and future research in this area was deemed fruitful (Zeanah, Zeanah, & Stewart, 1990).

As outlined in Chapter 1, mind-mindedness refers to an individual's propensity to view another as an agent with their own thoughts, feelings, beliefs and desires, and not simply someone with physical needs that require fulfilling (Meins, 1997). In contrast, coherence refers to the extent to which a person can provide a detailed, clear and consistent account of their important personal relationships in a resolved manner that acknowledges multiple perspectives (George et al., 1985). Both constructs stem from attachment research, attest to reflect the quality of the relationship and are seen as key mechanisms through which parents could influence child development. Specifically, parental cognitions are hypothesised to influence the quality of parent behaviours. In addition to this, both constructs can be

measured from the content of parental descriptions of their children (Meins & Fernyhough, 2015; Sher-Censor & Yates, 2010). This provides the opportunity to measure the extent that expectant parents are able to provide coherent and mind-minded descriptions of their unborn baby and so test the developmental scope of each construct. Understanding of prenatal measurement of these constructs is limited, as to date only one small scale study has examined the extent to which expectant parents are mind-minded during pregnancy (Arnott & Meins, 2008). Whilst coherence has been extensively examined using detailed interviews relating to parents' own caregivers (e.g., the Adult Attachment Interview; AAI - George et al., 1985) and their own children (both pre- and postnatally, e.g., the Working Model of the Child Interview; WMCI - Zeanah, Benoit, & Barton, 1986), to date no researchers have applied the narrative coherence coding scheme, developed for use with the five-minute speech samples (FMSS) to descriptions given by expectant parents.

Five-minute speech samples (FMSS) are increasingly being used to measure parent-child dynamics across a variety of age ranges (Sher-Censor, 2015; Weston, Hawes, & Pasalich, 2017). The work to date is based on the assumption again that the way in which parents talk about their child reflects dimensions of their relationship or the behaviours they use during interactions with them. Traditionally used in adult psychopathology research (Magana et al., 1986), developmental psychologists now code a variety of different constructs from the FMSS by listening to the audio recording or using the verbatim transcripts. Weston et al. (2017) reviewed four coding schemes used to assess different dimensions from the FMSS and examined the strength of their association with observed parent behaviours and parent-child interaction quality. The most widely used coding scheme was expressed emotion (K = 12), which assesses the extent that parental talk is overtly critical, hostile and indicative of an emotionally over-involved relationship. A range of small to large associations was found between parental expressed emotion and observed positive and negative parent behaviours, however this association was mainly restricted to mid- to late-childhood and not seen in infancy (Weston et al., 2017). These inconsistent findings emphasise the importance of considering development when adapting and using established coding schemes with new samples. Specifically, 'emotional over-involvement' is not necessarily pathological, but indeed may be normative or perhaps even indicative of positive parenting during the first few years of life (Peris & Miklowitz, 2015). Yet as discussed in Chapter 1, parental mind-mindedness and coherence appear to be universal constructs and of potential importance at all developmental stages.

In addition, the current novel application of the Narrative Coherence to prenatal speech samples is also the first account of paternal narrative coherence. If established as feasible, the scheme provides a useful and less labour-intensive method of measuring the coherence of parents' representations of their infants than the PDI or WMCI. The first set of questions to be addressed in this chapter concern the potential of these schemes to capture interesting individual differences during pregnancy. Are expectant mothers' and fathers' representations of their unborn infant different? Do couples talk in a similar manner? In their sample of 25 couples, Arnott and Meins (2008) found no differences between expectant mothers and fathers in the number of mental and non-mental attributes described. Yet it is possible that a larger sample will show that expectant mothers may find it easier to describe their baby than fathers. Based on the mothers' physical connection with the foetus, it is hypothesised that expectant mothers will provide more mind-minded and coherent speech samples than expectant fathers.

3.1. Are Mind-mindedness and Coherence Associated?

Previous research examining links between parental mind-mindedness and coherence has focused on the AAI. Bernier and Dozier (2003) found mind-mindedness mediated the association between parent AAI coherence and infant attachment security. This research group also highlighted the importance of the valence of parents' descriptors. In 106 mothers of 18-month-olds, only positive mental comments (as opposed to neutral or negative) were positively related to AAI coherence and parent sensitivity (Demers, Bernier, Tarabulsy, & Provost, 2010). Interestingly, over and above AAI coherence, parenting related stress and infant temperamental difficulty accounted for additional variance in maternal mind-mindedness. The researchers argue that having a more resolved state of mind with regards to one's own attachment figures frees up mental space to be aware of and tune into one's own child.

In their study of 17 couples, Arnott and Meins (2007) conducted the AAI during pregnancy, measured observational mind-mindedness at 6 months and infant attachment security at 12 months. A pattern emerged suggesting higher levels of mind-mindedness reduced the likelihood of infant attachment insecurity in the presence of a non-autonomous AAI classification, although mediation analyses were not conducted due to the lack of statistical power. In other words, for infants with autonomous mothers' high levels of mind-mindedness had no additional beneficial impact on infant attachment security. This suggests that mind-mindedness is not the only mechanism to explain the 'transmission gap' and perhaps a coherent state of mind facilitates the propensity to be mind-minded. In the same

study, prenatal reflective functioning, as coded from the AAI, was positively related to observed mind-related comments during play interactions. Individual prenatal reflective functioning accounted for 25% of the variance in the proportion of fathers' appropriate mind-related comments and 17% of the variance in the proportion of mothers' non-attuned mind-related comments. The findings suggest the tendency to reflect on the mental states of significant others and oneself in the AAI during pregnancy is associated with the propensity to tune into mental states when interacting with one's infant.

There is limited research examining the links between the AAI and parents' representations of their infants (Vreeswijk, Maas, & van Bakel, 2012). In a study of 84 mother-infant dyads, Madgian, Hawkins, Plamondon, Moran and Benoit (2015) found that the quality of expectant (but not concurrent) parents' representations of their infants mediated the association between parent prenatal AAI coherence and infant attachment security at 11 months. As concurrent representations did not mediate the association, the researchers argue that experience with the infant is not enough to restrict the influence of the quality of prenatal representations.

With this in mind, the second question to be addressed in this chapter is how are mind-mindedness and narrative coherence related? Central to the mind-mindedness coding scheme is the notion of infant agency, specifically whether infants are viewed as possessing their own thoughts, feelings and desires. In a similar vein, separateness is one of the six subscales rated before providing parents with an overall narrative coherence score. This scale is concerned with the extent that children are seen as unique and autonomous, with their own distinct personalities, and not simply an extension of the parent. In order to receive a high coherence score, a parent must first score highly on separateness and also must construct a relatively complex and balanced narrative of their child. However, it does not follow that parents have to describe the mental life of their child, for example, they could describe a range of interactions, behaviours and physical characteristics without mentioning emotions or cognitions to receive a high score. Though evidently describing different aspects of the child's mental life as well as highlighting their separateness, ensures that the parent does provide a more complex portrayal of the child, which in turn increases the likelihood that his or her narrative will be rated as coherent. Thus, mind-mindedness appears to be necessary but not sufficient for coherence. That is, being coherent necessitates a degree of mind-mindedness, but a high score on coherence requires additional parental cognitions beyond the capability of viewing one's infant as a mental being. As such, a positive but modest

association is expected between both expectant mothers' and fathers' mind-mindedness and coherence.

3.2. Are Parent Characteristics, Wellbeing, Couple Relationship Quality or Pregnancy Characteristic Associated with Prenatal Talk?

Debate continues surrounding the extent to which mind-mindedness can be seen as relational or a trait-like (Meins et al., 2014). In comparing the descriptions given by participants of their partner, a best friend, a celebrity and a famous piece of art, Meins et al. (2014) found adults were more mind-minded when describing someone they knew. Further support for this comes from Barreto, Fearon, Osório, Meins and Martins' (2015) study of 74 educated parents of 4 – 5-year-olds. Specifically, Barreto et al. (2015) found that mentalising skills did not significantly contribute to predict any unique variance in either maternal or paternal mind-mindedness. In addition, parent education, symptoms of distress and child temperament were not associated with parental mind-mindedness. Taken together, the findings from these studies add weight to the argument that mind-mindedness reflects the quality of personal relationships rather than the ability to mentalise.

Yet, other researchers have documented links between parent demographic characteristics, wellbeing and mind-mindedness. Higher levels of education have sometimes been found to be associated with increased mind-mindedness (e.g., Hughes, Aldercotte, et al., 2017; McMahon, Camberis, Berry, & Gibson, 2016) and Meins, Fernyhough, Arnott, Turner and Leekam (2011) reported a modest but significant association between maternal socio-economic status and appropriate mind-related comments at 8 months. Pawlby et al. (2010) found mothers in a psychiatric inpatient unit were less likely to make appropriate mind-related comments during interactions with their infants and others have found a negative association with parent stress rather than depression (Demers et al., 2010; Walker, Wheatcroft, & Camic, 2012). Other researchers have found links with infant characteristics. For example, in their study of 64 foster mother-infant dyads aged between 6 and 30 months, Bernier and Dozier (2003) found a positive association between child age and mind-mindedness and argue that perhaps it is not appropriate to reflect too much on the mental life of an infant that can so often be opaque. The inconsistency of these results points to the idea that characteristics of either the parent or child and wellbeing may contribute to parental mind-mindedness in different ways at different points in development.

Studies that have used the AAI and WMCI have reported differences in parent classification according to sample risk status and mental health diagnoses (Bakermans-Kranenburg & van IJzendoorn, 2009; Vreeswijk et al., 2012). However, the categorisation of

participants on the basis of AAI scores often precludes analysis of specific associations between individual characteristics and coherence. Of the limited studies available, it appears that parental demographic characteristics might be important for coherence. In the same sample of mother-infant dyads reported above, Bernier and Dozier (2003) found maternal coherence was positively associated with education but negatively related to mothers' age and number of years' experience as a foster mother. In an ethnically diverse sample of mothers and pre-schoolers, Sher-Censor and Yates (2015) found mothers rated as coherent had higher receptive vocabularies (which was positively associated with family socio-economic status) than did those categorised as incoherent. As research using this coding scheme is in its infancy there is, as yet, only a limited understanding of the factors that might be associated with narrative coherence. Due to the lack of substantial variability in education in the New FAMS sample, associations between parent demographic characteristics and coherence are not expected and only weak associations are expected with measures of parental mental ill-health.

Recent research in Finland points to the idea that expectant parents' representations of their infants are differentially associated with mental health and couple relationship quality for mothers and fathers (Ahlqvist-Björkroth et al., 2016). In their sample of 153 expectant parents, demographically similar to the New FAMS sample, expectant fathers (but not mothers) were less likely to have balanced representations when they reported greater marital distress. In contrast, expectant mothers (but not fathers) were more likely to have an unbalanced representation if they reported more depressive symptoms. A similar gendered spill-over from the couple relationship was also reported in a small-scale study that followed 40 heterosexual couples over the transition to parenthood. Luz, George, Vieux and Spitz (2017) found parent-foetal attachment quality was more strongly associated with couple relationship quality in fathers than in mothers. With these findings in mind, in addition to examining parent mental health, couple relationship quality will also be considered, and a stronger association is expected between measures of the couple relationship quality and fathers' mind-mindedness and coherence.

Finally, differences according to the characteristics of the pregnancy will be examined. Couples can differ in their route to parenthood, with some using ART to conceive. There has been scant examination of group differences in prenatal representations of the infant according to conception type. Postnatally, McMahon et al. (2016) reported no group differences between mothers who conceived naturally and those who used ART in online mind-mindedness at 7-months or offline mind-mindedness at 19-months. Again, comparable

postnatal evidence is not available for men who became fathers after the use of ART. It could be that during pregnancy the mode of conception may be more central and that the ability to think ahead may be compromised for parents who have had a more prolonged journey to conception (McMahon, Tennant, Ungerer, & Saunders, 1999) or that these parents have had more time to think about the infant and so show enhanced levels of mind-mindedness or coherence. Thus, an exploratory approach is taken with regards to the question of whether the use of ART would impact the nature of expectant parents' talk. Standing in contrast to the experience of ART, it is noted that only a minority of pregnancies resulting in birth in the UK are 'unplanned' (5.7%). A questionnaire-based study of 391 pregnant women (Pajulo, Helenius, & Mayes, 2006) found women with unplanned pregnancies held more negative representations, as indicated by a greater tendency to choose negative adjectives to describe their unborn infant (e.g., difficult, rejecting) than women with planned pregnancies. Thus, it might be expected that expectant mothers with unplanned pregnancies may show lower levels of coherence (due to reduced levels of acceptance and complexity) than expectant mothers with planned pregnancies. However, in line with the prevalence estimates, the number of unplanned pregnancies in New FAMS was expected to be small in number thus limiting the power of examining group differences. In addition, expectant parents also differ between each other in their decision to find out the sex of their baby. Arnott and Meins (2008) found knowledge of foetal sex was not associated with antenatal mind-mindedness. Thus, group differences according to nature of conception and knowledge of foetal sex will be explored but are not anticipated to be found in the current sample.

3.3. Summary

To summarise, in this chapter I will address three questions:

1. Do expectant mothers produce more coherent or mind-minded descriptions of their unborn infant than expectant fathers? Are there within couple associations between speech sample constructs?

It is hypothesised that expectant mothers will produce more mind-minded and coherent speech samples than expectant fathers. It is also expected that mind-mindedness and coherence will be associated within couples.

2. Are prenatal mind-mindedness and coherence associated?

Mind-mindedness is hypothesised to be necessary but not sufficient for coherence in both expectant mothers and fathers.

3. What are the correlates of prenatal mind-mindedness and coherence?

It is expected that (a) parent wellbeing will be more strongly associated with mind-mindedness than coherence and (b) the association between couple relationship quality and mind-mindedness and coherence will be stronger for expectant fathers than mothers. It is expected that there will be no group differences according to the nature of conception or knowledge of foetal sex.

Methods

3.4. Coding Scheme Modifications

As detailed in Chapter 2, expectant parents were asked to provide a five-minute speech sample, describing what they thought their baby might be like and how they expected to get along with them (Magana et al., 1986). These speech samples were audio-recorded and transcribed verbatim, with all identifying information redacted.

3.4.1. Mind-Mindedness.

Several clarifications and adaptations were required to the Meins and Fernyhough (2015) coding manual. Coding the representational measure of mind-mindedness requires identification of attributes that refer to the child and subsequently these attributes are coded as mental (e.g., cognitions, emotions, desires) or non-mental (e.g., behavioural, physical, general). After initially reading the speech samples, it was evident that parents described the infant using different tenses and so an attribute could be about the present or future infant (e.g., “you agree, it’s kicking me” or “she’ll enjoy being in my company”). It was also important to distinguish between activities done to versus with the infant, for example, “I will talk to baby,” in contrast to, “we will go to the park together.” The former activities were not coded as the main focus of the utterance was upon the parent and not an attribute of the child or indicative of an activity completed together. The speech samples contained references to the self or others that did not pertain to the infant or the parent-child relationship and so was not coded. Arnott and Meins (2008) coded mental attributes as present or absent within each description of the child, as a result the frequencies of mental and non-mental attributes were inspected before creating proportional scores, that is mental attributes as a proportion of the sum of total child attributes (i.e., mental and non-mental attributes). In line with recent research (McMahon et al., 2016) both frequency and proportional scores are presented in this chapter. Double coding of 20% of the speech samples was completed (n = 84) and due to the large sample size, a subsection of the reliability set (n = 27) were double-coded during the

coding period to check for coder drift. ICC's at both time points were excellent for mental (ICC = .78) and were good for non-mental (ICC = .71).

3.4.2. Narrative Coherence.

Along with another member of the New FAMS team (Dr Anja Lindberg), I was trained in the original narrative coherence scheme by Dr Sher-Censor, one of the scheme developers (Sher-Censor & Yates, 2010). In collaboration with colleagues from the Dutch New FAMS team and with guidance from Dr Sher-Censor, the manual was adapted to be used with prenatal speech samples. As mentioned in Chapter 1, speech samples were first coded on six subscales using a 7-point scale, with high scores indicative of higher levels which reflect better scores for all scales aside from concern. The six subscales included; focus on the child (e.g., sole focus on expectations of the child, relationship, plans for raising the baby), elaboration (e.g., rich and detailed descriptions), separateness (e.g., baby as an independent and unique person), concern/worry (e.g., fears about baby or parenting), acceptance/rejection (e.g., warmth and acknowledge potential challenges, lack of judgmental or rejecting descriptions) and complexity (e.g., multidimensional picture of positive/negative attributes, though mainly positive descriptions). With regards to the separateness scale, it was acknowledged that it is developmentally appropriate for expecting mothers to feel a symbiosis with their foetus. Thus, it was important to differentiate between descriptions of mothers that relate to the present and those that relate to after birth during which mothers should be able to relate to the born-child as separate. In addition, within the separateness subscale parents were scored for the presence of minor or major boundary dissolution (i.e., the roles of caregiver and child are described as equal or reversed). Scores from the six scales are then used to guide coherence scoring, for example 'good enough' scores on each of the scales (i.e., five or more on focus, elaboration, separateness, acceptance/warmth and complexity, and a score no higher than a four on concern) are required in order to score in the 'coherent' range of five or more.

Overall coherence is rated on a 7-point scale, with a high score reflecting a speech sample that was easy to follow, believable, complex and perhaps with elements of metacognitive monitoring, whilst a low score was given to a speech sample that was meagre, one-sided or even contradictory. This continuous coherence score can then be used to dichotomise transcripts as 'coherent' (i.e., score 5 – 7) or 'incoherent' (i.e., score 1 – 4). However, instead of comparing the coherent and incoherent group, in the current study the continuous score of coherence is examined. This is important as to score within the 'coherent' range (i.e., 5 – 7) expectant parents must meet a stringent criterion because the

coding scheme was established with mothers of pre-schoolers. Specifically, when prompted to describe their child and their relationship with their child, to score highly, parents' descriptions must be: (i) exclusively focused on these two notions (e.g., not digress onto themselves or other relationships); (ii) detailed (e.g., elaborate on most attributes); (iii) separate (e.g., not blur the boundaries between the self and child); (iv) low in concern (e.g., not overwhelmed with anxiety); (v) accepting and warm (e.g., be excited and aware of potentially challenging infant behaviour); and (vi) complex (e.g., awareness of both positive and negative attributes). Coherence can be seen to reflect a higher-order capacity which involves each of these dimensions. As parents of pre-schoolers have had years of experience with their child the task of drawing a balanced description with examples should be much easier than for expectant parents. Thus, it may be that simply showing some level of coherence, rather than necessarily being within the coherent range, is what is sufficient to predict later sensitivity (as tested in Chapter 4). For reliability, 15% of the speech samples were double coded and during the coding period an additional six transcripts were double-coded to check for coder drift. Coding of the transcripts was distributed to ensure that coders did not rate speech samples from families they had visited. ICC's were excellent for overall coherence, ICC = .82, and ranged from good to excellent for each subscale; focus ICC = .74, elaboration ICC = .86, separateness ICC = .80, concern ICC = .70, acceptance ICC = .70, complexity ICC = .77.

3.5. Plan of Analysis

To address the first set of questions paired t-tests were used to examine parent gender differences and Pearson's correlations were used to examine speech samples associations within and between individuals. At the bivariate level, Pearson's correlations were used to explore the associations between the speech sample constructs, demographics, mental health and couple satisfaction. Actor-Partner Interdependence Models (APIM) in M*plus* version 7.4 (Muthén & Muthén, 2012) were used to address question three as these models account for the inherently dyadic nature of the data. As heterosexual couples made up the sample, APIM for distinguishable dyads was used (Cook & Kenny, 2005). Within an APIM it is possible to explore the relative contribution of the individual versus the partners scores to the individual's outcome (i.e., actor versus partner effect). For example, is mothers' talk affected by paternal wellbeing or couple relationship quality (i.e., partner effect)? In addition, the relative strength of the associations for mothers and fathers can be compared and patterns can be tested, for example whether there is an actor-only pattern (e.g., actor effect only present for fathers) or whether there is a couple pattern (e.g., similar strength and direction of

association between two measures for both partners). A graphical representation of a model is illustrated in Figure 3.1. Pathways have been labelled to aid understanding of the order in which equality constraints were added to different pathways. Due to the non-normal distribution of the prenatal mind-mindedness scores the robust maximum likelihood method of estimation was used. Model fit was assessed using Brown's (2006) recommended criteria: nonsignificant chi-square, root mean square error of approximation (RMSEA) $\leq .06$, comparative fit index (CFI) $\geq .90$ and Tucker-Lewis Index (TLI) $\geq .90$.

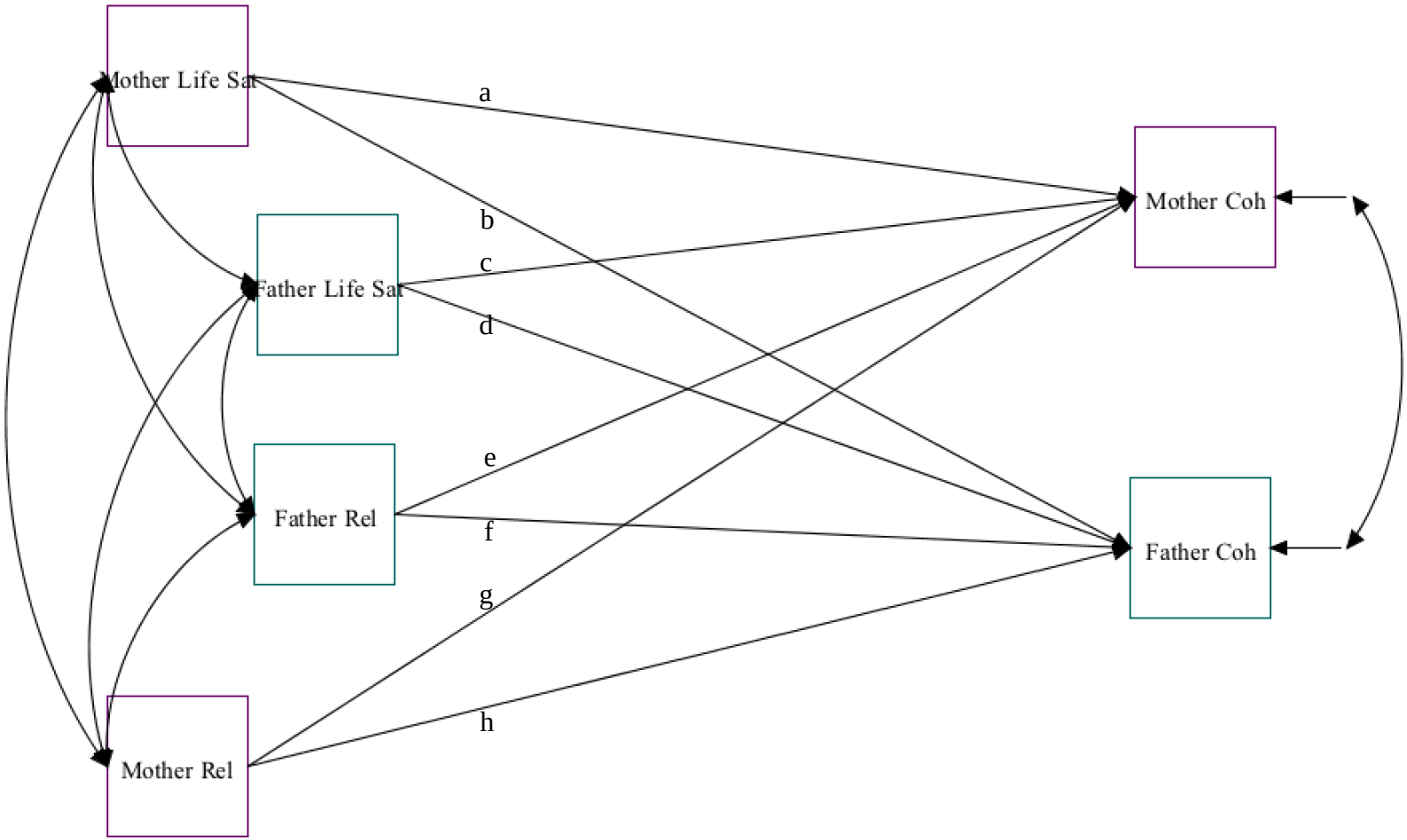


Figure 3.1. Conceptual model of an Actor-Partner Interdependence Model (APIM).

Results

3.6. How do Expectant Parents Talk about their Infant during Pregnancy?

Table 3.1 presents the descriptive statistics for the five-minute speech samples and includes results for each subscale of the narrative coherence coding scheme, as this is the first time this scheme has been applied prenatally. As illustrated in Table 3.1, expectant parents could talk about their unborn infant and the content and coherence of these narratives varied between individuals. The majority of expectant parents (87% mothers and 82% fathers) described at least one mental attribute but overall more non-mental descriptors of their infants were provided. Unlike Arnott and Meins (2008), in New FAMS it was possible to move beyond the distinction between the presence or absence of mental attributes and consider the frequencies and proportion of mind-minded descriptions. Overall, expectant parents appear able to; focus on their infant, elaborate and provide detail, see their infant as a separate person, not be overwhelmed with concern and be warm and accepting. However, on average, expectant parents struggled to provide a complex portrayal of their infant with a coherent narrative. Boundary dissolutions were extremely rare, with only two mothers and five fathers describing the roles of caregiver and child as equal or reversed (e.g., as a best friend). The continuous coherence scores for mothers and fathers were normally distributed.

Table 3.1.
Descriptive Statistics of Prenatal Speech Sample Constructs

	Mother (*N* = 201)				Father (*N* = 199)			
	M (*SD*)	Mode	Range	Skew (*SE*)	*M* (*SD*)	Mode	Range	Skew (*SE*)
Mental attributes (F)	3.52 (3.18)	2	0 – 18	1.35 (.17)	3.26 (3.46)	0	0 – 20	2.05 (.17)
Non-mental attributes (F)[a]	9.12 (4.87)	9	1 – 25	.68 (.17)	4.73 (1.20)	5	0 – 29	1.20 (.17)
Mind-mindedness (%)	.25 (.18)	.00	.00 – .80	.59 (.17)	.27 (.20)	.00	.00 – .79	.41 (.17)
Focus [a]	5.91 (1.27)	7	3 – 7	-.79 (.17)	5.50 (1.46)	7	1 – 7	-.72 (.17)
Elaboration	6.34 (1.20)	7	1 – 7	-1.79 (.17)	6.32 (1.15)	7	1 – 7	-1.77 (.17)
Separateness	6.87 (.55)	7	3 – 7	-4.77 (.17)	6.80 (.73)	7	2 – 7	-4.20 (.17)
Concern	2.19 (1.27)	1	1 – 6	.84 (.17)	2.06 (1.21)	1	1 – 7	1.18 (.17)
Acceptance	5.08 (.62)	5	2 – 7	-.82 (.17)	5.02 (.62)	5	1 – 6	-1.94 (.17)
Complexity	3.88 (1.32)	3	1 – 7	.07 (.17)	3.67 (1.31)	3	1 – 7	.05 (.17)
Coherence	4.11 (1.19)	3	1 – 7	.05 (.17)	3.91 (1.15)	3	1 – 7	.01 (.17)

Note. F = frequency score; % = proportion score. [a] = mother > father.

3.7. Are Mothers' Speech Samples More Mind-Minded and Coherent than Fathers?

On average, more infant attributes were described by mothers than fathers, $t(200) = 3.09$, $p = 002$, Cohen's $d = 0.30$ (see Table 3.1). Mothers were, on average more likely than fathers to keep the infant as the focal point of their speech sample, $t(198) = 3.07$, $p = 002$, $d = 0.28$, though it should be noted that, on average, fathers still scored high for focus. Adopting the traditional method of dichotomising coherence scores (i.e., 1 – 4 incoherent; 5 – 7 coherent), 59% of mothers and 66% of fathers would be classified as incoherent. The hypothesised maternal advantage was not supported; mothers were not more mind-minded or coherent than fathers.

3.8. Are there Within Couple Associations between Speech Sample Constructs?

As shown in Table 3.2, neither the frequency of mental and non-mental attributes nor the proportion of mind-minded descriptions were associated within couples. In contrast, within the narrative coherence subscales, the ability to focus, elaborate, remain separate and provide a complex description were modestly positively associated within couples. However, a positive association was not found between expectant mothers' and fathers' scores for concern, acceptance or coherence. A contingency table illustrating mothers' and fathers' coherence group membership was created (both coherent = 26, both incoherent = 78, mother coherent and father incoherent 54, mother incoherent and father coherent 40) and $\phi = -.02$, $p = .838$, which suggests that mothers and fathers from the same couple do not both necessarily produce coherent or incoherent narratives. Thus, the hypothesised positive within-couple associations were on the whole, not supported.

Table 3.2.
Within-Couple Prenatal Speech Sample Construct Correlations

	Speech Sample Construct	
1.	Mother – Father Mental attributes (F)	.09
2.	Mother – Father Non-mental attributes NM (F)	.05
3.	Mother – Father Mind-mindedness (%)	.11
4.	Mother – Father Focus	.16*
5.	Mother – Father Elaboration	.17*
6.	Mother – Father Separateness	.17*
7.	Mother – Father Concern	.10
8.	Mother – Father Acceptance	.01
9.	Mother – Father Complexity	.14+
10.	Mother – Father Coherence	-.00

Note. + $p < .10$. * $p < .05$.

3.9. Prenatal Mind-Mindedness was Related to Coherence

As hypothesised, parents' coherence was modestly associated with the proportion of mind-minded descriptions, r_{mother} = .17* and r_{father} = .23**. Table 3.3 illustrates the within-person associations between proportional mind-mindedness and coherence and other speech sample constructs. For mothers, the proportion of mind-minded descriptions was only positively associated with focus. In contrast, for fathers the proportion of mind-minded descriptions was positively associated with focus, elaboration, complexity and negatively associated with concern. Table 3.4 illustrates the within-person association between the additional speech sample subscales. For mothers, the frequency of mental attributes was positively associated with focus, elaboration, acceptance and complexity and negatively associated with concern. For fathers, the frequency of mental attributes was positively associated with focus, elaboration, acceptance and complexity and negatively associated with concern. The negative association between the frequency of fathers' non-mental attributes and separateness differed in strength between mothers and fathers (z = 2.71, p = .007).

Table 3.3.
Within-Person Correlations between Prenatal Mind-Mindedness and Coherence and Speech Sample Constructs

		Mother		Father	
		Mind-Mindedness	Coherence	Mind-Mindedness	Coherence
1.	Mental attributes (F)	.76**	.39**	.72**	.41**
2.	Non-mental attributes (F)	.30**	.48**	-.22**	.37**
3.	Focus	.18*	.39**	.13+	.52**
4.	Elaboration	.04	.43**	.19*	.36**
5.	Separateness	.08	.14*	.03	.11
6.	Concern	-.10	-.21**	-.15*	-.22**
7.	Acceptance	.06	.52**	.14+	.40**
8.	Complexity	.10	.93**	.24**	.91**

Note. Mind-Mindedness = % score.
+ p < .10. * p < .05. ** p < .001.

Table 3.4.
Within-Person Prenatal Speech Sample Construct Correlations

		1.	2.	3.	4.	5.	6.	7.	8.
1.	Mental attributes (F)	-	.29**	.27**	.24**	-.08	-.18*	.27**	.43**
2.	Non-mental attributes (F)	.35**	-	.31**	.19**	**-.21****	-.03	.09	.36**
3.	Focus	.32**	.30**	-	.09	-.07	-.09	.07	.49**
4.	Elaboration	.18*	.24**	-.09	-	.04	.15*	.11	.32**
5.	Separateness	.05	**.06**	.16*	-.06	-	-.03	.04	.02
6.	Concern	-.14*	-.08	-.23**	.13+	-.03	-	-.29**	-.23**
7.	Acceptance	.18*	.26**	.15*	.18*	-.03	-.25**	-	.36**
8.	Complexity	.34**	.51**	.38**	.41**	.09	-.15*	.44**	-

Note. Mothers bottom diagonal; Fathers top diagonal. Bold indicates significant difference in the strength between the correlation between mothers and fathers.
+ $p < .10$. * $p < .05$. ** $p < .001$.

3.10. Are there Stronger Associations between Parent Characteristics, Wellbeing and Couple Relationship Quality and Mind-Mindedness than Coherence?

Before addressing the associations with speech sample constructs, the associations between demographic, wellbeing and couple relationship quality variables were examined (see Table 3.5). For both expectant mothers and fathers, there were strong associations between couple relationship quality and life satisfaction.

Firstly, as illustrated in Table 3.6, there were very limited associations between parent demographics and speech sample constructs. Notably, higher levels of education were associated with a greater number of mental attributes described by mothers and an increased proportion of mental attributes described by fathers. For mothers, higher perceived social standing was positively associated with increased separateness, but this correlation was not significantly stronger than the association seen in fathers. Given the high levels of education in this sample, as expected there were no associations between parents' demographics and coherence. Partner demographics were not associated with individual scores.

Table 3.5.
Within-Person Correlations between Demographic, Wellbeing and Couple Relationship Quality Measures

		1.	2.	3.	4.	5.	6.	7.
1.	Age	-	.05	**.22****	.10	-.19**	-.21**	-.02
2.	Education	.16*	-	.15*	.38**	.14+	-.09	-.02
3.	Income	**.39****	.18*	-	.38**	-.02	-.13+	-.03
4.	Ladder of Social Standing	.15*	.33**	.35**	-	.08	.11	.01
5.	Mental health factor score	-.19**	.05	.02	-.03	-	.17*	.09
6.	Life satisfaction	**-.06**	.05	.06	.28**	-.04	-	.45**
7.	Couple relationship quality	-.10	.04	.00	.05	.09	.35**	-

Note. Mothers bottom diagonal; Fathers top diagonal. Bold indicates significant differences between mothers and fathers in the strength of the correlations.
+ $p < .10$. * $p < .05$. ** $p < .001$

Table 3.6.
Correlations between Parent Demographic Measures and Individual Prenatal Speech Sample Constructs

		Mother				Father			
		Age	Ed	Income	Ladder	Age	Ed	Income	Ladder
1.	Mental attributes (F)	-.04	.16*	.04	.03	.03	.09	-.02	.05
2.	Non-mental attributes (F)	.07	.01	.05	-.04	-.04	-.12	-.01	-.08
3.	Mind-mindedness (%)	-.03	.10	-.02	.01	.07	.14*	.02	.11
4.	Focus	-.06	.11	-.04	-.05	-.10	.03	-.08	-.08
5.	Elaboration	-.09	-.13+	.04	.09	-.09	.06	.14*	.17*
6.	Separateness	-.05	.07	.06	.18**	.05	.03	-.02	-.01
7.	Concern	.05	-.05	.05	.06	.08	.03	-.03	-.10
8.	Acceptance	-.14*	.16*	.00	.11	-.07	.04	-.06	.08
9.	Complexity	-.06	-.01	.04	.11	.01	.09	.01	.05
10.	Coherence	-.09	-.01	.03	.14*	.01	.09	.01	.03

Note. + $p < .10$. * $p < .05$. ** $p < .001$

Next associations between parent wellbeing and speech sample constructs were examined. As illustrated in Table 3.7, concern as rated in the speech samples was associated with poorer self-reported mental health (e.g., more depressive and anxiety symptoms) for expectant fathers. Whilst the cross-sectional nature of the study limits any claims of directionality, from a measurement point of view it is reassuring that this subscale appears to have some form of construct validity. Fathers' representations appeared more susceptible to variation in wellbeing than mothers: greater dissatisfaction with life were associated with lower ratings of acceptance ($z = 2.52$, $p = .01$), complexity ($z = 2.51$, $p = .01$) and coherence ($z = 2.51$, $p = .01$).

Table 3.7.
Correlations between Prenatal Wellbeing and Couple Relationship Quality and Individual Prenatal Speech Sample Constructs

		Mother			Father		
		MHFS	SWL	Rel	MHFS	SWL	Rel
1.	Mental attributes (F)	.07	.00	.05	.01	.07	.07
2.	Non-mental attributes (F)	-.04	-.02	.03	-.04	.12	-.01
3.	Mind-mindedness (%)	.10	.01	.08	.00	-.06	.01
4.	Focus	-.03	-.10	-.05	-.11	.12	.04
5.	Elaboration	.08	-.01	-.07	.02	.06	.05
6.	Separateness	-.01	.11	.00	.04	.11	.08
7.	Concern	.01	-.07	-.13+	.19*	-.19**	-.09
8.	Acceptance	.10	**.03**	**-.01**	-.07	**.28***	**.27****
9.	Complexity	.08	**.01**	**-.06**	-.03	**.26****	**.18***
10.	Coherence	.05	**.02**	**-.07**	-.04	**.22****	**.20**

Note. MHFS = mental health factor score; SWL = Satisfaction with life; Rel = Relationship Quality. Bold indicates significant differences in the strength of the correlations.
+ $p < .10$. * $p < .05$. ** $p < .001$.

Next, associations between couple relationship quality and speech sample constructs are also presented in Table 3.7. Fathers' representations again appeared more susceptible than mothers' to influence from other factors. Specifically, higher levels of couple relationship quality were associated with higher ratings of acceptance, complexity and coherence in fathers' speech samples. All of these correlations were significantly different in strength from those seen within maternal measures. This effect was also seen when comparing fathers' overall couple relationship quality between coherence groups, $t(191) = 2.69$, $p = .008$, Cohen's $d = 0.42$. Fathers rated as coherent reported higher levels of couple relationship quality ($M = .24$, $SD = .74$) than did the fathers rated as incoherent ($M = -.11$, $SD = .90$).

Reflecting the inter-correlated nature of individual satisfaction with life and couple relationship quality (see Table 3.5), APIM was used to examine the relative unique contribution of individual versus partner couple relationship quality and life satisfaction on individual narrative coherence. Each of the predictor variables were permitted to co-vary. Figure 3.4 shows standardised path coefficients from the unconstrained model, which indicate significant and marginal actor effects for fathers, with greater satisfaction in life and the couple relationship associated with higher ratings of narrative coherence. To test for gender differences in the strength of the pathways, model constraints were built up so that in turn all pathways were constrained to equality and changes to model fit were examined (see conceptual model Figure 3.1). As a robust maximum likelihood estimator was used in the analyses, the χ^2 difference between each nested model and the comparison model was calculated using the Satorra-Bentler χ^2 difference test (Satorra & Bentler, 2010) . Model fit statistics for each of these nested models are presented in Table 3.8. Nested model eight, with all satisfaction with life pathways constrained to equality and partner couple relationship quality pathways constrained to equality (pathways a, b, c, d, e and h) did not significantly worsen model fit when compared to nested model three, which only applied equality constraints to life satisfaction pathways (pathways a, b, c, d), χ^2 (2) =.62, $p = .734$. For reasons of parsimony, nested model eight was retained. Thus, although significant, the actor effects of fathers' satisfaction with life on narrative coherence did not significantly differ from the corresponding nonsignificant actor effect for mothers, χ^2 (1) = 1.53, $p = .580$. However, the marginal actor effect from fathers' couple relationship quality on fathers' narrative coherence was upheld, suggesting the strength of the pathway was significantly different between mothers and fathers.

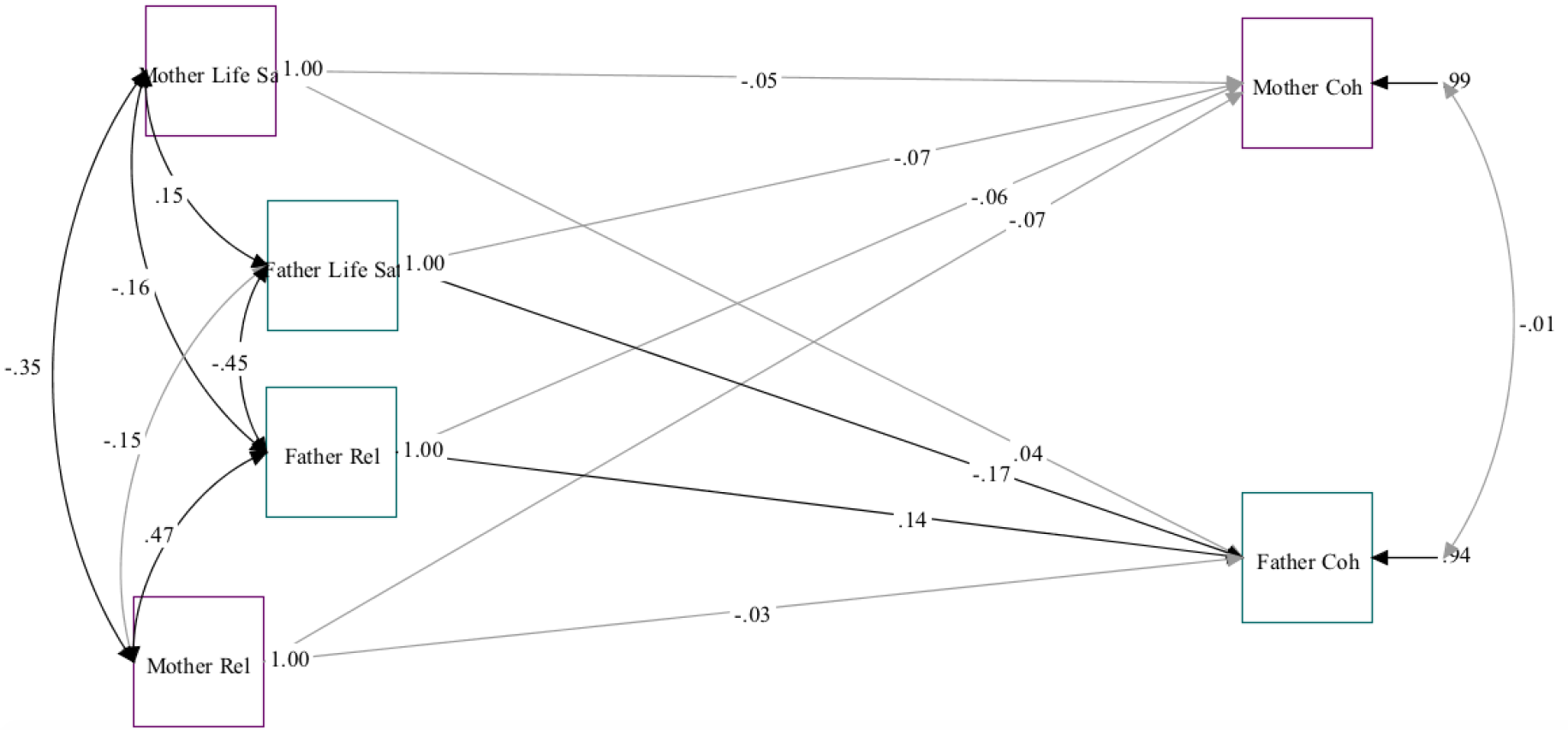


Figure 3.4. Actor-partner interdependence model displays standardised estimates of prenatal couple relationship quality and life satisfaction on narrative coherence.

Table 3.8.
Model Fit Indices for Nested Models

Nested models	χ^2	RMSEA	CFI	TLI
N1: Actor constraints (a, d, f, g)	6.79	0.08	0.31	1.06
N2: Partner constraints (b, c, e, h)	1.52	0.00	1.00	1.80
N3: Relationship constraints (e, f, g, h), life satisfaction freely estimated	4.35	0.08	0.57	0.92
N4: Relationship constraints (e, f, g, h), life satisfaction actor constraints (a, d)	8.54	0.08	0.18	-0.85
N5: Relationship constraints (e, f, g, h), life satisfaction partner constrains (b, c)	5.40	0.04	0.75	0.45
N6: Life satisfaction constraints (a, b, c, d), relationship freely estimated	1.74	0.00	1.00	1.21
N7: Life satisfaction constraints (a, b, c, d), relationship actor constraints (g, f)	7.60	0.07	0.35	-0.47
N8: Life satisfaction constraints (a, b, c, d), relationship partner constraints (e, h)	2.38	0.00	1.00	1.66
N9: All pathways constrained to equality	9.04	0.05	0.45	0.18

Note. Model fit criteria: nonsignificant chi-square, root mean square error of approximation (RMSEA) ≤ .06, comparative fit index (CFI) ≥ .90 and Tucker-Lewis Index (TLI) ≥ .90.

Finally, group differences in expectant parents' mind-mindedness and coherence according to pregnancy characteristics were examined. The majority of New FAMS couples conceived naturally but 21 couples (11% sample) used ART. Comparisons showed that expectant mothers who used ART described fewer non-mental infant attributes (M = 7.14, SD = 6.25) than those who conceived naturally (M = 9.35, SD = 4.65), $t(198) = 1.98$, $p = .049$, Cohen's d = 0.46. Expectant fathers who used ART described more non-mental infant attributes (M = 10.14, SD = 5.52) than those who conceived naturally (M = 7.33, SD = 4.55), $t(198) = 2.66$, $p = .009$, Cohen's d = 0.60. There was also a trend to suggest expectants mothers who used ART described marginally fewer mental attributes (M = 2.29, SD = 2.72) than those who conceived naturally (M = 3.66, SD = 3.21), $t(198) = 1.89$, $p = .06$, Cohen's d = 0.43. Turning to coherence, comparisons showed that expectant mothers who used ART provided less focused descriptions (M = 5.05, SD = 1.66) and compared to mothers who conceived naturally (M = 6.01, SD = 1.18), $t(198) = 3.36$, $p = .001$, Cohen's d = 0.67. Expectant mothers who used ART also displayed significantly reduced separateness (M = 6.52, SD = 1.12) compared to mothers who conceived naturally (M = 6.91, SD = 0.43), $t(198) = 3.10$, $p = .002$, Cohen's d = 0.46. In New FAMS 12 couples reported that their pregnancy was not planned and, on average, expectant fathers in these couples received significantly lower acceptance scores (M = 4.58, SD = 0.67) than fathers in couples with planned pregnancies (M = 5.05, SD = .62), $t(181) = 2.52$, $p = .012$, Cohen's, d = 0.75. These fathers also described narratives with lower levels of separateness (M = 6.33, SD = 1.30) than those with planned pregnancies (M = 6.82, SD = 0.69), $t(181) = 2.19$, $p = .030$, Cohen's d = 0.66. The small number of couples with unplanned pregnancies in the sample suggests this comparison should be treated with caution. Taken all together, these findings indicate that our understanding of the importance of the nature of conception to expectant parents' representations of their infants would benefit from future research with more diverse samples.

Interestingly, there was an even divide of expectant parents who chose to find out their infants' gender (unknown = 55%, known male = 27%, known female = 18%). Yet overall knowledge of infant gender did not appear to impact the nature of talk. There was however a small difference in separateness according to infant gender; compared to if the gender was unknown, mothers' and fathers' separateness was lower when they were expecting a child of a gender that matched their own, $F(2, 197) = 6.69$, $p = .002$, $\eta^2 = .06$, and $F(2, 196) = 3.20$, $p = .043$, $\eta^2 = .03$ respectively. For mothers, post-hoc tests showed that the narratives of those who were expecting a girl were rated as less separate (M = 6.59, SD = .96) than mothers who did not know the sex of their infant (M = 6.96, SD = 0.30). However, there

was no difference in separateness between mothers expecting a boy (*M* = 6.87, *SD* = 0.52) and mothers who were expecting a girl or those who did not know the sex of their infant. For fathers, post-hoc tests showed that the narratives of those who were expecting a boy were rated as less separate (*M* = 6.59, *SD* = 1.07) than mothers who did not know the sex of their infant (*M* = 6.90, *SD* = 0.45). However, there was no difference in separateness between fathers expecting a girl (*M* = 6.81, *SD* = 0.75) and fathers who were expecting a boy or those who did not know the sex of their infant. It should be kept it mind that these differences were still at the high end of separateness scale and were not indicative of problems.

3.11. Summary of Results

Three key conclusions emerged from this chapter. First, prenatal speech samples are challenging and when asked to describe what their infant will be like and how they expect to get along with them, expectant mothers and fathers typically use non-mental descriptors and provide narratives that are insufficiently complex to be rated as coherent. Expectant parents are equally 'in tune' with their unborn infant and there is no within-couple clustering of mind-mindedness or coherence. However, partners' ratings for focus, elaboration, separateness and complexity were positively associated with each other. Second, as hypothesised, mind-mindedness appears necessary but not sufficient for coherence. Finally, couple relationship quality exerted a stronger influence on fathers' rather than mothers' representations. Interestingly, pregnancy characteristics also had a different impact according to parent gender; compared to parents who conceived naturally, for couples who used ART, expectant fathers described more non-mental mental attributes of their unborn infant whilst expectant mothers described fewer attributes and were less likely to provide a narrative completely focused on their unborn infant.

Chapter 4. Prenatal Representations and Postnatal Sensitivity

When mothers in the New Fathers and Mothers Study were asked to imagine their unborn infants one pregnant mother hoped her son would be "*a happy little chap*" whilst another thought "*it would be lovely if the baby had eyes like [DAD] because he's got bright blue eyes.*" Thus, while some expectant mothers focus on mental attributes others do not and yet are able to offer a coherent description. Chapter 2 introduced New FAMS, which, among other goals is the first study to integrate assessments of prenatal mind-mindedness and coherence, allowing their relative overlap and independence to be explained. Chapter 3 showed that prenatal mind-mindedness and coherence are related but distinct constructs with different correlates in expectant mothers and fathers. The aim of this chapter is to test whether the manner in which parents talk about their unborn infant influences sensitivity during later parent-infant interactions. However, before exploring prenatal predictors of sensitivity, it is important to understand the nature of sensitivity during infancy and early toddlerhood.

4.1. Sensitivity

In Chapter 1, I outlined the construct of sensitivity, defined as the ability to notice, interpret and respond in a timely and appropriate manner to children's signals (Ainsworth et al., 1974) and discussed its pertinence to infancy. To date, sensitivity has been much more heavily studied in mothers than in fathers. Studies that do consider both parents typically show higher ratings of sensitivity for mothers than for fathers during infancy. For example, Barnett, Deng, Mills-Koonce, Willoughby and Cox (2008) found mothers were rated higher for sensitivity at 6 months and Lickenbrock and Braungart-Rieker (2015) found a maternal advantage at 3, 5 and 7 months.

In an innovative study, Hallers-Haalboom et al. (2017) adopted a within-family design to compare mothers' and fathers' sensitivity and, importantly, whether this changed over time or according to birth order. Specifically, 364 families were visited at home when their first born child was 36 months old and their second born child was 12 months and subsequently when the second born was 24 and then 36 months. At each time point the Emotional Availability Scales (Crittenden, 2001) were used to code mothers' and fathers' sensitivity when interacting separately with each child during free-play sessions. Mothers, on average, were rated as more sensitive than fathers at each time point and with each child, adding to the literature in favour of a maternal advantage. It seems likely that this contrast reflects mothers' increased experience with the child, which fosters greater understanding of their child's cues that in turn may further reduce fathers' propensity to seek opportunities to

develop their own sensitivity (Umemura et al., 2013). Others note that the conceptualisation of sensitivity is important when considering equivalence between mothers and fathers. For example, in their large-scale study of mothers and fathers followed across infancy, Mills-Koonce et al. (2015) found that the four indicators of a latent-factor reflecting sensitivity took on different factor loadings for mothers and fathers. Specifically, stimulation of development was the strongest indicator of fathers' sensitivity rather than responsiveness to cues. Thus, in the current study it is acknowledged that focusing on Ainsworth's (1974) conceptualisation of sensitivity (i.e., the ability to notice, interpret and respond in a timely and appropriate manner to children's signals) may not capture other dimensions of parenting that perhaps may be pertinent to fathers (e.g., stimulation) but that these dimensions are not considered as a defining feature of sensitivity.

Adopting dyadic growth curve models, Hallers-Haalboom et al. (2017) found mothers' and fathers' sensitivity followed similar trajectories. Specifically, parents' sensitivity towards their first born decreased over time whilst parents' sensitivity to their second born increased from infancy into toddlerhood and remained stable from 24 to 36 months. However, the reduction in sensitivity towards their first-born child was not related to an increase in sensitivity towards the second born infant. The researchers suggest that the lack of spill-over from one parent-child relationship to another reflects the importance of responding to the individual needs of the child rather than a parents' general sensitivity. As such, child characteristics (e.g., age, temperament and gender) are noted as important drivers of parental sensitivity. For example, at the first-time point fathers were less sensitive in their interactions with boys than girls but their sensitivity showed a greater increase over time with boys than girls. Mothers' and fathers' sensitivity towards their first-born child was related over time. Similarly, both the initial level and the increase in parents' sensitivity towards their second born were associated within couples. Interestingly, higher initial levels of sensitivity in fathers and mothers was associated with a smaller increase in fathers' sensitivity over time. The within-couple association may reflect social learning, with parents learning from each other, whilst the reduced growth in fathers' sensitivity may reflect either the lack of room or need to grow in sensitivity (i.e., indicative of 'good enough' parenting). Furthermore, it was acknowledged in Chapter 1 that mean levels and the association between mothers' and fathers' parenting may differ according to the gender of the child with whom parents are interacting with (e.g., Deschênes, Bernier, Jarry-Boileau and St-Laurent (2014)). Thus, in this chapter, the extent to which there are differences in the mean levels of parents' sensitivity and associations between mothers' and fathers' sensitivity will be considered.

To summarise, the first goal of this chapter is to explore mothers' and fathers' sensitivity at 4 and 14 months. It is hypothesised that parents' sensitivity will (i) be higher in mothers than fathers; (ii) increase from infancy to early toddlerhood; and (iii) be positively associated within couples.

4.2. Mind-Mindedness and Sensitivity

In a recent 20-year review of the field, McMahon and Bernier (2017, p. 20) state that "*Perhaps the most outstanding conceptual issues pertain to how mind-mindedness differs from sensitivity, mentalizing capacity, and other measures of parent mentalizing*." Mind-mindedness is directly rooted in the literature on parental sensitivity. According to the original coding scheme devised by Ainsworth et al. (1974), the highly sensitive parent has both an appreciation of and respect for her/his infant's point of view. However, Meins, Fernyhough, Fradley and Tuckey (2001) argued that by capturing variation in parents' ability to acknowledge a child has a mind that governs his or her behaviour and reflect appropriately upon a child's thoughts, feelings and desires, the construct of mind-mindedness is distinct from that of parental sensitivity. Specifically, while sensitivity coding schemes typically rest upon global impressions of parents' awareness and responses to infant cues during observed interactions, the coding of mind-mindedness (especially interactional coding) provides a more direct and explicit index of the extent to which parents appreciate their child as a sentient individual, rather than simply as a being with needs to be fulfilled (Meins et al., 2001). Though conceptually related, if mind-mindedness and sensitivity are distinct, they should be modestly associated and differ in the magnitude of their predictive links to parent and child outcomes.

Partial support for the view that mind-mindedness and sensitivity are distinct comes from Zeegers et al. (2017) who, using a novel three-level meta-analytic approach, reported only a modest association between sensitivity and measures of mentalizing, such as mind-mindedness, reflective functioning and insightfulness (N = 2029, r = .25), and equally modest associations between attachment and measures of mentalizing (N = 974, r = .30) or sensitivity (N = 5871, r = .25). Overall, mentalising exerted both a direct and indirect effect (via sensitivity) on infant attachment security. Thus, the researchers argue that though mind-mindedness and sensitivity are related they are not equivalent; mentalising may increase the likelihood of responding sensitively but it does not follow that parents will necessarily use language to indicate this. Indeed, parental sensitivity can manifest through non-verbal behaviours, such as following infant gaze. Unfortunately, only a small number of studies have examined reflective functioning and insightfulness in relation to sensitivity and as such

Zeegers et al.'s (2017) meta-analysis precluded the examination of unique associations between each measure of parental mentalizing and sensitivity.

Furthermore, conclusions about the association between parental sensitivity and mind-mindedness have so far been based upon studies adopting observational measures of mind-mindedness. Researchers have established that appropriate but not non-attuned mind-related comments are positively associated with observed sensitivity (Meins et al., 2011). It should also be noted that these measures are typically not independent, as both mind-related comments and sensitivity are typically coded from the same observation. The use of the representational method increases the independence of the measures and therefore provides a stringent test of the association between the constructs. In the only study to consider the association between the representational measure of mind-mindedness during infancy and parent sensitivity, Farrow and Blissett (2014) found representational mind-mindedness in 74 mothers of 6 month olds was positively related to the sensitivity of their interactions at 12 months, both during free-play (r = .36) and feeding (r = .29). It remains to be established whether the same association is evident between fathers' mind-mindedness and sensitivity. One goal of the current chapter was to address this important yet outstanding theoretical and methodological questions within the field.

Utilising the representational interview measure of mind-mindedness also provides the opportunity to test whether mind-mindedness is a precursor to parental sensitivity. This notion has been previously examined by Laranjo, Bernier and Meins (2008) in their study of 50 mother-infant dyads. Laranjo et al. (2008) found appropriate mind-related comments at 12 months were positively associated with Q-Sort ratings of infant attachment behaviour at 15 months, but importantly this relationship was mediated by mothers' sensitivity. Unfortunately, as these mothers were only followed across two time points, with mind-mindedness and sensitivity measured at the same time point, the true nature of this mediation was masked. By following families over three time points beginning before birth, New FAMS has the exciting possibility of testing whether prenatal mind-mindedness is a precursor to sensitivity at 4 and 14 months. Specifically, the question of whether prenatal mind-mindedness is an antecedent of sensitive behavior is tested. Research so far has implied this might be the case, with prenatal mind-mindedness (as examined in a small sample of 25 couples) associated with both postnatal mind-mindedness (Arnott & Meins, 2008) and infant attachment security (Arnott & Meins, 2007). This chapter adds clarity to the field by examining relations between representational mind-mindedness and ratings of mothers' and fathers' sensitivity during infancy and early toddlerhood.

4.3. Coherence and Sensitivity

To date, researchers examining variation in parenting quality on the basis of parents' representations of their children have mainly compared groups, for example parents categorised as providing balanced versus unbalanced representations (Korja et al., 2010). As a result, specific dimensions of these representations (e.g., warmth, complexity, coherence) are only considered as a factor that contributes to the categorisation of parents. For example, parents whose responses to the WMCI demonstrate clear enjoyment of their relationship with the child, coupled with an appreciation of the child as a distinct individual, are classified as having a balanced representation of their child. In contrast, a parent is classified as having an unbalanced representation of their child if their description either conveys a lack of both emotion and content (i.e., disengaged representation) or offers incomplete, inconsistent or confusing descriptions of the child or the parent-child relationship (i.e., distorted representation). Typically, parents rated as having a balanced representation on the WMCI are more sensitive than those with unbalanced representations during interactions with their child (Schechter et al., 2006; Sokolowski, Hans, Bernstein, & Cox, 2007). Similar findings have been found in studies using the IA (from which the narrative coherence scheme was adapted), with mothers rated as positively insightful (e.g., providing rich and coherent descriptions) displaying more sensitive behaviour than mothers rated as disengaged or one-sided (Koren-Karie et al., 2002). Of particular relevance to the present study are the findings that mothers with representations classified as balanced during pregnancy were rated as displaying more indicators of positive parenting (i.e., high levels of sensitivity and warmth and low levels of controlling manipulation) than those with unbalanced representations (Dayton, Levendosky, Davidson, & Bogat, 2010). Such research extends the developmental scope of the field to date and leads to the hypothesis that in New FAMS mothers classified as 'coherent' during pregnancy would display higher levels of sensitivity during interactions with their infants.

In contrast with the lack of evidence about paternal mind-mindedness and sensitivity, there is evidence to suggest similar group differences in parenting between fathers categorised as holding balanced and unbalanced representations. For example, in a sample of 150 fathers, Hall et al. (2014) found fathers who were categorised as describing a balanced representation of their infant at 6 months (55%) were more likely than fathers with unbalanced representations to display higher levels of sensitivity during interactions when their child was 24 months. However, research examining fathers' prenatal representations has focused upon methodological questions surrounding measurement and stability (e.g.,

Vreeswijk, Maas, Rijk, Braeken, & van Bakel, 2014) rather than examining links with or group differences in subsequent behaviour.

In the current chapter, it is tested whether ratings of coherence from expectant mothers' and fathers' descriptions of their infants are associated with their postnatal sensitivity. As noted in Chapter 3, coherence scores reflect a higher-order capacity which involves the ability to provide a focused, elaborated, separate, warm and complex picture of the infant and parent-infant relationship, that is also low in concern. Researchers have typically dichotomized these scores and made comparisons between mothers categorised as coherent versus incoherent (Sher-Censor et al., 2016). However, as discussed in Chapter 3, expectant parents must meet a stringent criterion to score in the 'coherent' range (i.e., 5 – 7) because the coding scheme was established with mothers of pre-schoolers. Yet, it may be that simply showing some level of coherence, rather than necessarily being within the coherent range, is what is sufficient to predict later sensitivity. Thus, the continuous coherence scores (i.e., range 1 – 7) are used in this thesis and a positive correlation is hypothesized to be present between prenatal coherence and sensitivity.

4.4. Summary

The first goal of this chapter is to address questions surrounding the nature of sensitivity during infancy and toddlerhood. It is hypothesised that parents' sensitivity will (i) be higher in mothers than fathers; (ii) increase from infancy to early toddlerhood; and (iii) be positively associated within couples.

Following this, the second goal of this chapter is to address the questions outlined below surrounding the impact of prenatal thoughts and feelings about the infant on subsequent ratings of parents' sensitivity. By comparing mind-mindedness and coherence as separate predictors I aim to assess the unique contribution of the content and the narrative quality of expectant parents' descriptions of their infants to later behaviour. That is, does variation in *what* is being said (i.e., mind-mindedness) contribute differently to parents' sensitivity than *how* it is being said (i.e., coherence). The two questions are as follows:

1. Does prenatal mind-mindedness and coherence predict observed parental sensitivity at 4 months and 14 months? Are the associations the same for mothers and fathers?

   It is hypothesised that there will be modest associations between prenatal mind-mindedness and coherence scores and parents' sensitivity.

2. What patterns of association are evident within the couple? Are there partner effects in these pathways?

An exploratory approach is adopted to the question of whether partners' prenatal talk would influence individual observed behaviour during infancy. However, in line with previous research suggesting fathers' behaviour is more susceptible to variation in the couple relationship, it is expected that mothers' talk would exert a stronger effect on fathers' sensitivity than vice versa.

Methods

4.5. Procedure

Transcripts of parents' prenatal speech samples were coded for mind-mindedness and narrative coherence in line with the Meins and Fernyhough (2015) and Sher-Censor and Yates (2010) coding manual respectively (for further details see Chapter 3). Mothers' and fathers' sensitivity was coded from free play episodes with their infant at 4 and 14 months using Ainsworth et al.'s (1974) manual (as detailed in Chapter 2).

4.6. Data Screening

First the data was screened to assess the normality of the sensitivity scores. Fathers' ratings of sensitivity at 4 months exhibited a negative skew ($Z_{\text{skewness}} = -2.33$), however visual inspection of the distribution of scores revealed only a slight skew in the normal curve. Histograms of mothers' 4-month sensitivity scores and both fathers' and mothers' 14-month sensitivity scores illustrated normal distributions.

4.7. Plan of Analysis

Prior to exploring associations between prenatal speech sample constructs and postnatal parental sensitivity, parents' sensitivity scores were examined at both time points: differences in scores on the basis of parent and infant gender were examined using a paired-sample *t*-test and an independent-samples *t*-test respectively. Changes in parent sensitivity over time and whether this differed according to parent gender were explored using a repeated measures ANOVA. Actor-Partner Interdependence Models (APIM) were used to examine the relative contribution of the individual versus partner sensitivity at 4 months to individual sensitivity at 14 months (Cook & Kenny, 2005). To test for differences in the strength of the predictive pathways, the saturated APIM was compared to nested models in which actor then partner and then all pathways were constrained to equality. Poor model fit suggests that the pathways are not similar in strength for mothers and fathers and that the nature of the effect is different according to parent gender. Due to the non-normal distribution of the prenatal mind-mindedness scores the robust maximum likelihood method of estimation was used. A full information approach was used so that all cases with data at either time point

could be used in the analyses. This approach is suitable for regression models and produces less biased estimates than traditional missing data handling procedures (Enders, 2001).

To address the second set of questions, Pearson's correlations were used to examine whether individual differences in prenatal mind-mindedness and coherence were associated with postnatal ratings of mothers' and fathers' sensitivity. APIM was again used to examine the relative contribution of the individual versus partners' prenatal speech sample scores to the individual's sensitivity.

Results

4.8. The Nature of Sensitivity during Infancy and Early Toddlerhood

4.8.1. Change over time?

A repeated measures ANOVA showed that mean levels of sensitivity increased significantly over time, $F(1, 170) = 10.83$, $p = .001$, $\eta^2 = .06$. An interaction effect between time point and parent showed that this increase was significantly sharper for mothers than fathers, $F(2, 170) = 18.26$, $p = .000$, $\eta^2 = .10$ (see Figure 4.1).

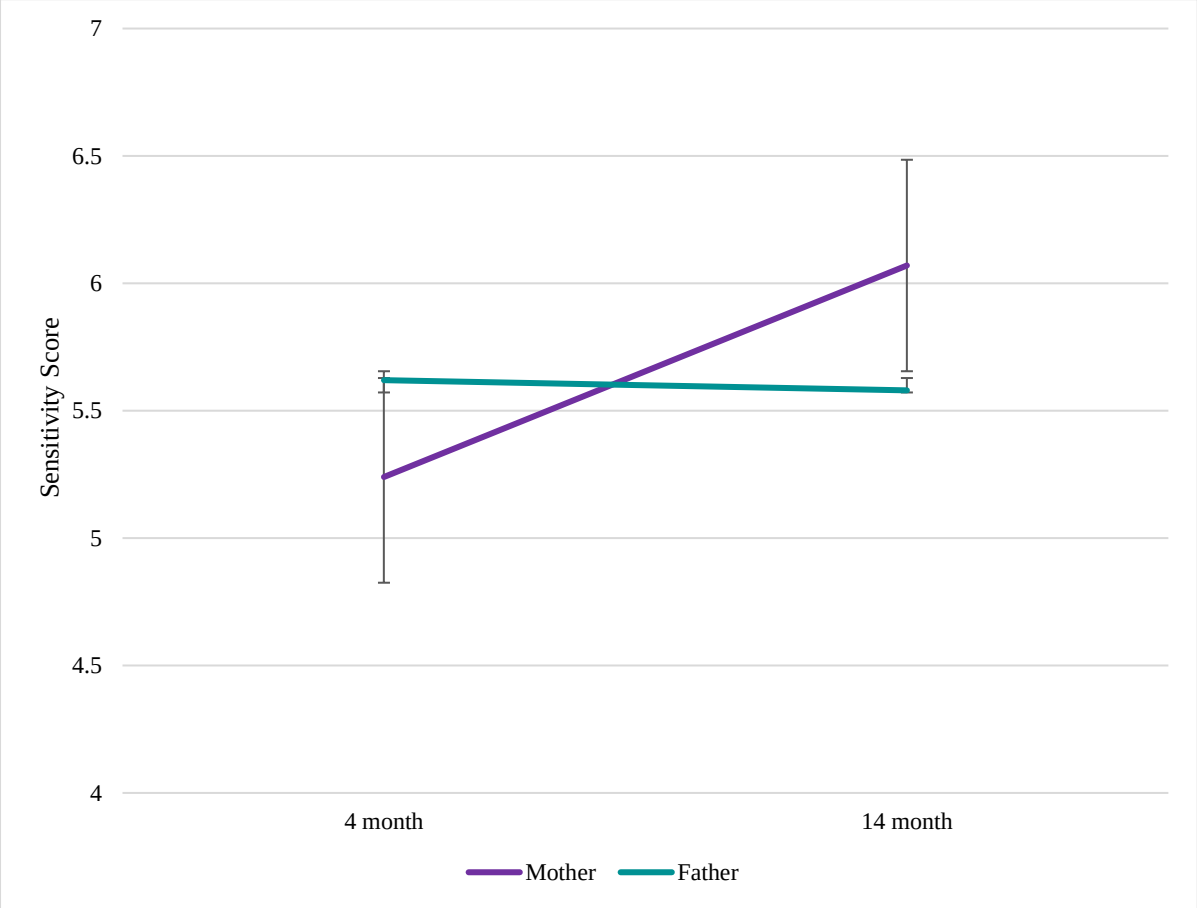


Figure 4.1. Changes in mothers' and fathers' sensitivity from 4 to 14 months.

4.8.2. Is Sensitivity Stable?

A further illustration of this change in mothers' sensitivity over time is the lack of significant association between 4 and 14 months scores (r = .10, p = .181). In contrast, fathers' sensitivity scores at 4 and 14 months were modestly correlated (r = .23, p = .002). As displayed in Figure 4.2, an APIM was specified and showed a significant actor effect from fathers' early sensitivity to later sensitivity. The model constraining partner pathways to equality had an acceptable fit, χ^2 (6) = 2.04, p = .916, RMSEA = 0.00, CFI = 1.00, TLI = 3.01. The model constraining actor pathways to equality had a poor fit, demonstrating that the actor pathways differed in strength for mothers and fathers. Thus, for fathers only, sensitivity at 4 months was positively related to sensitivity at 14 months and neither parents' sensitivity contributed to their partners' later sensitivity scores.

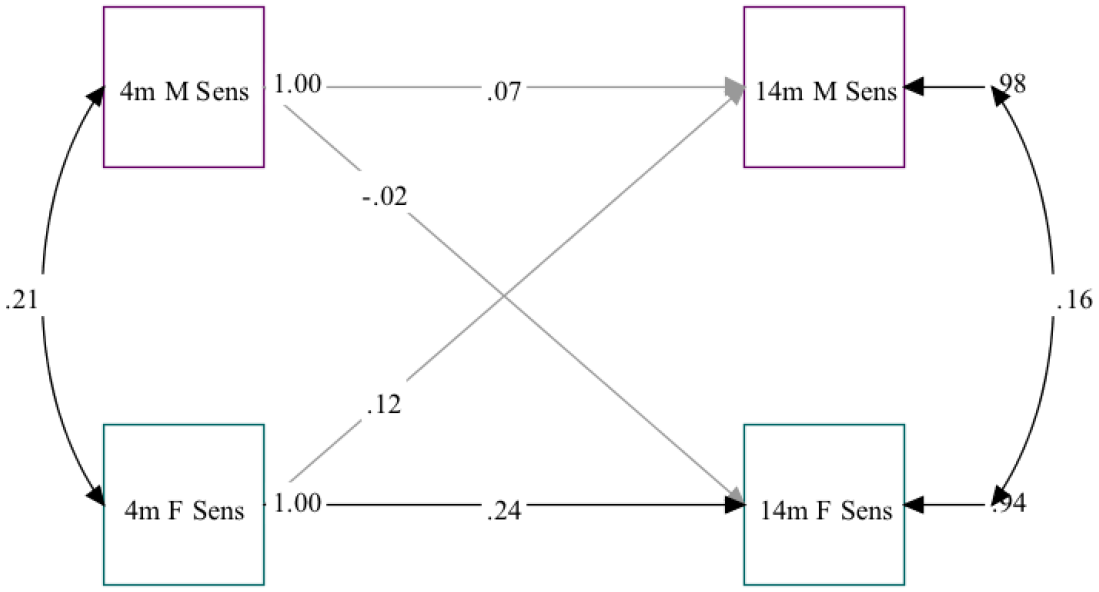


Figure 4.2. Actor-partner interdependence model displays standardised estimates of sensitivity at 4 months on sensitivity at 14 months.

4.8.3. Gender differences?

As highlighted above, at 4 months fathers were, on average, rated as more sensitive (M = 5.62, SD = 1.72) than mothers, (M = 5.24, SD = 1.65), $t(186) = 2.63$, $p = .009$, Cohen's d = 0.25. In contrast, at 14 months mothers, on average, were rated as more sensitive (M = 6.07, SD = 1.53) than fathers (M = 5.58, SD = 1.60), $t(180) = 3.46$, $p = .001$, Cohen's d = 0.33. Ratings of parental sensitivity did not significantly differ according to infant gender, though at 14 months there was a trend to suggest that mothers were, on average, more sensitive with daughters (M = 6.28, SD = 1.34) than with sons (M = 5.91, SD = 1.66), $t(189) = 1.70$, $p = .092$, Cohen's d = 0.24. At both 4 and 14 months, mothers' and fathers' sensitivity scores were modestly associated ($r_4 = .21$, $p = .004$, and $r_{14} = .18$, $p = .017$).

Due to the modest group difference at 14 months in sensitivity between mothers of infant boys and mothers of girls, two separate APIMs were specified to examine stability in sensitivity for parents of boys and girls. Standardised path coefficients for parents with girls are displayed in Figure 4.3 and show both actor and partner effects. Models constraining actor, then partner and then all pathways to equality had a poor fit, suggesting the pathways were significantly different in strength for mothers and fathers. Specifically, for parents with girls, mothers' early sensitivity was positively associated with both her own and her partners' later sensitivity. In contrast, fathers' early sensitivity was inversely related to mothers' later sensitivity.

Standardised path coefficients are displayed in Figure 4.4 for parents with boys and show a significant actor effect from fathers' early sensitivity to later sensitivity. The model constraining actor pathways to equality had a poor fit whilst the model constraining partner pathways to equality had an acceptable fit, χ^2 (6) = 2.04, $p = .916$, RMSEA = 0.00, CFI = 1.00, TLI = 3.01. In line with the results from the overall model, for parents with sons, fathers' sensitivity at 4 months was positively related to sensitivity at 14 months.

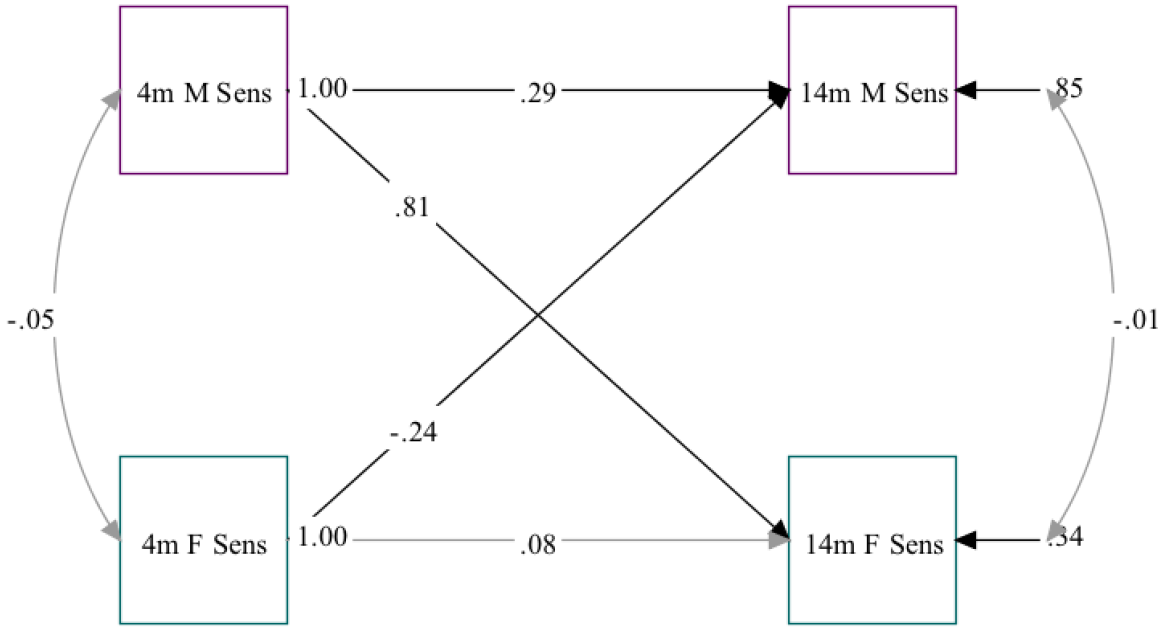


Figure 4.3. Actor-partner interdependence model displays standardised estimates of sensitivity at 4 months on sensitivity at 14 months for parents with daughters.

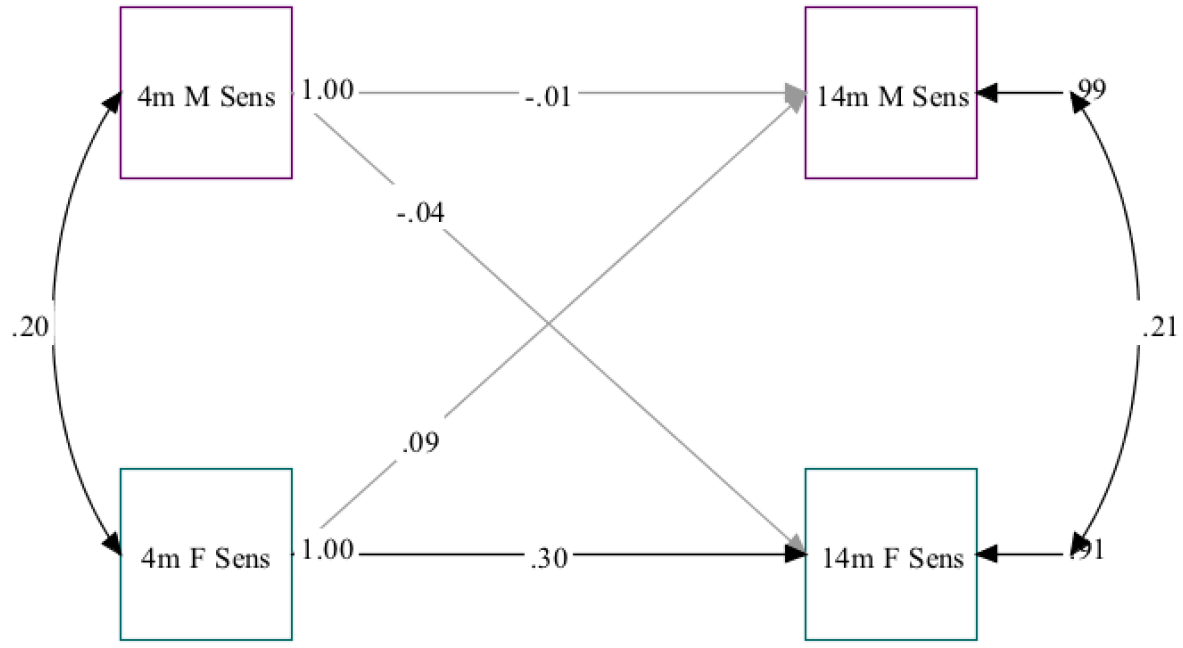


Figure 4.4. Actor-partner interdependence model displays standardised estimates of sensitivity at 4 months on sensitivity at 14 months for parents with sons.

4.9. Prenatal Speech Samples and Postnatal Sensitivity

4.9.1. Are Prenatal Mind-Mindedness and Coherence Associated with Observed Parental Sensitivity at 4 and 14 months?

Table 4.1 presents the correlations between the prenatal mind-mindedness and coherence and postnatal sensitivity for mothers and fathers and highlighted nonsignificant associations.

Table 4.1.
Correlations and Bayes Factor Scores between Prenatal Speech Sample Constructs and Sensitivity

	Mother		Father	
	4m Sens	14m Sens	4m Sens	14m Sens
Coherence	.06	.04	.05	.12
	10.70	8.17	10.78	2.06
Mind-mindedness	.04	.03	.06	.11
	9.36	9.94	8.24	4.01

Note. Bayesian factor scores (BF_{01}); shading indicates moderate to strong evidence to support the null hypothesis.

To examine these associations further, Bayes factors were calculated for each of the correlations using *JASP* Version 0.7.5.6 (2017). Bayes factors provide a quantifiable measure of the evidence in favour of the alternative (BF_{10}) or null hypothesis (BF_{01}), by computing the probability of the observed data under the null hypothesis vis-à-vis the alternative hypothesis (Wetzels & Wagenmakers, 2012). Interpretation of these scores is judged on the strength of the evidence required to suggest the alternative hypothesis is true, such that the evidence is considered as anecdotal (1 – 3), substantial (3 – 10), strong (10 – 30) or very strong (30 – 100) (Jeffreys, 1961). Looking at fathers' mind-mindedness and sensitivity, the Bayes factors suggested that there is moderate evidence that the null hypothesis is true (i.e., scores range 4.01 – 10.78). Similarly, interpretation of the Bayes factor suggests that there is strong evidence that there is no association between fathers' prenatal coherence and sensitivity at 4 months. However, the Bayes factor suggest that the evidence there is no association between coherence and sensitivity at 14 months is only anecdotal. This finding appears to be in line with the more future-oriented content provided by expectant fathers in their prenatal speech samples. That is, it appeared that compared to expectant mothers, expectant fathers appeared more likely to describe an older child rather than an infant, thus the prenatal descriptions may reflect fathers' expectations of and preparation for interactions with an older toddler/child rather than an infant. Turning to mothers, the Bayes factors suggested that there is moderate

to strong evidence that the null hypothesis is true. In other words, there is no association between prenatal mind-mindedness and coherence and sensitivity at 4 and 14 months (i.e., scores range 8.17 – 10.70). Thus, overall it appeared that the prenatal measures were not associated with later parent sensitivity. However, more research is required before dismissing the association between fathers' prenatal coherence and sensitivity.

4.9.2. What Patterns of Association are Evident Within the Couple?

APIM was applied to examine whether (i) the association between prenatal mind-mindedness and coherence and sensitivity was comparable in strength for mothers and fathers and whether (ii) partner speech sample constructs contributed to individual sensitivity.

The model looked at the relative strength of the actor and partner pathways between pregnancy and 4-month sensitivity to sensitivity at 14 months. Standardised path coefficients are displayed in Figure 4.5 and show only significant actor effects from fathers' sensitivity at 4 months to sensitivity at 14 months and show no statistically significant actor or partner effects from prenatal mind-mindedness and coherence to 4-month sensitivity. Examination of the associations between the independent variables showed no significant associations between the prenatal speech sample constructs and sensitivity at 4 months. The model constraining all pathways to equality had an acceptable fit, χ^2 (10) = 5.11, p = .884, RMSEA = 0.00, CFI = 1.00, TLI = 1.62, suggesting the pathways were similar for mothers and fathers. Thus, although significant, the actor effects from fathers' 4-month sensitivity to 14-month sensitivity did not significantly differ from the corresponding nonsignificant actor effect for mothers.

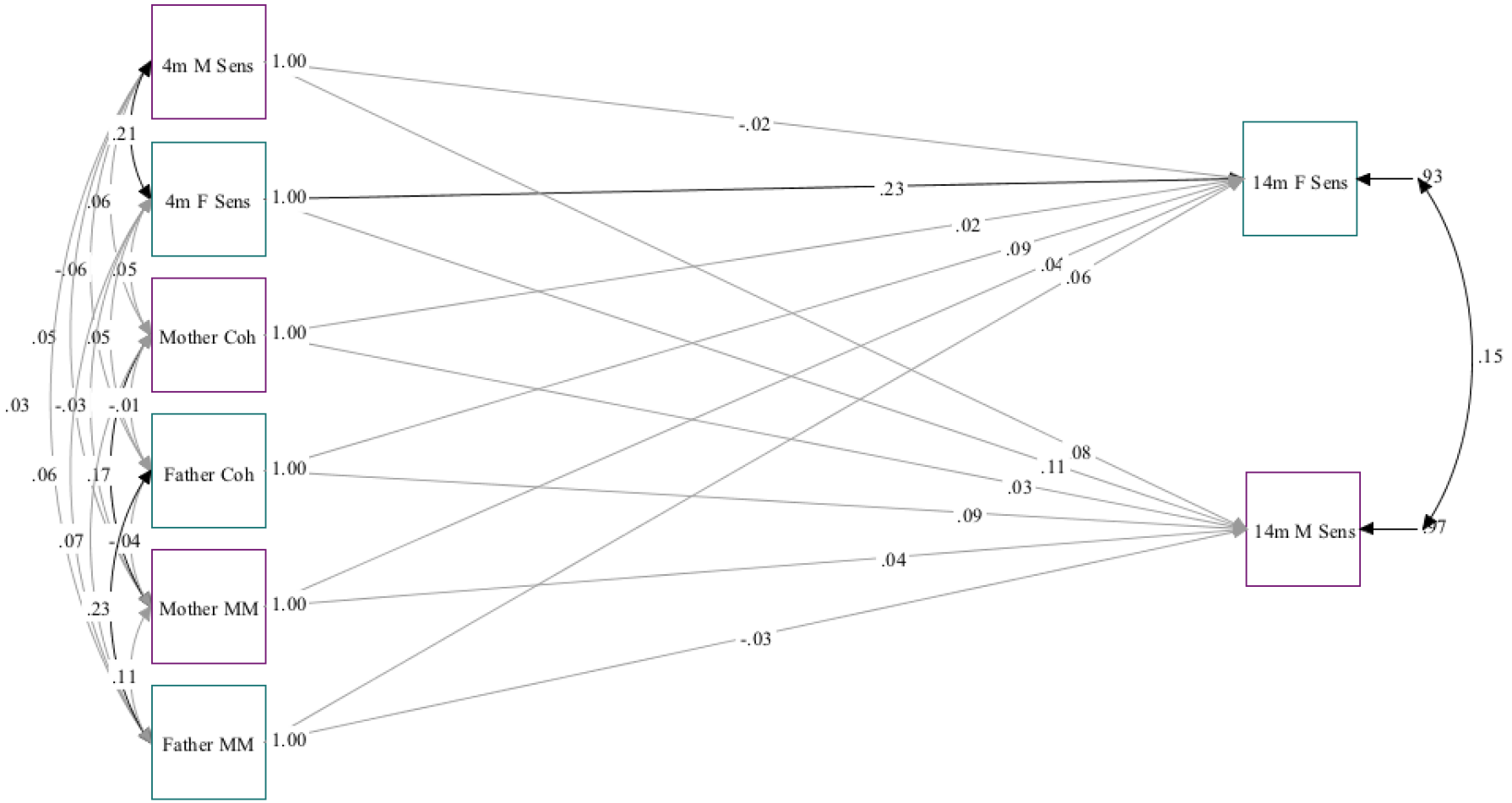


Figure 4.5. Actor-partner interdependence model displays standardised estimates of prenatal mind-mindedness, coherence and sensitivity at 4 months on parents' sensitivity at 14 months.

4.10. Summary of Results

Three key findings emerged in this chapter, which examined associations between parents' prenatal mind-mindedness and coherence and their observed postnatal sensitivity. First, at 4 months, fathers were rated as more sensitive in their interactions with their infants than mothers. The increase in mothers' sensitivity from 4 to 14 months was sharper for mothers than for fathers so that by 14 months mothers on average received higher ratings than fathers. Second, individual differences in sensitivity were significantly more stable for fathers than mothers. When this association over time was examined separately by child gender, this pattern held for parents of sons, but parents of daughters showed stability in mothers' sensitivity as well as interpersonal effects. Specifically, mothers' early sensitivity was positively related to fathers' later sensitivity whilst fathers' early sensitivity was *inversely* related to mothers' later sensitivity. Finally, parents' prenatal coherence or mind-mindedness was not related to their later sensitivity.

Chapter 5. Mind-Mindedness Across the Transition to Parenthood

When asked to reflect on her journey to parenthood one mother in the New Fathers and Mothers Study said, *"I didn't realise my baby would start to be a little person so early."* This mothers' surprise at her own developing understanding of her infant perhaps reflects a more general emerging awareness of parents' tendency to think of their children beyond an infant that has physical but perhaps also as a distinct individual in their own right. In Chapter 3 the descriptions expectant parents provided of their unborn infants were shown to display striking variability in the extent to which they are mind-minded and coherent. In Chapter 4 mothers' tendency to respond to infants' cues in an appropriate and timely manner increased from 4 to 14 months, however expectant parents' proclivity to provide mind-minded or coherent descriptions of the unborn infant during pregnancy was not related to this sensitive behaviour at 4 or 14 months for the sample overall. This chapter explores changes in mind-mindedness across the transition to parenthood and, as examined in Chapter 3, associations with key individual, couple or child characteristics at each postnatal time point. My aim is to examine the similarity in maternal and paternal mind-mindedness and contribute to the debate surrounding the extent to which mind-mindedness should be seen as a purely relational construct. In adding to this knowledge base, I will also highlight the utility of using the representational measure of mind-mindedness during infancy.

5.1. Mind-Mindedness: Change Over Time?

Though limited, research to date has established that variation in parents' tendency to be mind-minded is relatively stable across infancy for parent-child interactions. For example, Meins et al. (2011) showed that the proportion of parents' appropriate mind-related comments were strongly associated from 3 to 7 months. However, as researchers working with infants almost exclusively adopt the observational measure of mind-mindedness, understanding of the broader construct is incomplete. A small-scale study of 32 highly educated parents of pre-schoolers found that though the observational and representational measures of mind-mindedness were stable over a period of 9 months, they were not associated with each other either concurrently or over time (Illingworth, MacLean, & Wiggs, 2016). In contrast, McMahon et al. (2016) observed 132 women interacting with their infants at ages 7 and 19 months to measure observational mind-mindedness and at 19 months also asked mothers to describe their toddlers in order to measure representational mind-mindedness. Partially supporting the notion of stability, the frequency of mothers' appropriate (but not non-attuned) mind-related comments at 7 months predicted appropriate mind-related comments at 19 months. In addition, although appropriate mind-related

comments at 7 months were not associated with the tendency to produce mind-minded descriptions at 19 months (though there were associations between the observational and representational measures at 19 months). The researchers tentatively conclude that, firstly, there is reason to suggest there is some degree of stability in mind-mindedness (across a 12-month window) and, secondly, the two different measures of mind-mindedness appear to tap the same construct.

Within this chapter I will test the hypothesis that mind-mindedness increases over time, with greater gains expected between the prenatal and first postnatal time point. In line with research examining observational mind-mindedness, individual differences in parents' mind-mindedness are expected to be stable over time. Contrasting levels of stability across a similar time for the observational and representational measures of mind-mindedness would suggest that these measures cannot be used interchangeably.

5.2. Mind-Mindedness: Purely Relational?

Meins et al. (2014) has argued that parental mind-mindedness reflects the quality of the parent-child relationship and is not associated with personal characteristics, for example education or mental health (see discussion in Chapter 3) or synonymous with the general ability to reflect on mental states (Devine & Hughes, 2017b). To test this view, Hill and McMahon (2016) invited 103 mothers to provide descriptions of their pre-schooler, partner, and a famous person. Participants also completed the Balanced Index of Psychological Mindedness (Nyklíček & Denollet, 2009), which measures individual insight (e.g., awareness of mental state leading to action), interest in being in-tune with their own psychological state and concern for others' psychological processes. Mirroring the results of Meins et al. (2014), the frequency of mentalistic descriptions of a famous person were significantly lower than for a child or partner, whilst there were similar proportions of mental attributes in the descriptions mothers gave of their pre-school children and partners (Hill & McMahon, 2016). Increased interest in others' minds was associated with more mind-minded descriptions of children and partners, however there was no association between mothers' insight and mind-mindedness. Taken together with the findings from other studies (e.g., Barreto et al., 2015), this suggests that mind-mindedness and mentalising are distinct and that mind-mindedness is more common in close relationships. However, Hill and McMahon (2016) emphasise that it is still not possible to conclude that mind-mindedness reflects the quality of the relationship rather than simply familiarity and that the association between mind-mindedness and interest in other minds does not rule out the role of personality or trait associations.

Across the transition to parenthood, parents continue to develop a relationship with their infant and, arguably, for many such a relationship has yet to emerge during pregnancy. This might imply that when the parent-child relationship is still being established mind-mindedness would be more subject to influence from other factors. However, as noted in Chapter 3, parent education was only modestly associated with the frequency of expectant mothers' mental descriptors of their infant and fathers' anxiety was only marginally associated with the proportion of mind-minded descriptions. In the only previous study to adopt the representational measure of mind-mindedness during infancy, Farrow and Blissett (2014) found lower levels of maternal mind-mindedness compared with parents of pre-schoolers but no contrasts by infant gender, maternal age or occupational code (though education was not reported).

In this chapter I present the first account of both mothers' and fathers' descriptions of their infants collected at three time points across the transition to parenthood. In doing so I also examine associations with other factors. Specifically, I explore whether key demographic, individual (e.g., mental health) and couple variables are associated with mind-mindedness as the parent-child relationship continues to develop.

5.3. Mind-Mindedness: Child-Driven?

As noted in Chapter 3, researchers have found mind-mindedness to vary according to certain child characteristics, for example, increasing with child age (Bernier & Dozier, 2003; Degotardi & Sweller, 2012) and reducing with perceived infant temperamental difficulty (Demers et al., 2010). Interestingly, McMahon et al. (2016) found child gender was important, with mothers of sons providing more mind-related descriptors of their toddlers than mothers of daughters. However, such results are not consistently reported and effects of infant gender have received very little attention. Over the first two years of life children go through rapid changes and achieve important developmental milestones (e.g., mobility increases, language begins to develop). As a result, not only does the child become a more active social partner, but as they enter their second year of life infants develop new ways of expressing themselves and behaving that make their thoughts, feelings and desires more transparent. The new behaviours parents observe may elicit mind related comments or mind-minded descriptions. For example, as parents begin to discipline their child they come to appreciate whether they understand certain commands (e.g., learning "no" or "don't touch"). In further support of the idea that mind-mindedness might increase over infancy, prior studies have established that mothers' use of mental state language increases across development (Hughes, 2011) and that parents perceive older children, especially girls, as more intentional

than younger infants (Reznick, 1999). As such I expect to see both age-related increases in parents' use of mind-related descriptors and gender specific contrasts, specifically higher levels of mind-mindedness for girls than boys. Within this chapter I will provide the first account of how specific child characteristics (including: gender, temperament, language, behaviour and affect) are associated with parents' tendency to describe their child in a mind-minded fashion.

5.4. Summary

Three sets of questions guide the current chapter; answering each should add to understanding of the nature of representational mind-mindedness during infancy and test the developmental scope of this measure.

1. Do parents' descriptions of their infants become more mind-minded across the transition to parenthood? How stable are individual differences in mind-mindedness across infancy?

Mind-mindedness is expected to increase from pregnancy to the first postnatal visit as the infant is no longer an abstract concept. Likewise, an increase in mind-mindedness is expected from 4 to 14 months, as infants develop and parents continue to strengthen their relationships with their children. Individual differences in parents' tendency to make appropriate mind-related comments appear relatively stable during interactions and so a similar stability is expected for variation in parents' tendency to describe mind-related comments, alongside an increase from 4 to 14 months. Interestingly, despite the different physical experience of pregnancy, expectant mothers and fathers did not, on average, differ in their tendency to provide mind-minded descriptions. As such, no differences between mothers and fathers are expected at 4 and 14 months.

2. Is variation in parents' tendency to produce mind-minded description of their infants associated with parents' demographic characteristics, wellbeing or couple relationship quality?
    a. How stable are these associations across time points (when the infants are aged 4 and 14 months)?
    b. And are they similar for mothers and fathers?

During pregnancy, there were limited associations between parental mind-mindedness and parent demographics, mental health or couple relationship quality. However, anxious expectant fathers produced more mind-minded descriptions and expectant fathers who reported more satisfaction in their couple relationship gave more coherent descriptions of

their unborn infant, indicating that their descriptions were susceptible to spill-over effects from other domains. These prenatal associations were not evident for expectant mothers. Based on these findings, I hypothesize that these correlates will be more evident in fathers' than mothers' postnatal mind-mindedness.

3. Are infant cognitive or emotional characteristics associated with parents' tendency to produce mind-minded descriptions of their infants?
    a. How stable are these associations across time points (when the infants are aged 4 and 14 months)?
    b. And are they similar for mothers and fathers?

Reflecting the inconsistent evidence that parents' mind-mindedness varies as a function of child characteristics, an exploratory approach is adopted in this chapter, although child gender contrasts are expected to favour girls.

Methods

5.5. Procedure

As detailed in Chapter 2, transcripts of parents' speech samples were coded for mind-mindedness in line with the Meins and Fernyhough (2015) coding manual (described in Chapter 3). Double coding of 20% of the speech samples was completed and coder drift was checked during the coding period. ICC's were excellent for mental (4 months = .91; 14 months = .92) and non-mental attributes (4 months = .84; 14 months = .83).

5.6. Data Reduction

To control for effects of verbal fluency, proportional mind-mindedness scores rather than frequency scores are presented in this chapter. In order to examine further change in mind-mindedness over time, difference scores between mind-mindedness scores at each time point are also used for each parent (i.e., prenatal to 4 months, 4 months to 14 months and prenatal to 14 months). Inspection of histograms showed these difference scores were normally distributed (see Appendix 5.1).

Child affect was coded from the Still-Face and 'Don't Touch' parent-child task at 4 and 14 months respectively. Both infant positive and negative affect alongside infant gaze are coded from the Still-Face paradigm (Tronick et al., 1978). Typically, three scores are created by comparing change in infant behaviour across the three episodes of the still-face; the baseline where the parent and infant interact as normal, the still-face where the parent ceases interaction and adopts a neutral face and the reunion where normal face-to-face interaction is resumed. The *still-face effect score* reflects the change in affect or gaze from the baseline to

the still-face episode (i.e., negative affect is expected to increase). The *recovery score* reflects the change in affect or gaze from the still-face episode to the recovery episode (i.e., positive affect and infant gaze is expected to increase). The *carry-over score* reflects the change in affect or gaze from baseline to the recovery episode (i.e., negative affect is expected to increase). For reasons of space only the findings from the positive affect scores, which showed greater variability over time than the negative affect scores, will be presented. In the present chapter, high scores reflect the expected or typical phenomenon in the literature (Mesman, van Ijzendoorn, & Bakermans-Kranenburg, 2009). That is, a high still-face score reflects a decrease in positive affect from the baseline to still-face, a high recovery score reflects an increase from the still-face to reunion and a high carry-over score reflects a decrease from the baseline to the reunion. The 14-month child affect scores reflect average levels of positive or negative affect shown by the child during the 4-minute 'Don't Touch' task, where the child is told by his or her parent not to play with a set of attractive colourful toys. The Parent Child Interaction Coding Scheme (PARCHISY; Deater-Deckard et al., 1997) was used to displays of infants' positive affect (e.g., smiles, laughter) and negative affect (e.g., frowns, cries). The presence of these behaviours was rated on a 7-point global scale, with a high score reflecting high levels of affect.

5.7. Data Screening

First the data were screened to assess the normality of the distributions. Field (2013) recommends visual inspection of data in large samples (N ≥ 200) as interpretation of the significance of the skew statistic (i.e., $Z_{\text{skewness}} = \frac{S-0}{\text{SE}_{\text{skewness}}}$) can be misleading due to the presence of small standard errors. With this in mind, parent reports of child expressive vocabulary at 14 months and ratings of infant negative affect during the Still-Face paradigm were excluded from further analysis due to the data exhibiting a strong positive skew (i.e., most infants were unable to express any words). The questionnaires tapping into parent wellbeing were expected to have a non-normal distribution (Bebbington et al., 1998). At 4 months, there was an outlier within the scores for mothers' couple relationship quality and so to correct for this inflation in error this score was Winsorised (i.e., Mean + 3 SD) or "*moved closer to the good data*" (Hampel, Ronchetti, Rousseeuw, & WA, 1986, p. 69).

5.8. Plan of Analysis

A repeated measures ANOVA was used to explore whether mind-mindedness changed over time and whether this differed according to parent gender. Pearson's correlations were used to examine the stability of individual differences in mind-mindedness

and two hierarchical regressions (i.e., for mother and father) were conducted in order to establish how much of the variation in 14-month mind-mindedness could be explained by prenatal and 4-month mind-mindedness. Following this, Actor-Partner Interdependence Models (APIM) were chosen to examine whether the stability between time points (e.g., prenatal to 4 months, 4 months to 14 months, and prenatal to 14 months) differed in strength between mothers and fathers. Pearson's correlations between mothers and fathers mind-mindedness also allowed for within-couple associations to be established (i.e., how similar are partners to each other). APIM allows for further exploration of the relative contribution of the individual versus the partners scores to the individual's outcome (i.e., actor versus partner effect), for example, whether early maternal mind-mindedness is associated with both later maternal or paternal mind-mindedness or vice versa.

Pearson's correlations were used to explore the associations between mind-mindedness (both proportion scores from each time point and changes over time), demographics, mental health, couple satisfaction and child characteristics when the infants were aged 4 and 14 months. The parent and child characteristics that were significantly associated with changes in mind-mindedness over time were entered as predictors of these mind-mindedness difference scores in separate hierarchical regressions. Additional APIMs were used to assess the relative strength of predictors of change in mind-mindedness for mothers and fathers (i.e., difference scores).

The contribution of significant child/parent characteristics to parents' mind-mindedness at 14 months was explored using auto-regressive models, these models allow for an understanding of the unique contribution of child/parent characteristics whilst controlling for the stability of mind-mindedness. Brown's (2006) criteria was used to assess model fit: nonsignificant chi-square, root mean square error of approximation (RMSEA) $\leq .06$, comparative fit index (CFI) $\geq .90$ and Tucker-Lewis Index (TLI) $\geq .90$. Due to the non-normal distribution of the prenatal mind-mindedness scores the robust maximum likelihood (MLR) method of estimation was used. A full information approach was used so that all cases with data at either time point could be used in the analyses. This approach is suitable for regression models and produces less biased estimates than traditional missing data handling procedures (Enders, 2001).

Results

5.9. Preliminary Analyses

Before exploring associations with mind-mindedness, the associations between demographic, wellbeing and couple relationship quality variables at 4 and 14 months were examined to allow for an understanding of stability in these measures and as such whether any associations between these measures and mind-mindedness were independent. As shown in Table 5.1, all measures showed moderate to strong stability from 4 to 14 months. The extent to which couples are similar in these constructs is also displayed in Table 5.1. Couple relationship quality was strongly associated between partners but associations between partners' mental health were only at trend level at 4 months but appeared stronger by 14 months. Tables 5.1 also displays within-person associations for mothers' and fathers' wellbeing and couple relationship variables. Just as during pregnancy, for both mothers and fathers and at 4 months and 14 months, there was a strong association between couple relationship quality and life satisfaction. As was the case prenatally, couple relationship quality and satisfaction with life were more strongly associated for fathers than mothers (4 months: $z = 2.55$, $p = .011$, 14 months: $z = 1.74$, $p = .082$).

Table 5.1.
Correlations between Parents' Wellbeing and Couple Relationship Quality Measures between 4 and 14 months

		1.	2.	3.	4.	5.	6.	Similarity mothers – fathers
1.	4m MHFS	-	-.59**	-.31**	.55**	-.37**	-.22**	.10
2.	4m SWL	.48**	-	-.47**	-.31**	.59**	.41**	.07
3.	4m Rel	-.20**	-.24**	-	-.20**	.32**	.72**	.44**
4.	14m MHFS	.49**	-.27**	-.04	-	-.41	-.35**	.30**
5.	14m SWL	-.33**	.67**	.18*	-.46**	-	.44**	.09
6.	14m Rel	-.30**	-.29**	.56**	-.25**	.28**	-	.47**

Note. MHFS = Mental Health Factor Score; SWL = Satisfaction with Life; Rel = Couple Relationship Quality. Mothers bottom diagonal; Fathers top diagonal.
* $p < .05$. ** $p < .001$.

Testament to the notion of assortative mating (e.g., Luo & Klohnen, 2005), partners show strong similarities in terms of age (r = .68), education (r = .47), perceived social standing (r = .40) and income (r = .42). Tables 5.2 displays within-person associations for mothers' and fathers' demographic variables and shows all measures showed moderate to strong stability from 4 to 14 months.

Table 5.2.
Correlations between Parents' Demographic Measures between 4 and 14 months

		1.	2.	3.	4.	6.	6
1.	Education	-	.05	.25**	.44**	.05	.31**
2.	Age	.13+	-	.08	-.01	.12	-.09
3.	4m Income	.19**	.12	-	.36**	.53**	.26**
4.	4m Ladder	.39**	.16*	.23**	-	.36**	.69**
5.	14m Income	.23**	.28**	.30**	.25**	-	.33**
6.	14m Ladder	.30**	.10	.25**	.68**	.34**	-

Note. Mothers bottom diagonal; Fathers top diagonal.
** $p < .001$.

5.10. Do Parents' Descriptions of their Infants Become More Mind-Minded Across the Transition to Parenthood?

Supporting the above hypothesis, a repeated measures ANOVA showed that mean levels of mind-mindedness increased significantly over the three time points, $F(2, 340) = 136.72$, $p = .000$, $\eta^2 = .45$. Post-hoc analyses showed that there was a mean difference between each time point. That is, mind-mindedness increased significantly from pregnancy to both 4 and 14 months but also significantly increased from 4 to 14 months. This increase over time interacted significantly with parent gender, $F(2, 340) = 3.46$, $p = .033$, $\eta^2 = .02$. In particular, the increase in mind-mindedness between pregnancy and 4 months was significantly steeper for mothers than fathers (see Figure 5.1).

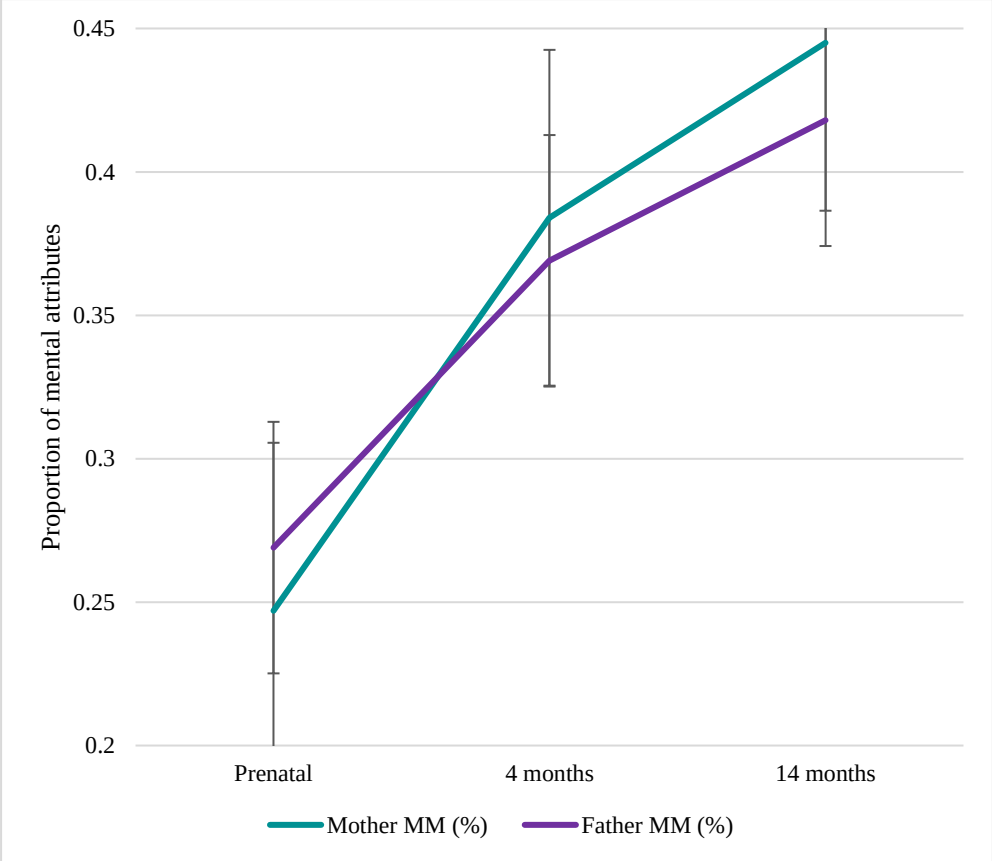


Figure 5.1. Mind-mindedness increases across the transition to parenthood.

Difference scores between mind-mindedness scores at each time point (i.e., prenatal to 4 months, 4 months to 14 months and prenatal to 14 months) showed, on average, gains for both parents between each of the three time points. However, mind-mindedness decreased between time points for a sizeable minority. Specifically, 22% of mothers and 34% fathers decreased from pregnancy to 4 months, 30% of mothers and 30% fathers decreased from 4 to 14 months and 14% of mothers and 25% fathers decreased from pregnancy to 14 months. On

average, fathers with daughters showed greater gains from pregnancy to 4 months (M = .14, SD = .25) than did fathers with sons, (M = .05, SD = .24), t(181) = 2.32, p = .021, Cohen's d = 0.37. In contrast, mothers with sons showed, on average, greater gains from pregnancy to 14 months, (M = .22, SD = .19), than did mothers with daughters, (M = .17, SD = .18), t(181) = 2.18, p = .031, Cohen's d = 0.38.

5.11. Are Individual Differences in Mind-Mindedness Stable Across Infancy?

Table 5.3 illustrates the correlations between mind-mindedness at each time point for mothers and fathers, as well as within-couple associations. Mothers' mind-mindedness was significantly positively associated at each time point, though as expected the association was stronger between the postnatal time points. Interestingly, for fathers, mind-mindedness was significantly associated between the two postnatal time points and between the prenatal and 14-month time points, but not between pregnancy and 4 months. Mothers' and fathers' mind-mindedness scores were positively associated at 4 months and mothers' mind-mindedness at 4 months was positively associated with fathers' mind-mindedness at 14 months.

Table 5.3.
Descriptive Statistics and Correlations for Mothers' and Fathers' Mind-mindedness Scores Across Three Time Points

		1.	2.	3.	4.	5.	6.	*M*	*SD*	Range
1.	T1 Mother MM	-						.25	.18	.00 – .80
2.	T2 Mother MM	.14*	-					.39	.13	.08 – .69
3.	T3 Mother MM [a]	.21**	.32**	-				.45	.12	.14 – .78
4.	T1 Father MM	.11	.03	.02	-			.27	.20	.00 – .79
5.	T2 Father MM	-.09	.27**	.10	-.06	-		.36	.13	.00 – .84
6.	T3 Father MM	.08	.19**	.06	.22**	.16*	-	.42	.42	.00 – .79

Note. T1 = prenatal; T2 = 4-months; T3 = 14-months. MM = mind-mindedness.
[a] = mothers, on average, significantly higher than fathers.
* p < .05. ** p < .01.

To examine further stability in individual differences in mind-mindedness, separate hierarchical regressions were conducted for mothers and then fathers. The first regression tested whether mothers' mind-mindedness during pregnancy and at 4 months significantly predicted mind-mindedness at 14 months. The results indicated that the two predictors overall explained 12% of the variance, R^2 = .12, F(2, 179) = 12.28, p = .000, with prenatal mind-mindedness significantly predicting 4% (β = .16, p = .040) and 4-month mind-mindedness explaining an additional 8% of the variance (β = .29, p = .000) (see Figure 5.2).

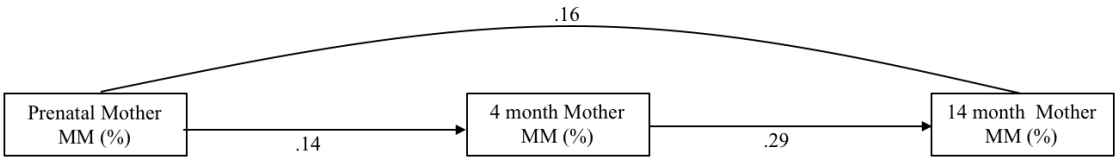


Figure 5.2. Regression model displaying mothers' prenatal and 4-month mind-mindedness on 14-month mind-mindedness.

The second regression tested whether fathers' mind-mindedness during pregnancy and at 4 months significantly predicted mind-mindedness at 14 months. The results indicated that the two predictors overall explained 7% of the variance, R^2 = .07, F(2, 179) = 7.18, p = .001, with prenatal mind-mindedness significantly predicting 5% (β = .22, p = .002) and 4-month mind-mindedness explaining an additional 2% of the variance (β = .17, p = .031) (see Figure 5.3).

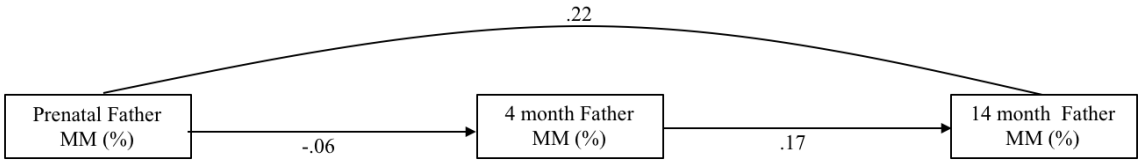


Figure 5.3. Regression model displaying fathers' prenatal and 4-month mind-mindedness on 14-month mind-mindedness.

Following this, an APIM was specified to examine whether the stability of mind-mindedness between each time point was comparable in strength for mothers and fathers and to examine whether partner mind-mindedness contributed to individual mind-mindedness. A model examining mind-mindedness at all three time points, did not show a good fit to the data, χ^2 (4) = 15.40, p = .003, RMSEA = 0.12, CFI = 0.79, TLI = 0.25. As such separate models were specified between each time points. The first model looked at the relative strength of the actor and partner pathways between pregnancy and 4 months. Standardised path coefficients, displayed in Figure 6.4, show only marginal actor effects from mothers' prenatal to 4-month mind-mindedness. To test for differences in the strength of the predictive pathways, the saturated APIM was compared to nested models in which actor then partner and then all pathways were constrained to equality. Only the model constraining partner effects to equality had an acceptable fit, χ^2 (1) = 1.31, p = .253, RMSEA = 0.04, CFI = 0.98, TLI = 0.92, suggesting stability in mothers' and not fathers' mind-mindedness and no partner effects.

The next model looked at the relative strengths of the actor and partner pathways from 4 to 14 months. Standardised path coefficients, displayed in Figure 6.4, show significant actor and partner effects from mothers' 4-month mind-mindedness to 14-month mind-mindedness. To test for differences in the strength of the predictive pathways, the saturated APIM was compared to nested models in which the actor, then partner, and then all pathways were constrained to equality. Each model had a poor fit suggesting the strength of the actor and partner associations were significantly different between mothers and fathers, indicating stability only for mothers.

The final model looked at the relative strength of the actor and partner pathways between pregnancy to 14 months. Standardised path coefficients, displayed in Figure 5.4, show significant actor effects for mothers and fathers. To test for differences in the strength of the predictive pathways, the saturated APIM was compared to nested models in which actor then partner and then all pathways were constrained to equality. As a robust maximum likelihood estimator was used in the analyses, the χ^2 difference between each nested model and the comparison model was calculated using the Satorra-Bentler χ^2 difference test (Satorra & Bentler, 2010). A model constraining all pathways to equality did not significantly worsen model fit when compared to a model which only applied equality constraints to actor pathways, χ^2 (2) =.39, p = .533. This suggests an actor-only pattern of significant intrapersonal but nonsignificant interpersonal effect for both mothers and fathers.

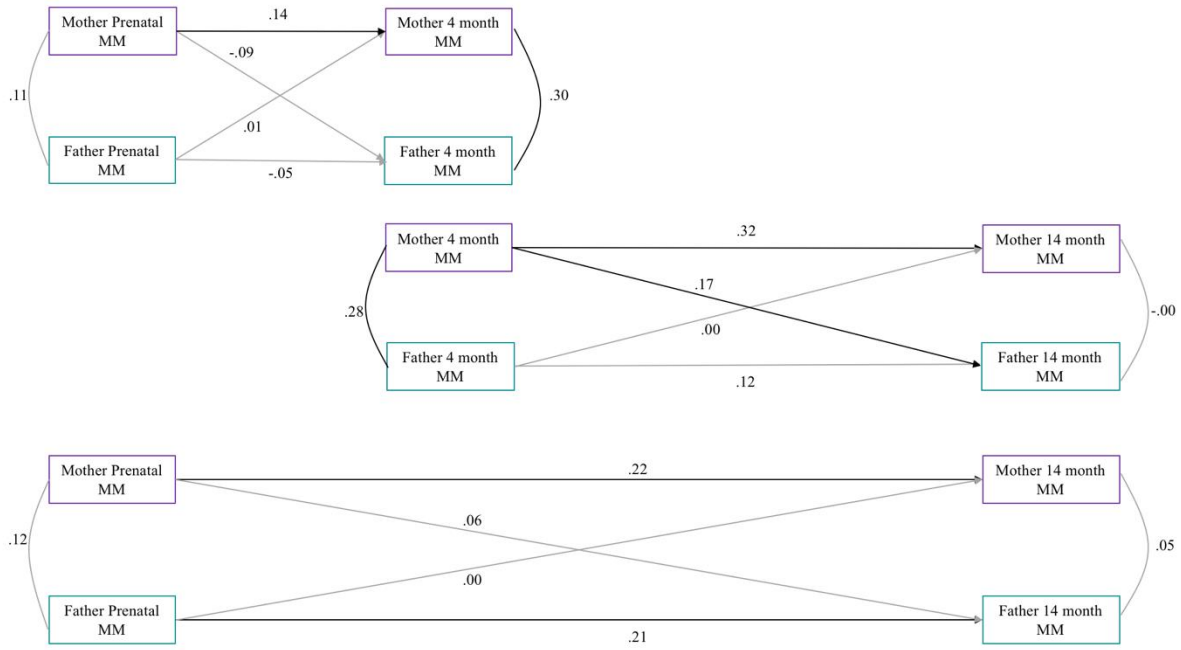


Figure 5.4. Actor-partner interdependence model displays standardised estimates of prenatal on 4-month mind-mindedness, 4-month on 14-month mind-mindedness and prenatal on 14-month mind-mindedness.

5.12. Are Parents' Demographic Characteristics and Wellbeing Associated with Parents' Mind-Mindedness?

As illustrated in Table 5.4, and reminiscent of the prenatal findings, more educated fathers produced marginally more mind-minded descriptions at 14 months, but no other associations were observed for mothers or fathers. This partially supports the hypothesis that associations between mind-mindedness and demographic factors would be more evident for fathers than mothers. Associations between mind-mindedness and wellbeing or couple relationship quality at either time point for mothers or fathers were very limited.

Table 5.4.
Correlations between Parent Characteristics and Postnatal Mind-Mindedness.

		Mother		Father	
		4m MM	14m MM	4m MM	14m MM
1.	Age	-.11	-.07	-.12	-.05
2.	Education	.09	.05	.08	.14^{+}
3.	Income	.05	.05	-.04	-.07
4.	Ladder	.00	-.01	.10	.09
5.	Mental Health Factor Score	.09	.05	.06	-.02
8.	Satisfaction with Life	-.00	.04	.03	.03
9.	Couple relationship quality	.06	.01	.01	.05

Note. 4m = 4-month time point; 14m = 14-month time point; MM = mind-mindedness. Partial correlations controlling for scores at previous the time point are presented.
$+ p < .10$.

Next, factors associated with individual differences in changes in mind-mindedness over time were explored (i.e., mind-mindedness difference scores). For both parents, there were limited associations between the 4- to 14-month difference score and any individual or child characteristics. There were also very limited associations between mothers' difference scores and demographic, individual or child characteristics (as such no further analyses were conducted to explore predictors of change in mothers' mind-mindedness). For fathers, gains in mind-mindedness from pregnancy to 4 months were significantly associated with lower maternal age, fathers' income and prenatal coherence, couple relationship quality as reported by the mother and infant temperamental distress. A hierarchical regression, with parent 4-month scores entered at the first step, child characteristics at the second step and paternal prenatal coherence at the third step, explained 17% of the variance in the prenatal to 4 month mind-mindedness difference score, $F(1, 170) = 7.56$, $p = .007$. At the third step, all measures except paternal income, were significant predictors of gains in fathers' mind-mindedness from pregnancy to 4 months (see Table 5.5).

Table 5.5.
Hierarchical Regression Predicting Gains in Fathers' Mind-Mindedness from Pregnancy to 4 months

	ΔR^2	β
Step 1.	.07**	
Father personal income		-.12
Mother couple relationship		.22
Step 2.	.06**	
Father personal income		-.09
Mother couple relationship		.24
Infant gender		.15
ITQ distress		.20
Step 3.	.04**	
Father personal income		-.08
Mother couple relationship		.25
Infant gender		.14
ITQ distress		.21
Father prenatal coherence		-.19

Note. * $p < .05$. ** $p < .01$. *** $p < .001$

Fathers' gains from prenatal to 14 months were significantly associated with lower maternal age, income and perceived social standing and mothers' perception of greater couple relationship quality and infant receptive vocabulary. A hierarchical regression, with parent 14-month scores entered at the first step, child characteristics at the second step and paternal prenatal coherence at the third step, explained 19% of the variance in the prenatal to 14-month difference score, $F(1, 143) = 8.04$, $p = .005$. At the third step, only mothers' couple relationship quality, infant receptive vocabulary and fathers' prenatal coherence were significant predictors of gains in fathers' mind-mindedness from pregnancy to 14 months (see Table 5.6).

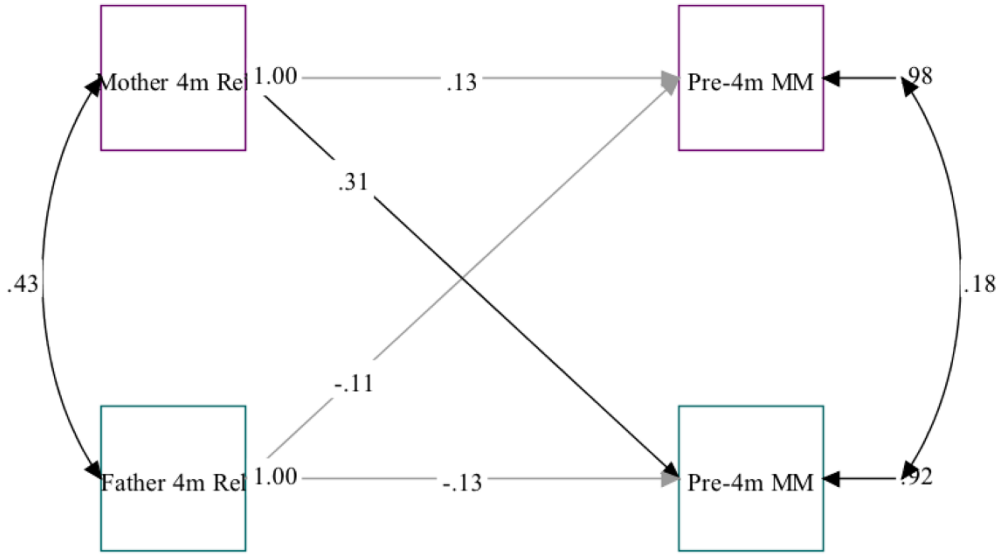
Table 5.6.
Hierarchical Regression Predicting Gains in Fathers' Mind-Mindedness from Pregnancy to 14 months

	ΔR^2	β
Step 1.	.12**	
Mother personal income		-.10
Mother ladder		-.05
Mother couple relationship		.33
Step 2.	.02*	
Mother personal income		-.09
Mother ladder		-.05
Mother couple relationship		.33
Infant receptive vocabulary		.16
Step 3.	.05**	
Mother personal income		-.08
Mother ladder		-.08
Mother couple relationship		.33
Infant receptive vocabulary		.16
Father prenatal coherence		-.22

Note. * $p < .05$. ** $p < .01$. *** $p < .001$

At each time point mothers' ratings of couple relationship quality appeared to be the most important predictor of gains in fathers' mind-mindedness. Two APIMs were specified to clarify the true nature of this partner effect (see Figure 5.5 a & b). Both models looked at the relative strength of the actor and partner pathways between relationship quality and the (a) prenatal to 4-month and (b) prenatal to 14-month mind-mindedness difference scores. Standardised path coefficients are displayed in Figure 5.5 a and b and show significant partner effects from mothers' reports of 4-month couple relationship quality to fathers' mind-mindedness difference scores. To test for differences in the strengths of the predictive pathways, the saturated APIM was compared to nested models in which the actor, then partner, and then all pathways were constrained to equality. Each model had a poor fit highlighting that the strength of the actor and partner associations were significantly different between mothers and fathers, which suggests the pathways were stronger for fathers. Cross-lagged analyses revealed no intrapersonal effects that were over and above the stability of couple relationship quality and mind-mindedness. Thus, gains in fathers' mind-mindedness across the transition to parenthood was susceptible to variation in mothers' couple relationship quality during infancy.

a.



b.

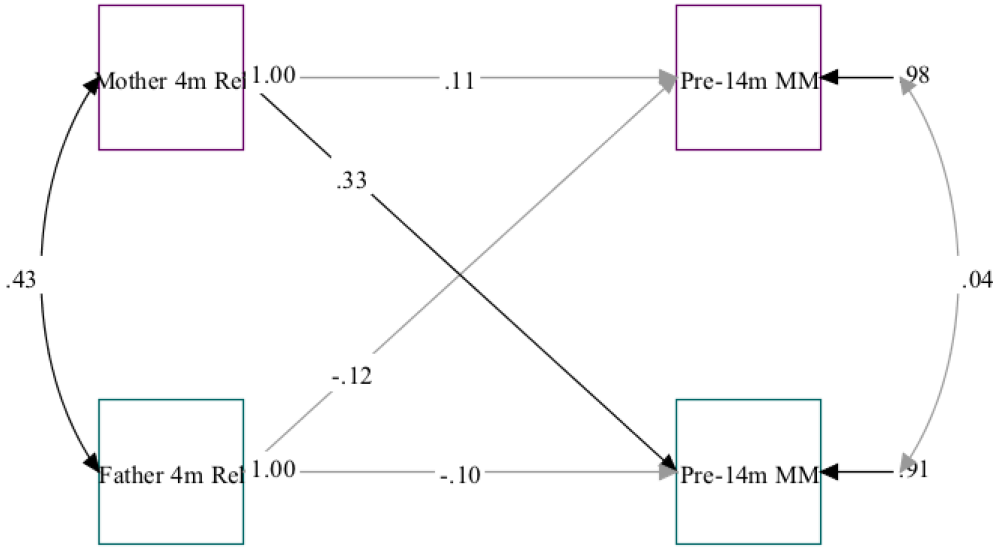


Figure 5.5. Actor-partner interdependence model displays standardised estimates of 4-month couple relationship quality on (a) prenatal to 4-month and (b) prenatal to 14-month mind-mindedness difference scores.

5.13. Are Child Cognitive or Emotional Characteristics Associated with Parents' Mind-Mindedness?

The hypothesised difference in parental mind-mindedness on the basis of child gender was partially supported. On average, at 4 months, fathers with daughters were more mind-minded (M = .39, SD = .13) than those with sons (M = .34, SD = .13), $t(192) = 2.63$, $p = .009$, Cohen's $d = 0.40$. However, this gender difference was not evident at 14 months nor at either time point for mothers.

As seen in Table 5.7, there were some associations between parent rated infant temperament and mind-mindedness at 4 months. Specifically, higher levels of infant distress were associated with more mind-minded descriptions given by fathers. There was a trend to suggest infants with a greater duration of orientation (i.e., attention) actually received fewer mind-minded descriptions at 4 months from their mothers. Overall, there were no associations between mind-mindedness and children's receptive vocabulary.

Table 5.7.
Correlations between Child Characteristics and Postnatal Mind-Mindedness

		Mother		Father	
		4m MM	14m MM	4m MM	14m MM
1.	Age	-.07	.02	-.10	-.02
2.	4m ITQ orient	-.14^{+}	-.04	.04	-.03
3.	4m ITQ distress	.10	.05	.19*	.01
4.	14m ECBQ negative affect	-.06	-.01	.12	-.04
5.	14m ECBQ surgency	.05	.01	.12	-.06
6.	14m ECBQ effortful control	-.05	-.03	-03	.04
7.	14m Receptive vocabulary	-.03	.07	.08	-.01

Note. 4m = 4-month time point; 14m = 14-month time point; MM = mind-mindedness.
$^{+}$ $p < .10$. * $p < .05$.

In addition, associations between child affect during the 'Still-Face' and 'Don't Touch' task respectively at 4 and 14 months and mind-mindedness were explored (see Table 5.8). At 4 months, infants who responded to the still-face with an increase in positive affect had fathers who were more mind-minded. There was also a negative association between the infant still-face positive affect score with mother and fathers' mind-mindedness at 14 months. Put differently, infants who responded to the still-face with an increase in positive affect had fathers who were displaying higher levels of mind-mindedness at 14 months. Similarly, there was a negative association between the infant positive affect recovery score with the mothers'

and fathers' mind-mindedness at 14 months. That is, infants who did not show the expected response in the reunion (i.e., increase in positive affect) had fathers who were displaying higher levels of mind-mindedness at 14 months. Higher levels of parental mind-mindedness at 4 months were also associated with lower levels of infant negative affect during the 'Don't Touch' task with each parent at 14 months. Concurrently higher levels of infant negative affect were associated with lower levels of maternal mind-mindedness.

Table 5.8.
Correlations between Child Affect During the 'Still-Face' and 'Don't Touch' Task and Postnatal Mind-Mindedness

			Mother		Father	
Interaction		Child Affect	4m MM	14m MM	4m MM	14m MM
Mother	1.	'Still-effect' 4m	-.03	.03	.02	-.19*
	2.	'Recovery' 4m	.03	-.02	.12	-.16*
	3.	'Carry-over' 4m	-.07	.05	-.11	-.02
	4.	Positive affect 14m	.09	.03	-.04	.01
	5.	Negative affect 14m	-.20*	-.19*	-.02	.00
Father	6.	'Still-effect' 4m	.04	.03	-.18*	-.07
	7.	'Recovery' 4m	-.11	.06	-.11	.10
	8.	'Carry-over' 4m	.06	.02	-.09	.02
	9.	Positive affect 14m	-.02	-.02	.10	.04
	10.	Negative affect 14m	-.03	.04	-.14+	-.10

Note. Child affect = positive affect. 4m = 4-month time point; 14m = 14-month time point; MM = mind-mindedness.
* $p < .05$.

Separate correlations between child characteristics and mind-mindedness were conducted for girls and boys to explore possible child gender differences in the associations. Three associations differed marginally in strength on the basis of child gender. First, fathers' mind-mindedness at 4 months was positively associated with boys' but not girls' receptive vocabulary at 14 months (r = .21* and r = -.09 respectively, z = 1.91, p = .056). Second, for fathers, decreased positive affect in the reunion episode with daughters but not sons are associated with higher levels of mind-mindedness in fathers at 4 months (z = 2.00, p = .045). Finally, greater levels of maternal mind-mindedness at 4 months was associated with heightened displays of positive affect in boys but not girls during the 'Don't Touch' task (z = 1.87, p = .062).

5.14. Does Child Affect Drive Changes in Mind-Mindedness?

After establishing that fathers' mind-mindedness showed limited stability over time and that child positive affect during the still-face administered at 4 months was associated with fathers' mind-mindedness at 14-months, auto-regressive models were used to explore the extent to which increases in mind-mindedness might reflect child-driven effects.

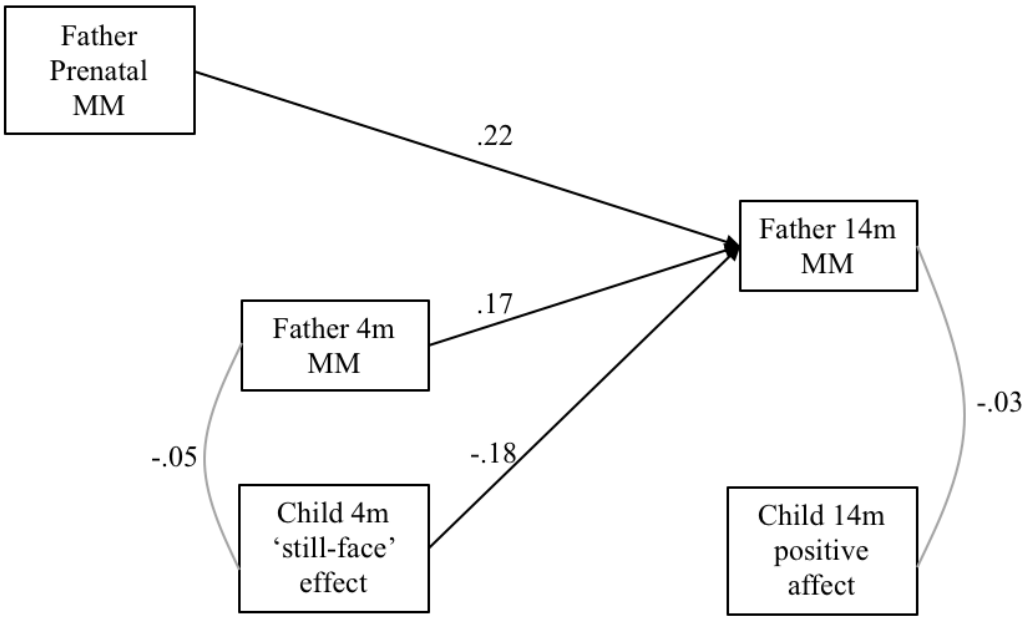


Figure 5.6. Regression model depicting individual paths of fathers' prenatal and 4-month mind-mindedness and child 'still-face' effect alongside child positive affect at 14 months on fathers' mind-mindedness at 14 months. Standardised estimates displayed.

As illustrated in Figure 5.6, model one regressed fathers' mind-mindedness at 14 months on infant response to the mothers' still-face (i.e., 'still-face effect' positive affect score), prior mind-mindedness and child positive affect in the 'Don't Touch' task. The model showed an excellent fit to the data, χ^2 (5) = 4.22, p = .518, RMSEA = 0.00, CFI = 1.00, TLI = 1.06. The results indicated that the three predictors overall explained 11% of the variance in 14 month mind-mindedness (R^2 = .11, F(1, 168) = 6.08, p = .015), with prenatal mind-mindedness significantly predicting 6% of the variance, 4-month mind-mindedness significantly predicting an additional 2% of the variance and, over and above this stability, the 'still-face effect' positive affect score explained an additional 3% of the variance.

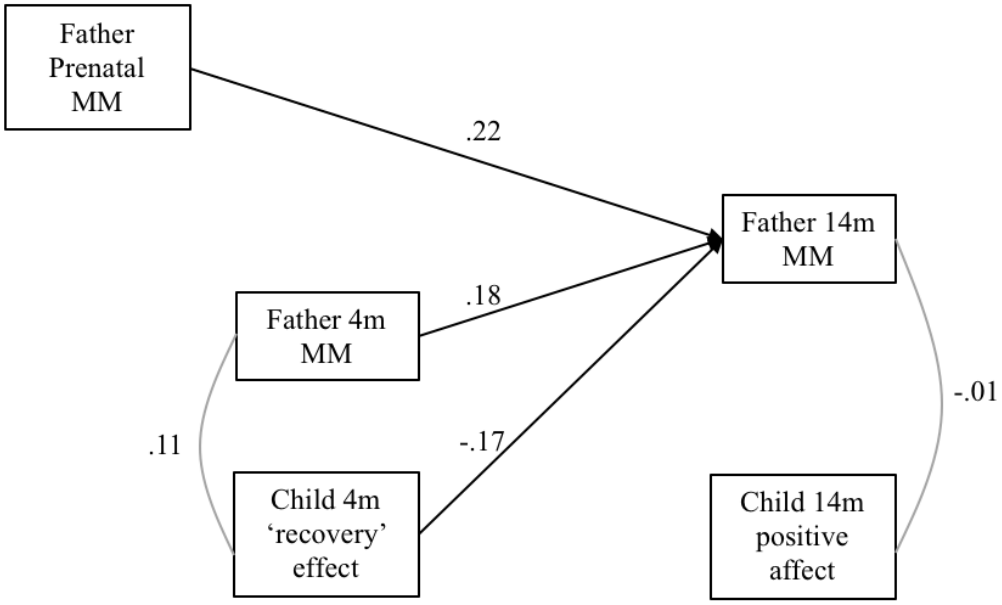


Figure 5.7. Regression model depicting individual paths of fathers' prenatal and 4-month mind-mindedness and child recovery of positive affect after the still-face alongside child positive affect at 14 months on fathers' mind-mindedness at 14 months. Standardised estimates displayed.

As illustrated in Figure 5.7, model two regressed fathers' mind-mindedness at 14 months on infant response to the reunion after the mothers' still-face (i.e., 'recovery' positive affect score), prior mind-mindedness and child positive affect in the 'Don't Touch' task. The model showed an excellent fit to the data, χ^2 (5) = 1.21, p = .944, RMSEA = 0.00, CFI = 1.00, TLI = 1.38. The results indicated that three predictors overall explained 10% of the variance in 14 month mind-mindedness (R^2 = .10, F(1, 168) = 5.03, p = .026), with prenatal mind-mindedness significantly predicting 6% of the variance, 4-month mind-mindedness significantly predicting an additional 1% of the variance and, over and above this stability, child recovery in positive affect significantly predicting an additional 3% of the variance. That is, mothers' interaction with their infants at 4 months were associated with fathers' descriptions of their infants at 14 months.

Models examining the role of child positive affect on maternal mind-mindedness at 14 months showed a poor fit to the data, as did additional separate models specified for boys and girls. Perhaps reflecting the greater stability in mothers' mind-mindedness, child-driven effects were only present for fathers' mind-mindedness.

5.15. Summary of Results

Three key findings emerged from this chapter. First, confirming expectations, the descriptions that first-time mothers and fathers provide of their infant became more mind-minded across the transition to parenthood. However, contrary to expectation, mothers' mind-mindedness was more stable across the transition to parenthood than fathers. Second, the hypothesis that fathers' mind-mindedness would be more subject to influence from individual and child characteristics than mothers' mind-mindedness was supported. Gains in fathers' mind-mindedness from pregnancy to 4 months were associated with key individual (coherence), couple and child (gender and distress) factors whilst mothers' couple relationship quality, infant receptive vocabulary and fathers' prenatal coherence predicted gains from pregnancy to 14-months. Finally, child characteristics were related to parental mind-mindedness, especially for fathers. At 4 months fathers with daughters were more mind-minded than those with sons. Infants who responded to the 'still-face' episode by eliciting parental behaviour (i.e., more smiling) had fathers who provided more mind-minded descriptions at 4 and 14 months. Reduced negative affect during the 'Don't Touch' task at 14 months was associated with higher levels of maternal mind-mindedness at 4 months.

Chapter 6. Longitudinal Associations between Parental Talk and Sensitivity

Building on the findings set out in the previous chapters, this final results chapter based on NEW FAMS data considers both prenatal and postnatal factors as predictors of sensitivity. As reported in Chapter 3, the descriptions given by expectant mothers and fathers in New FAMS varied in the extent that they were mind-minded and coherent. However, as presented in Chapter 4 neither prenatal mind-mindedness nor coherence were significant predictors of parents' sensitivity. Chapter 5 showed that both mothers' and fathers' mind-mindedness increased over the transition to parenthood, but while gains in fathers' mind-mindedness over time were subject to the influence of individual, couple and child characteristics, these associations were not seen for mothers. Together, these findings highlight the importance of considering both mothers and fathers and examining both intra- and interpersonal effects on dimensions of parenting. Furthermore, the lack of association between prenatal coherence and mind-mindedness to postnatal sensitivity contrasts does not preclude an indirect association.

In this final results chapter I first test for the presence of longitudinal reciprocal associations between parental talk and sensitivity. For example, does mind-mindedness during early infancy predict sensitivity in early toddlerhood? Or does early sensitivity contribute to later mind-mindedness? Second, and more specifically, I test whether mind-mindedness in early infancy is the mechanism linking prenatal mind-mindedness to sensitivity during early toddlerhood. That is, is mindedness the first domino in a chain linking prenatal talk to postnatal behaviour? Finally, I test whether individual, couple and infant characteristics predict parents' sensitivity. In particular, does parental talk about the infant predict unique variance in parents' sensitivity? Overall, this chapter should help clarify understanding about the nature and importance of both prenatal and postnatal talk and their relationship to sensitivity.

6.1. Is Mind-Mindedness a Precursor to Sensitivity?

As discussed in previous chapters, though sensitivity and mind-mindedness both stem from the attachment field, the two concepts are conceptually distinct. Prior research (e.g., Rosenblum, McDonough, Sameroff, & Muzik, 2008) suggests that mind-mindedness and sensitivity should be moderately associated but not overlapping during infancy. Only one study to date has examined the relations between the representational measure of mind-mindedness during infancy and sensitivity (Farrow & Blissett, 2014). These researchers found a positive association between mothers' mind-mindedness and sensitivity, though as is often the case there was no corresponding data on fathers.

However, other recent studies suggest that such positive associations are not always found, even with the observational measures. In their study of 150 first-time Australian mothers, a sample demographically similar to the mothers in New FAMS, Camberis, McMahon, Gibson and Boivin (2016) coded parental sensitivity and mind-mindedness from a 15-minute play session when their infants were 4 months old. Mothers' sensitivity, as coded using the 4-point global NICHD coding scheme, was not related to the use of appropriate mind-related comments. Camberis et al. (2016) argue that this null association adds weight to the thesis that the two constructs are distinct. However, this lack of association can also be interpreted as reflecting methodological differences, as prior studies have measured sensitivity using the 9-point Ainsworth et al. (1974) coding scheme, which provides a greater range of scores. To remove this potential problem the parent-infant interactions analysed for this thesis were also coded using the Ainsworth et al. (1974) scheme and so the lack of an association does not appear to be attributable to methodological differences in the ratings of parents' sensitivity. This thesis also contributes to the field in two other ways. Notably it is the first longitudinal examination of representational mind-mindedness and sensitivity during infancy and so provides a novel opportunity to look at reciprocal associations between constructs across more than one time period. In addition, the study is unique in providing a replication of these findings by testing whether these associations are also present for fathers.

As discussed in Chapter 4, researchers have argued that mind-mindedness precedes sensitivity (Laranjo et al., 2008). However, Laranjo and colleagues (2008) study did not include fathers and so the extent to which the findings apply equally to fathers is not understood. Recent research by Lundy (2013; 2016) has the potential to contribute to this discussion. In this study, 72 parents (36 mothers, 36 fathers) completed the interview measure of mind-mindedness and were filmed completing a puzzle with their 4-year-old. These sessions were coded for parents' 'attuned' behaviour, that is the extent to which parents gave contingent and appropriate responses to their children's behaviour (e.g., Wood & Middleton, 1975). Parent talk was coded into mutually exclusive categories of being mind-related, autonomy promoting or controlling. Children's mental state talk during the interaction was also coded and two experimenter-administered false-belief tasks assessed their theory of mind. Mothers' and fathers' mind-mindedness, as assessed via the representational measure, was positively associated with their interactional attunement. Lundy (2013) argues that attunement should be considered an extension of parental sensitivity in the pre-school years and as such, the findings suggest that mind-mindedness is a precursor to both mothers' and fathers' sensitivity. However, mediation analyses suggest that

only representational mind-mindedness contributed to children's theory of mind via interactional attunement. Furthermore, this indirect effect was only present for mothers and not fathers.

Additional analyses highlighted an alternative mediated pathway; parents' representational mind-mindedness was associated with children's theory of mind via parents' use of autonomy promoting language, which in turn influences children's own tendency to use of mental state talk (Lundy & Fyfe, 2016). However, these mediation models were only specified for the sample overall and so the extent to which these pathways differ according to parent gender remains unknown. In addition, claims about directionality of these mediation models were limited by the cross-sectional nature of the data. Lundy's earlier mediation models would suggest that such pathways would not be similar for mothers and fathers. Thus, similarities in mind-mindedness and interaction styles between mothers and fathers does not imply similarities in pathways or the outcomes associated with these constructs. It should also be remembered that Lundy's (2013; 2016) findings are based on parents of pre-schoolers. This is important as fathers' involvement tends to show a marked increase from infancy to the preschool years (Talmi, 2013) leading to similarity between parents increasing over time. This chapter therefore extends the developmental scope of existing work by contributing much needed data on the relation between fathers' mind-mindedness and behaviour during infancy and including prenatal measures.

6.2. Beyond Talk: What Other Factors are Associated with Sensitivity?

As discussed in Chapter 1, it is expected that factors other than mind-mindedness will also influence parents' sensitivity. In particular, parental psychological characteristics (e.g., wellbeing and efficacy), couple relationship quality and child characteristics (e.g., temperament and gender) have all been identified as key influences on parents' behaviour (Belsky, 1984). Adding to this work, in this thesis, parents' expectations of and actual involvement in childcare were also considered as predictors of sensitivity. Prior research (e.g., Pratt et al., 1988) has established that negative violations of expectation (i.e., the division of childcare was less equal than expected) had a negative impact on parents' behaviour with their pre-schoolers. However, these findings were based upon a smaller sample with older children from a different historical context. Thus, at a time when the dominant societal narrative is one of shared childcare, it is expected that violations of childcare expectations in New FAMS will influence parents' behaviour towards their infants. In particular, it is anticipated that violations of expectations and dissatisfaction with the

division of childcare will have a greater influence on mothers' than fathers' sensitivity, given that violations are more likely to reflect increases rather than decreases in maternal workload.

Researchers have shown that the correlates and outcomes associated with parental sensitivity differ for mothers and fathers. In their sample of 135 families, a sample demographically similar to the mothers in New FAMS, Lickenbrock and Braungart-Rieker (2015) rated both parents' sensitivity when the infant was 3, 5 and 7 months, and found parents' sensitivity was positively associated with greater resources (e.g., parental age, education level, occupation and family income). Mothers' and fathers' sensitivity were each also positively associated with mothers' greater satisfaction in the couple relationship. However, using data from the same sample of parents, Planalp, Braungart-Rieker, Lickenbrock and Zentall (2013) found that parental ratings of infants as displaying low levels of surgency (i.e., low activity level and impulsivity) were associated with higher initial levels of sensitivity in mothers but not fathers. This finding may reflect a 'dosage effect,' with greater maternal experience with the infant contributing to their increased sensitivity.

In terms of child outcomes associated with sensitivity, Lickenbrock and Braungart-Rieker (2015) found higher levels of maternal sensitivity increased the likelihood of infants being classified as securely attached when mothers had low resources. The picture was slightly more complex for fathers, with high levels of sensitivity increasing the likelihood of infants being classified as securely attached when fathers were low in resources but high in marital satisfaction. However, the presence of high levels of resources combined with low marital satisfaction did not impact the strength of the association between fathers' sensitivity and the likelihood of infant secure attachment classification. This highlights the importance of considering a range of influences, and in particular, couple relationship quality. Mindful of these findings and the associations between ratings of couple relationship quality and gains in fathers' mind-mindedness across the transition to parenthood reported in Chapter 5, it is expected that couple relationship quality will exert a stronger effect on fathers' than mothers' sensitivity. This is also consistent with the fathering vulnerability hypothesis, that is that fathers' parenting is more vulnerable to spill-over from the couple relationship (Cummings, Goeke-Morey, & Raymond, 2004).

These results, alongside those reported in other studies (e.g., Malmberg et al., 2016 found fathers' rather than mothers' sensitivity at 10 months had a stronger impact on child language outcomes at 36 months), highlight the difficulty of extrapolating conclusions from mothers to fathers and the importance of considering dimensions of co-parents together. New FAMS is able to offer a more comprehensive account of the influences on parents' sensitivity

and can extend the analyses presented by Lickenbrock and Braungart-Rieker (2015). Specifically, a key strength of New FAMS is its prospective longitudinal design, which ensures prenatal levels of these factors are also taken into account. Furthermore, unlike Lickenbrock and Braungart-Rieker (2015), in New FAMS multiple measures of parental and infant wellbeing are taken and the measure of couple relationship quality includes both relationship satisfaction and conflict.

6.3. Summary

The overall goal of this chapter is to examine the unique predictive value of parental speech sample constructs on sensitivity. To this end, two sets of questions will be addressed:

1. Are there longitudinal associations between parents' talk and sensitivity? Do these differ for mothers and fathers? Does mind-mindedness in early infancy mediate the association between mind-mindedness during pregnancy and sensitivity at 14 months?

Chapter 4 reported no associations between prenatal mind-mindedness and mothers' and fathers' sensitivity towards their infants, while Chapter 5 reported associations between prenatal mind-mindedness and mind-mindedness at 4 months for mothers but not fathers. Based on these findings, it is hypothesised that mind-mindedness will be a precursor to mothers' but not fathers' sensitivity and that mind-mindedness at 4 months will mediate the association between prenatal mind-mindedness and sensitivity at 14 months in mothers but not fathers.

2. Over and above prior levels of sensitivity and other correlates of sensitivity, does postnatal mind-mindedness predict unique variance in sensitivity at 14 months? Are the associations the same for mothers and fathers?

In light of the findings from previous chapters, specifically that sensitivity was more variable in mothers and fathers' mind-mindedness was more subject to influence from other factors, it is expected that mind-mindedness will predict unique variance in mothers' rather than fathers' sensitivity.

Methods

6.4. Data Screening and Reduction

As previously discussed in Chapter 4 and 5, parents' sensitivity, postnatal mind-mindedness and couple relationship quality scores and scores from the Who Does What? questionnaire were normally distributed. The violation of expectation scores also had a normal distribution, though the median scores for both mothers and fathers indicated a negative violation of expectation. The questionnaires measuring parent wellbeing had, as

expected, a positive skew. Given the high level of stability in parents' perceptions of their social standing (as reported in Chapter 5, r_{mother} = .68, r_{father} = .69), a mean score was used for mothers and fathers by averaging ratings across time points.

6.5. Plan of Analysis

First, Pearson's correlations between postnatal mind-mindedness and sensitivity were examined. Bayes factors were also calculated, using *JASP* Version 0.7.5.6 (2017), to examine these associations further. As described in earlier chapters, Bayes factors quantify the evidence in favour of the alternative (BF_{10}) or null hypothesis (BF_{01}) (Wetzels & Wagenmakers, 2012). Following this, it was possible to address whether, after taking into account the stability of the construct, mind-mindedness stimulates sensitivity. To this end, cross-lagged models were specified to study bidirectional associations between constructs in mothers and fathers. The cross-lagged models included autoregressive paths, accounting for the stability in individual differences in the constructs from one measurement to the next and cross-lagged paths, accounting for the effect of one construct on another.

In their influential paper, Baron and Kenny (1986) presented a causal step approach to test whether a third variable is the mechanism through which the independent variable influences the dependent variable. Crucially, this procedure involves first establishing that there is a significant effect of the independent variable on the dependent variable. However, Chapter 4 showed no significant direct association between prenatal mind-mindedness and sensitivity at 14 months. Nevertheless, scholars have argued that such direct effects are not necessary to demonstrate mediation (Hayes, 2009). In particular, Collins, Graham and Flaherty (1998, p. 296) proposed that mediation should be considered "*analogous to a line of dominos*." Notably, the mediated process is akin to a chain reaction where the independent variable changes the mediator, which then influences the dependent variable and importantly this occurs within an individual over time. Mathieu and Taylor (2007) note that such results are still of interest but should be referred to as indirect effects rather than mediation. In line with this alternative framework of examining indirect effects (Collins et al., 1998), I will test the hypothesis that mind-mindedness during pregnancy increases the likelihood of being mind-minded during infancy, which in turn fosters parents' sensitivity. A model to test for this indirect effect was specified in M*plus* using bootstrapping procedures (5,000 bootstrap samples).

Finally, to address question two, Pearson's correlations were used to examine associations between sensitivity and parent characteristics (e.g., mental health, involvement in childcare), couple characteristics (e.g., couple relationship quality) and child

characteristics (e.g., temperament, affect and receptive language). Following this, hierarchical regressions were conducted separately for mothers and fathers in order to establish how much of the variation in sensitivity at 4 and 14 months could be explained by postnatal mind-mindedness, over and above other correlates of sensitivity.

Results

6.6. Are there Longitudinal Associations between Parents' Talk and Sensitivity?

As noted in Chapter 4, prenatal mind-mindedness or coherence were not significantly associated with sensitivity. Turning to postnatal associations, mothers' mind-mindedness at 4 months was associated with sensitivity both concurrently and at 14 months and fathers mind-mindedness at 14 months was associated with his sensitivity at 14 months (see Table 6.1). The Bayes factors support the validity of this association.

Table 6.1.
Correlations and Bayes Factor Scores between Parents' Postnatal Mind-Mindedness and Sensitivity

	Mother		Father	
	4m Sens	14m Sens	4m Sens	14m Sens
4m mind-mindedness	.14^{+}	-.07	.05	.11
	.56	6.80	8.47	2.06
14m mind-mindedness	.15*	-.05	.04	.20**
	.69	8.77	9.30	3.82

Note. Bayesian factor scores above the diagonal. The unshaded cells show BF_{01} or Bayes Factors for the alternative hypothesis of a positive correlation. The shaded cells show BF_{01} and indicates moderate to strong evidence to support the null hypothesis.
+ $p < .10$. * $p < .05$. ** $p < .01$.

Figure 6.1 shows the cross-lagged model illustrating the longitudinal association between mothers' prenatal mind-mindedness and coherence and postnatal mind-mindedness and observed sensitivity from 4 to 14 months. The model showed an acceptable fit to the data, χ^2 (4) = 5.77, p = .217, RMSEA = 0.05, CFI = 0.94, TLI = 0.80 (Kline (2005) notes that such models are acceptable as in samples of modest size, the value of the TLI can indicate poor fit despite the other fit statistics pointing towards good fit). The auto-regressive paths show the stability of mind-mindedness across time and the instability of sensitivity from 4 to 14 months. The cross-lagged paths show a significant association between mind-mindedness at 4 months and sensitivity at 14 months, but the parallel association was not significant, χ^2 (1) = 4.07, p = .044, RMSEA = 0.12, CFI = 0.88, TLI = 0.38. The model accounts for 12% of the variance in 14-month mind-mindedness and 4% of the variance in sensitivity.

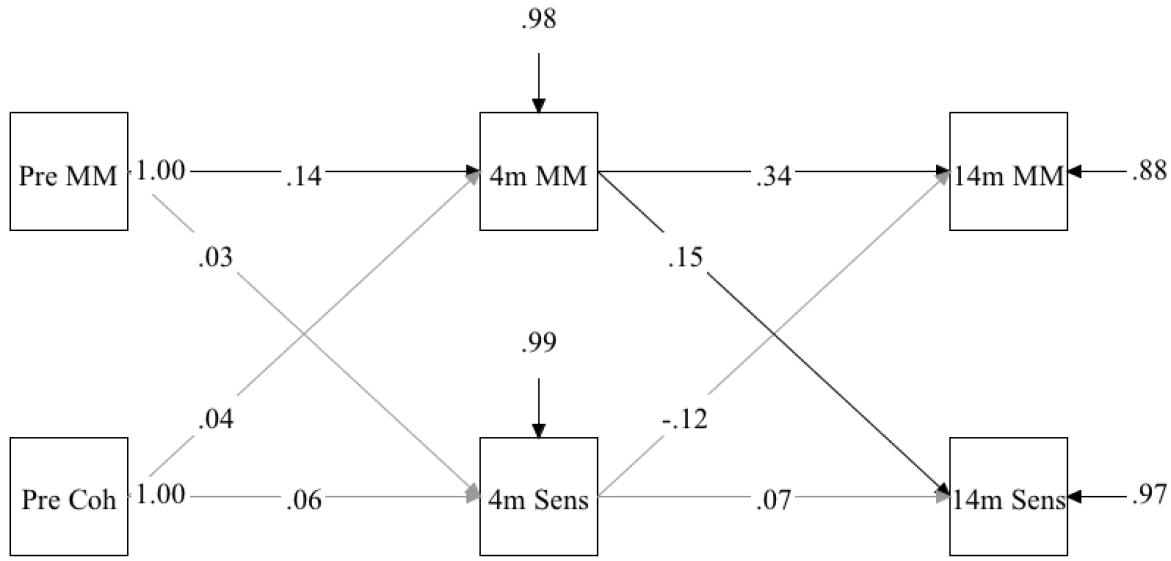


Figure 6.1. Cross-lagged model displays standardised estimates of longitudinal associations between mothers' prenatal mind-mindedness and coherence on mind-mindedness and sensitivity at 4 months and mind-mindedness and sensitivity at 14 months.

The same model was specified for fathers but showed a poor fit to the data, χ^2 (4) = 11.49, p = .022, RMSEA = 0.10, CFI = 0.67, TLI = -0.14. This finding is not surprising as the results presented in Chapter 5 showed a lack of significant associations between prenatal and 4-month mind-mindedness for fathers.

6.7. Does Mind-Mindedness During Infancy Predict Parents' Sensitivity in Toddlerhood?

In order to further test the idea that mind-mindedness precedes sensitivity in both parents, cross-lagged models were specified focusing on postnatal variables. These analyses were then replicated separately for parents of daughters and sons. This also important as others (e.g., Lovas (2005) have reported mean differences in mothers' and fathers' sensitivity according to child gender. Furthermore, the findings from this thesis suggest that exploring gender differences would be pertinent, notably in Chapter 4 that mothers with daughters were marginally more sensitive than mothers with sons and in Chapter 5 that, on average, fathers with daughters were more mind-minded than fathers with sons.

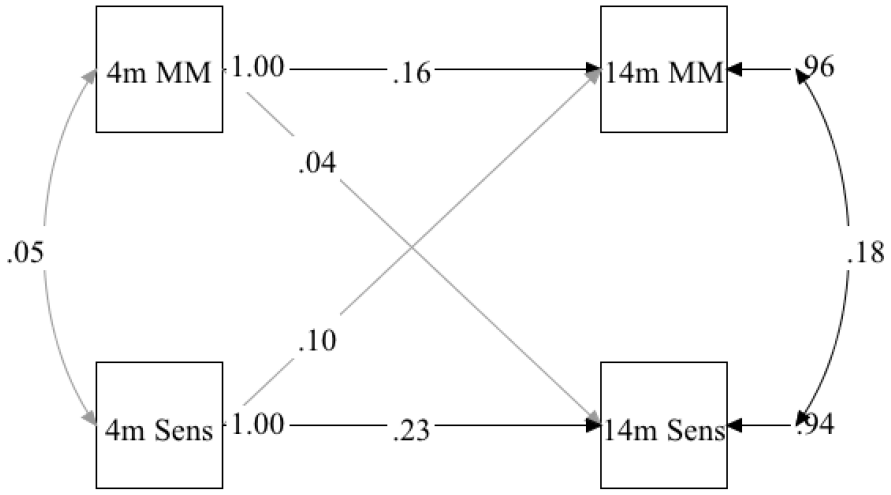


Figure 6.2. Cross-lagged model displays standardised estimates of fathers' mind-mindedness and sensitivity from 4 months to 14 months.

For fathers, cross-lagged analyses showed stability from 4 to 14 months in both mind-mindedness and sensitivity, as displayed by the standardised path coefficients in Figure 7.2 (these pathways did not significantly differ in strength, χ^2 (1) = .40, p = .530, RMSEA = 0.00, CFI = 1.00, TLI = 1.17). The model accounted for 4% of the variance in mind-mindedness and 6% of the variance in sensitivity. In contrast with mothers, fathers' mind-mindedness and sensitivity were significantly associated at 14 months but not 4 months. There were no cross-lagged associations between the 4 and 14-month measures of mind-mindedness or sensitivity.

6.8. Are Associations between Mind-Mindedness and Sensitivity During Infancy Different for Parents of Boys and Girls?

Following this, the above models were then estimated separately for parents of girls and parents of boys.

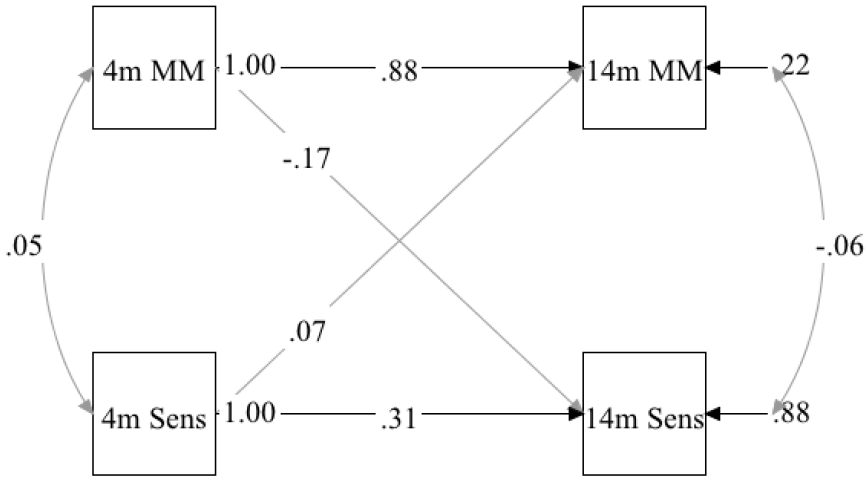


Figure 6.3. Cross-lagged model displays standardised estimates of mothers' mind-mindedness and sensitivity from 4 months to 14 months for daughters.

As displayed by the standardised path coefficients in Figure 6.3, for mothers of daughters, there was again stability in representational mind-mindedness from 4 to 14 months and, as reported in Chapter 4, stability in sensitivity. The model accounted for 78% of the variance in mind-mindedness and 12% of the variance in sensitivity, highlighting the value of this gender specific approach. Constraining the pathways to equality showed that mind-mindedness was more stable than sensitivity. Mind-mindedness and sensitivity were not significantly concurrently associated at 4 or 14 months. There were also no significant cross-lagged associations between the 4 and 14-month measures of mind-mindedness or sensitivity.

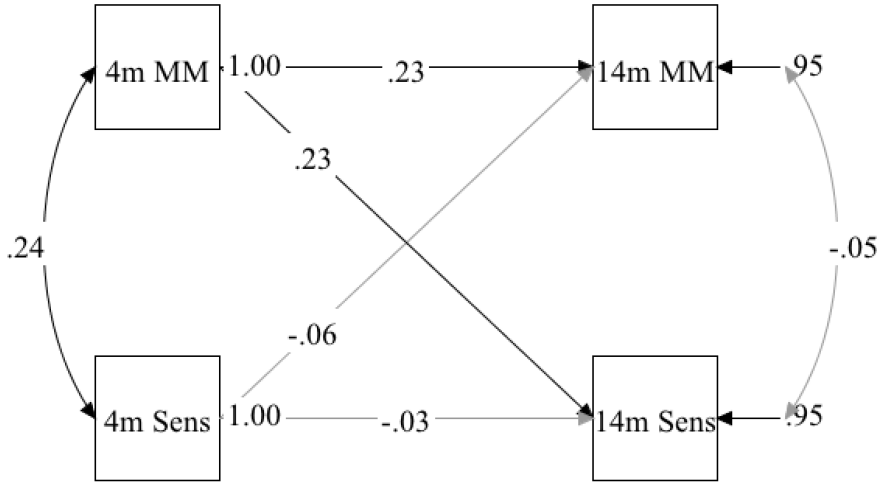


Figure 6.4. Cross-lagged model displays standardised estimates of mothers' mind-mindedness and sensitivity from 4 months to 14 months for sons.

As displayed by the standardised path coefficients in Figure 6.4, for mothers of sons, there was again stability in mind-mindedness from 4 to 14 months. However, as reported in Chapter 4, there was no stability in sensitivity across time (these pathways were significantly different in strength, χ^2 (1) = 3.05, p = .081, RMSEA = 0.14, CFI = 0.62, TLI = -0.91). The model accounted for 5% of the variance in mind-mindedness and 5% of the variance in sensitivity. Mind-mindedness and sensitivity were significantly associated at 4 months but not 14 months. As was the case for the sample overall, mothers' mind-mindedness at 4 months was positively related to sensitivity at 14 months and this pathway significantly differed in strength from the nonsignificant parallel association between sensitivity at 4 months and mind-mindedness at 14 months, χ^2 (1) = 4.98, p = .026, RMSEA = 0.19, CFI = 0.25, TLI = -2.74. Thus, for mothers with sons, mind-mindedness was stable over time and higher levels of mind-mindedness at 4 months were associated with increased sensitivity at 14 months. There was no overlap in the 95% confidence intervals of the standardised estimates for mothers of daughters and mothers of sons, indicating that the observed cross-over influence for the sample as a whole, was carried by the influence of mind-mindedness for mothers with sons.

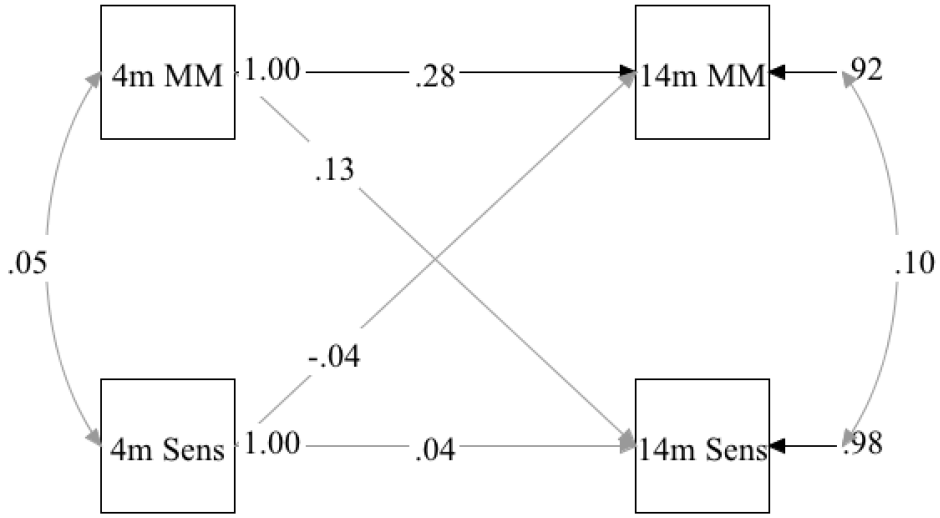


Figure 6.5. Cross-lagged model displays standardised estimates of fathers' mind-mindedness and sensitivity from 4 months to 14 months for daughters.

As displayed by the standardised path coefficients in Figure 6.5, for fathers of daughters, again there was stability in mind-mindedness but, contrary to the findings from the sample overall (as reported in Chapter 4), not in sensitivity from 4 to 14 months. The model accounted for 8% of the variance in mind-mindedness and 2% of the variance in sensitivity. Mind-mindedness and sensitivity were not significantly associated at 4 or 14 months. Similar to the sample overall, there were no cross-lagged associations between the 4 and 14-month measures of mind-mindedness or sensitivity, χ^2 (1) = .20, p = .656, RMSEA = 0.00, CFI = 1.00, TLI = 1.92. Thus, these two constructs appeared distinct for fathers of daughters.

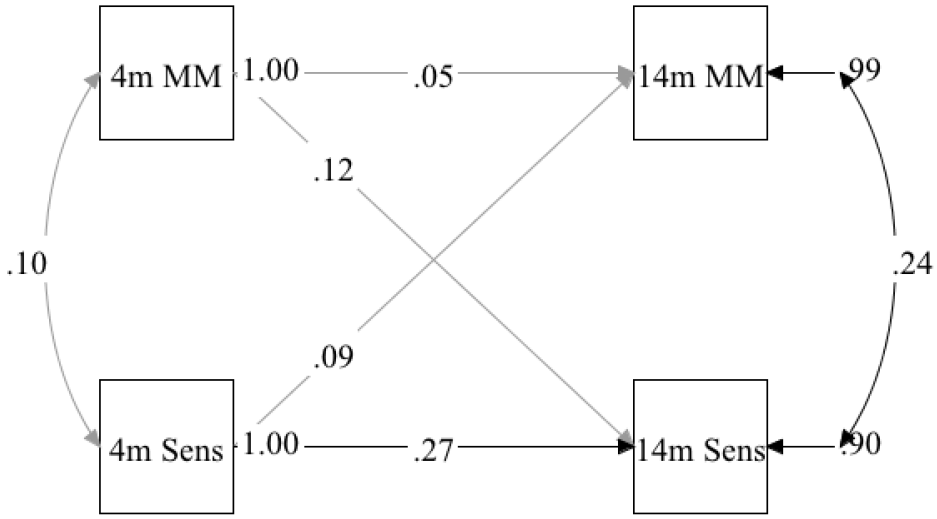


Figure 6.6. Cross-lagged model displays standardised estimates of fathers' mind-mindedness and sensitivity from 4 months to 14 months for sons.

As displayed by the standardised path coefficients in Figure 6.6, for fathers of sons, there was stability in sensitivity but not in mind-mindedness from 4 to 14 months, (these pathways were significantly different in strength, χ^2 (1) = 2.32, p = .123, RMSEA = 0.11, CFI = 0.90, TLI = 0.47). The model accounted for 1% of the variance in mind-mindedness and 10% of the variance in sensitivity. Mind-mindedness and sensitivity were significantly concurrently associated at 14 months but not at 4 months. Similar to the sample overall, there were no cross-lagged associations between the 4 and 14-month measures of mind-mindedness or sensitivity, χ^2 (1) = 4.07, p = .044, RMSEA = 0.12, CFI = 0.88, TLI = 0.38. Thus, fathers of sons showed greater stability in sensitivity than in mind-mindedness.

6.9. Does Mind-Mindedness in Early Infancy Mediate the Association between Prenatal Mind-Mindedness and Sensitivity at 14 months?

The indirect effects of prenatal mind-mindedness on sensitivity at 14 months was tested using bootstrapping procedures. Figure 6.7 displays the standardised results and shows significant associations between mothers' prenatal mind-mindedness and mind-mindedness at 4 months and mind-mindedness at 4 months and sensitivity at 14 months. However, the unstandardised estimate of the indirect effect and 95% confidence intervals with 5,000 bootstrap samples was nonsignificant, .19 [.02, .53], p = .184, indicating no indirect effect.

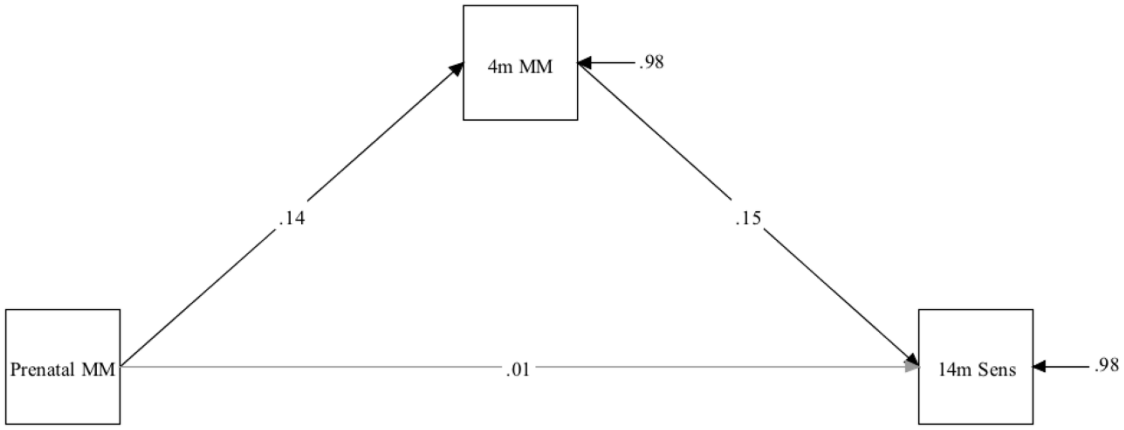


Figure 6.7. Mediation model displays standardised estimates between mothers' prenatal mind-mindedness, mind-mindedness at 4 months and sensitivity at 14 months.

As expected, Figure 6.8 displays the standardised results for fathers and shows nonsignificant associations between prenatal mind-mindedness and mind-mindedness at 4 months and mind-mindedness at 4 months and sensitivity at 14 months. The unstandardised estimate of the indirect effect and 95% confidence intervals with 5,000 bootstrap samples was also nonsignificant, -.02 [-.20, .03], p = .817.

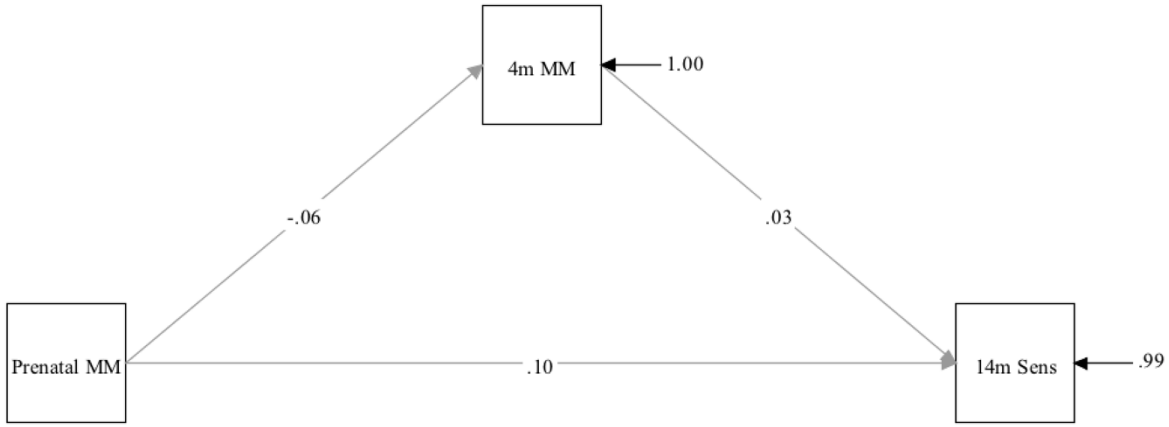


Figure 6.8. Mediation model displays standardised estimates between fathers' prenatal mind-mindedness, mind-mindedness at 4 months and sensitivity at 14 months.

6.10. What are the Correlates of Sensitivity?

Fathers. Fathers' education level, concurrent income and both their own and their partners' perceived standing in society was positively associated with their sensitivity at 4 months (within-person correlations are presented in Table 6.2). Again, fathers' education level was positively associated with their sensitivity at 14 months. Mothers' self-efficacy at 4 months were inversely related to sensitivity at 14 months. The positive violations of mothers' expectations surrounding the division of childcare related tasks was positively associated with fathers' sensitivity. That is, fathers who were more involved in childcare at 4 months than anticipated during pregnancy by their partners showed greater sensitivity at 14 months than other fathers.

Mothers. Mothers' age and perceived social standing was positively associated with sensitivity at 4 months, while mothers' education level and concurrent personal income were positively associated with sensitivity at 14 months (see Table 6.2). Higher prenatal anticipated levels of involvement in childcare was inversely related to mothers' sensitivity at 14 months (see Table 6.3). Interestingly, fathers' prenatal mental health was positively associated with mothers' sensitivity at 14 months (note for reasons of space the between-person correlations are presented in Appendix 6.1 & 6.2)

Turning to associations with infant characteristics (see Table 6.4), infants rated as higher in surgency (i.e., high activity level and impulsivity) had mothers who were rated as more sensitive at both 4 and 14 months. Greater toddler receptive vocabulary was associated with higher sensitivity at 14 months. Infant behaviour during the still-face at 4 months was related to both fathers' and mothers' sensitivity. Specifically, infants who were less perturbed by the still-face episode, measured by a reduction of positive affect in the reunion episode compared to the baseline, had parents who displayed higher levels of sensitivity at 14 months.

Table 6.2.
Within-Person Correlations between Parents' Demographics and Wellbeing and Sensitivity

	Mother		Father	
	4m Sensitivity	14m Sensitivity	4m Sensitivity	14m Sensitivity
Age	.15*	.08	.03	-.02
Education	.07	.18*	.28**	.25**
Ladder	.15*	.05	.27**	.06
Prenatal				
Income	.08	.15*	.13+	-.11
Mental Health Factor Score	.05	.04	.00	-.12
Satisfaction with life	-.11	-.04	-.03	.06
4 months				
Income	.12	.05	.15*	.15+
Mental Health Factor Score	-.06	.01	.04	-.06
Satisfaction with life	.05	.01	.02	.09
14 months				
Income	.03	.15*	.12	-.10
Mental Health Factor Score	.03	-.11	.03	.01
Satisfaction with life	.02	-.01	.08	-.05

Note. + $p < .10$. * $p < .05$. ** $p < .01$.

Table 6.3.
Within-Person Correlations between Parents' Self-Efficacy, Couple Relationship Quality, Childcare Responsibility and Sensitivity

	Mother		Father	
	4m Sensitivity	14m Sensitivity	4m Sensitivity	14m Sensitivity
Prenatal				
Self-efficacy	-.13+	-.12	-.11	-.08
Couple relationship quality	.04	-.04	-.01	.05
WDW involvement	-.01	-.15*	.13+	.07
4 months				
Self-efficacy	-.04	-.05	-.05	.05
Couple relationship quality	.13+	.08	-.09	-.08
WDW involvement	.06	.01	.11	-.01
Dissatisfaction with WDW	-.06	.00	.05	-.04
WDW violated expectation	.07	.14+	-.02	.08
14 months				
Couple relationship quality	-.03	-.08	-.07	.02
WDW involvement	.01	.08	-.01	.07
Dissatisfaction with WDW	.05	-.00	-.03	-.13+
WDW violated expectation	-.06	.08	-.06	.05
Division of housework	-.15*	.01	-.04	-.14+

Note. + $p < .10$. * $p < .05$.

Table 6.4.
Within-Dyad Correlations between Child Measures and Parents' Sensitivity

	Mother		Father	
	4m Sensitivity	14m Sensitivity	4m Sensitivity	14m Sensitivity
4 month				
ITQ orient	-.02	.08	-.02	-.01
ITQ distress	.06	-.01	-.02	-.06
'Still Effect'	-.02	-.12	-.11	-.03
'Recovery'	-.01	.04	-.07	.09
'Carry-over'	-.01	-.17*	-.03	-.17*
14 month				
ECBQ negative affect	.00	-.04	-.01	-.14
ECBQ surgency	.21**	.18*	.00	-.01
ECBQ effortful control	.10	.03	.06	-.06
Receptive vocabulary	-.07	.06	.03	.16*

Note. ITQ = Infant Behaviour Questionnaire; EBQ = Early Childhood Behaviour Questionnaire. Correlations between still-face scores for positive affect and sensitivity are within dyad (e.g., mother-child, father-child).
+ $p < .10$. * $p < .05$. ** $p < .01$.

6.11. Are Parents' Speech Sample Constructs Associated with Parents' Sensitivity at 14 months?

Four separate hierarchical regressions (i.e., with fathers' and mothers' sensitivity at 4 and 14 months as dependent variables) were conducted with parent and child characteristics that were significantly associated with sensitivity at 4 and 14 months entered as predictors of these scores.

The first hierarchical regression was specified to examine the relative predictive power of measures associated with fathers' sensitivity at 4 months. Note, fathers' mind-mindedness scores were not entered as neither the prenatal or 4-month scores for mind-mindedness were associated with fathers' sensitivity at 4 months. The final model explained 13% of the variance at 4 months (see Table 6.5). At the final step, mothers' sensitivity and fathers' education were significant predictors of fathers' sensitivity, $F(5, 146) = 2.01$, $p = .081$.

Table 6.5.
Hierarchical Regression Predicting Fathers' Sensitivity at 4 months

	ΔR^2	β
Prenatal measures	.07**	
Father education		.27
4-month measures	.06+	
Father education		.20
Father income		.08
Father ladder of social standing		.07
Mother ladder of social standing		.07
Mother sensitivity		.19
Infant carry-over		-.03

Note. * $p < .05$. *** $p < .001$.

The second hierarchical regression was specified to examine the relative predictive power of measures associated with fathers' sensitivity at 14 months. The final model explained 21% of the variance (see Table 6.6). At the final step, fathers' education and mothers' prenatal self-efficacy (but not fathers' mind-mindedness) were significant predictors, whilst infant receptive vocabulary was a marginal predictor of fathers' sensitivity, $F(3, 116) = 1.34$, $p = .264$.

Table 6.6.
Hierarchical Regression Predicting Fathers' Sensitivity at 14 months

	ΔR^2	β
Prenatal measures	.7**	
Father education		.26
4-month measures	.12**	
Father education		.17
4m Father sensitivity		.17
4m Mother self-efficacy		-.22
Mother violated expectation		.15
4m Infant still-face carry-over		-.03
14-month measures	.03	
Father education		.19
4m Father sensitivity		.14
4m Mother self-efficacy		-.21
Mother violated expectation		.12
4m Infant still-face carry-over		-.04
14m Infant receptive vocabulary		.15
14m Father division of housework		-.00
14m Father mind-mindedness		.09

Note. + $p < .10$. * $p < .05$. ** $p < .01$.

The third hierarchical regression was specified to examine the relative predictive power of measures associated with mothers' sensitivity at 4 months. The final model explained 9% of the variance (see Table 6.7). At the final step, both fathers' sensitivity and mothers' mind-mindedness at 4 months were significant predictors, $F(2, 172) = 6.71$, $p = .001$.

Table 6.7.
Hierarchical Regression Predicting Mothers' Sensitivity at 4 months

	ΔR^2	β
Prenatal measures	.01	
Mother age		.12
4-month measures	.07**	
Mother age		.11
4m Mother mind-mindedness		.16
Father sensitivity		.21

Note. + $p < .10$. ** $p < .01$.

The fourth hierarchical regression was specified to examine the relative predictive power of measures associated with mothers' sensitivity at 14 months. The final model explained 16% of the variance (see Table 6.8). At the final step, mothers' infant surgency at 14 months was a significant predictor, whilst mothers' prenatal predicted involvement in childcare was a marginal predictors, $F(2, 136) = 4.44$, $p = .014$.

Table 6.8.
Hierarchical Regression Predicting Mothers' Sensitivity at 14 months

	ΔR^2	β
Prenatal measures	.06*	
Mother education		.09
Father education		.14
Mother predicted involvement		-.12
Father mental health factor score		.10
4-month measures	.05	
Mother education		.05
Father education		.13
Mother predicted involvement		-.14
Father mental health factor score		.10
4m Infant still-face carry-over		-.11
4m Father sensitivity		.07
4m Mother sensitivity		.06
4m Mother mind-mindedness		.13
14-month measures	.05*	
Mother education		.00
Father education		.17
Mother predicted involvement		-.15
Father mental health factor score		.10
4m Infant still-face carry-over		-.09
4m Father sensitivity		.07
4m Mother sensitivity		.01
4m Mother mind-mindedness		.13
14m Mother income		.09
14m Child surgency		.21

Note. * $p < .05$.

6.12. Summary of Results

Several key findings emerged from this chapter. In line with expectations of mind-mindedness as a precursor to maternal sensitivity, longitudinal cross-lagged analyses showed stability in mothers' mind-mindedness across the transition to parenthood; in addition, mind-mindedness at 4 months was positively associated with mothers' sensitivity at 14 months. As parallel results across three time points were not obtained for fathers due to poor model fit, focus was placed on the associations between postnatal mind-mindedness and sensitivity. Unlike mothers, fathers' mind-mindedness and sensitivity were both stable over time, but did not show any crossover influence. Furthermore, concurrent associations between mind-mindedness and sensitivity were present at 4 months for mothers, but at 14 months for fathers. Interesting differences also emerged between parents of boys and girls. For mind-mindedness, individual differences were clearly associated over time, but only for parents with daughters. Notably, for this group there was stability in mind-mindedness from 4 to 14 months but no concurrent or cross-lagged associations between mind-mindedness and sensitivity. In contrast, mothers and fathers differed when they had sons. First, across time stability was evident in mothers' mind-mindedness but fathers' sensitivity. Second, mind-mindedness and sensitivity were associated at 4 months for mothers but at 14 months for fathers. Third, early mind-mindedness was associated with later sensitivity for mothers and not fathers. Overall, prenatal mind-mindedness was not a precursor to sensitivity at 14 months. Specifically, there was no support for an indirect association between prenatal mind-mindedness and sensitivity at 14 months via mind-mindedness at 4 months for either mothers or fathers. Finally, when considered alongside other predictors of sensitivity, child temperament was associated with mothers' sensitivity. In contrast, fathers' sensitivity was associated with fathers' education and mothers' characteristics (e.g., sensitivity, self-efficacy). When considered together neither mothers' nor fathers' mind-mindedness was associated with sensitivity.

Chapter 7. Prenatal Thoughts and Feelings about the Infant and Postnatal Parenting: a Meta-Analytic Review

"Parenting formally begins during or before pregnancy and can continue throughout the lifespan" (Bornstein, 2002, p. xiv)

This thesis has considered a range of influences on later parenting. In recent years there has been a growing interest in the academic, policy and public sphere in prenatal influences on later parent and child behaviour. To that end, there now exists a long and sometimes bizarre list of 'dos and don'ts' during pregnancy, for example, stop drinking alcohol, avoid unpasteurised cheese, cut down on caffeine and don't change your pet cat's litter tray. The range of advice available for expectant parents is substantial, overwhelming and often lacking an evidence base. Furedi (2008) discusses the commercialisation of pregnancy and how the promotion of talking to your bump, "Baby Einstein" (©Kids II Inc 2017), or even of one diet over another, contains the message that what parents do during pregnancy is critical to the outcome of their pregnancy and their child's future adjustment. Pregnancy is seen as a time when individuals might be particularly receptive to learning about child development and parenting (Nolan, 1997). Yet prenatal parenting classes rest on the assumption that people can think about their infant during pregnancy and that the nature of these thoughts, feelings and behaviours are important for postnatal parenting (Gilmer et al., 2016). It is presumed that these thoughts might be malleable and as such interventions or classes could potentially change the course of future child development. However, the findings from studies examining prenatal thoughts and feelings about the unborn baby as key influences on parenting have yet to be synthesized. Indeed, the results presented in this thesis have highlighted the lack of association between prenatal mind-mindedness and coherence and postnatal sensitivity. Building on these results, this chapter outlines a meta-analysis that aimed to establish the validity of the assumed relationship between prenatal thoughts and feelings about the unborn infant and later observed parenting.

First of all, I provide an overview of the different interview and questionnaire measures available to tap into expectant parents' thoughts and feelings about the unborn infant and discuss their known correlates and predictive quality. Second, I outline the meta-analytic methods employed to examine the association between prenatal thoughts and feelings about the unborn infant and postnatal observed parenting. A meta-analytic review was chosen as it allows for the careful summary of effects which in turn produces "*summary statements of greater thoroughness, greater precision, and greater intersubjectivity or*

objectivity" (Rosenthal, 1984, p. 17). Following this, I present the meta-analytic results, including moderator analyses. Finally, I consider the possible explanations and implications of the findings.

7.1. Assessing Expectant Parents' Thoughts and Feelings About Their Unborn Infants

As outlined in Chapter 1, parenting encompasses a range of thoughts, feelings and behaviours (O'Connor, 2002). Variation in these dimensions have been captured by observations, interviews and questionnaires and, while it is not possible to utilise observation methods during pregnancy, interviews and questionnaires are clearly of use (as illustrated in the current study which highlighted the developmental scope of the five-minute speech sample measure for use during pregnancy).

In the attachment literature, it is well established that adults' own representations of their relationships with their caregiver have some influence on their own subsequent parenting and thus infant attachment security (see reviews, e.g., van Ijzendoorn, 1995; Verhage et al., 2016). Stemming from this base, researchers have sought to examine how parents' representations of their own children influence child outcomes and parenting. Parental representations of their infant have commonly been assessed using an adapted version of the Working Model of the Child Interview (WMCI; Zeanah, Benoit, et al., 1986) and its 'conceptual cousin' the Parent Development Interview (PDI; Slade, Grienenberger, Bernbach, Levy, & Locker, 2002). From the WMCI, parents' representations are categorized into three groups dependent on the quality and content of the narrative: balance, disengaged and distorted. Typically, these three groups map on to infant attachment classifications (secure, avoidant and resistant respectively). This link has been hypothesized to operate via influences on parenting behaviour. For example, by definition, a parent with a balanced representation sees their infant as an individual with changeable experiences and so is more likely to act in a sensitive manner (e.g., look out for cues as to what their infant may be trying to communicate). In contrast, a caregiver with a disengaged representation of their infant appears disinclined to attend to their infant cues (i.e., if they believe they already know what they want) (Korja et al., 2010). Supporting this, in their review of the WMCI, Vreeswijk, Maas and van Bakel (2012) found three postnatal studies that highlighted links between variation in the quality of parents' interaction and representation categorisation. Specifically, in comparison with those with balanced representations, mothers with disengaged representations were, on average, less sensitive and responsive, whilst those with distorted

representations were on average more intrusive and negative (Schechter et al., 2006; Sokolowski et al., 2007).

Benoit, Parker and Zeanah (1997) later adapted the WMCI to be used during pregnancy and found mothers' representations were typically stable over the transition to parenthood. For example, 89% of mothers with balanced prenatal representations also provided balanced representations during postnatal interviews. Likewise, 85% of mothers with unbalanced prenatal representations also provided unbalanced representations at 12 months. These prenatal representations were meaningfully related to infant strange situation attachment classification at 12 months (i.e., 91% of mothers with balanced prenatal representations had infants classified as securely attached). In their review, Vreeswijk et al. (2012) found five studies (n = 298) that used the WMCI prenatally. Overall classifications were relatively consistent with those initially reported by Benoit (e.g., 62% balanced, 17.5% disengaged and 20.5% distorted). Balanced representations were most likely to be stable across the transition to parenthood. Changes from unbalanced representations during pregnancy to postnatal balanced representations were associated with lower levels of depression, a stable partner relationship and higher family incomes (Vreeswijk et al., 2012). However, it appears that parenting quality was higher in dyads where the mother became unbalanced after birth rather than vice-versa, thus suggesting a protective or predictive dimension of the quality prenatal representations (Theran, Levendosky, Bogat, & Huth-Bocks, 2005). Vreeswijk et al. (2012) called for further research examining how representations are transmitted after birth and thus influence child outcomes.

Central to the coding the WMCI and PDI is the concept of reflective functioning, defined as the capacity to understand and interpret one's own and others' behaviour as a product of mental states (Katznelson, 2014). Though reflective functioning has similarities to the construct of mind-mindedness, it is thought to reflect a more global capacity whilst parental mind-mindedness is hypothesized to be relationship specific (Meins et al., 2014). Individual differences in parents' ability to mentalise about and reflect on their relationship with their child have been hypothesized to partially explain the 'transmission gap' (Slade, Grienenberger, Bernbach, Levy, & Locker, 2005); that is, the disjuncture between parent internal working models and their infants' subsequent attachment classification, as discussed in Chapter 1 (van Ijzendoorn, 1995). In their study of 40 mothers, Slade et al. (2005) found that reflective functioning as measured via the PDI at 10 months was significantly higher in mothers classified prenatally as having autonomous rather than dismissing, preoccupied or unresolved adult attachments. Reflective functioning was also positively associated with

infant attachment security and appeared to mediate the association between adult and infant attachment. Reflective functioning has also been measured prenatally via the Pregnancy Interview (Slade et al., 2002). Using this measure, Smaling et al. (2016) found a small but significant correlation between prenatal reflective functioning and postnatal maternal sensitivity, adding weight to the argument that reflective functioning is important for postnatal functioning.

Coding coherence and reflective functioning from the AAI and other interviews is typically time intensive. As discussed in Chapter 1 and Chapter 3, Sher-Censor and Yates (2010) developed a coding scheme which adopts similar principles but is quicker to both administer and code than other in-depth interviews. Specifically, as described in Chapter 2, researchers ask parents to describe their child and then focus upon the extent to which the narrative provided is logical, complex and coherent. These uninterrupted five-minute speech samples are increasingly being used to measure parent-child dynamics across a variety of age ranges (Sher-Censor, 2015; Weston et al., 2017) and, as demonstrated in this thesis, can be usefully adopted during pregnancy. As discussed in Chapter 3, developmental psychologists now code a variety of different constructs from the five-minute speech samples (Weston et al., 2017), including expressed emotion (Magana et al., 1986), parental warmth and criticism (e.g., Caspi et al. (2004), (PFMSS; Daley, Sonuga-Barke, & Thompson, 2003) and attributions (e.g., (FAARS; Bullock & Dishion, 2004). Unfortunately, due to power restraints, Weston et al. (2017) were unable to perform meta-analytic analyses, but they argue the FMSS is a promising avenue of future research into parent-child dynamics. To maximize the scope of the current review, the above-noted parental constructs commonly assessed with the FMSS were added to the search terms used to identify studies to be included in the meta-analysis.

Other researchers have applied questionnaire methods to investigate the maternal-foetal relationship, a concept that has deep roots within the psychological literature. Winnicott (1960, p. 165) noted that during pregnancy the expectant mother "*shifts some of her sense of self on to the baby that is growing within her*," and highlighted the importance of understanding the psychological changes experienced by women during pregnancy. However, this notion that parents develop an emotional tie with their infant during pregnancy is not without controversy, as illustrated by on-going nosological debates (Walsh et al., 2013). In particular the term prenatal 'attachment', with its basis in the behavioural caregiving system, has largely been replaced by reference to the parent-foetal relationship (Walsh, 2010), though some discuss 'bonding' (e.g., de Cock et al., 2016).

In their methodological review, van den Bergh and Simons (2009) identified three questionnaires widely used in the field: the Maternal Foetal Attachment Scale (MFAS; Cranley, 1981), Maternal Antenatal Attachment Scale (MAAS; Condon, 1993) and the Prenatal Attachment Inventory (PAI; Muller, 1993). Adapted paternal versions are also now available. The questionnaires differ slightly from each other in relation to their focus on parents' behaviours, thoughts and feelings. For example, both the MAAS and MFAS have items that focus on the tendency to interact with and ascribe intentions to the foetus, the MAAS and PAI both have items that consider differentiation between self and the foetus, and the MFAS and PAI also measure the presence of positive thoughts and feelings (see van den Bergh and Simons' (2009) review for a fuller discussion of the similarities and differences between the measures).

In a study of 252 women, using the MFAS, Lindgren (2001) found over and above low levels of education, being a multiparous pregnancy, and higher levels of depression, a lack of maternal-foetal relationship was associated with fewer positive health practices (e.g., giving up smoking, attending prenatal appointments). More generally however the maternal-foetal relationship is the outcome of interest rather than a predictor of postnatal outcomes. For example, Yarcheski, Mahon, Yarcheski, Hanks and Cannella (2009) identified 72 studies that highlighted 14 predictors of maternal-foetal relationship, including social support, gestational age and prenatal testing, and low levels of anxiety, depression, self-esteem and younger maternal age. Interestingly, parity, high-risk status, income, marital status and whether or not the pregnancy was planned were not systematically associated with the maternal-foetal relationship. Indeed, gestational age was the strongest predictor of the maternal-foetal relationship suggesting that the bond develops over time rather than being particularly susceptible to variation in demographic factors.

A key assumption underlying much of this research is that the maternal-foetal relationship is necessarily important for postnatal parent and child functioning (Walsh et al., 2013). In the first of two recent studies to look at this, Rossen et al. (2016) found significant but modest positive correlations between MAAS scores for 372 women collected during each trimester of pregnancy and postnatal bonding. Three separate multiple regression analyses, controlling for demographic and postnatal covariates (e.g., age, breastfeeding problems), showed predictive links between MAAS scores at each time point and variance in postnatal scores. However, three caveats deserve note: (i) no model specified included all three prenatal MAAS scores; (ii) prenatal depression scores were also significant predictors of bonding; and (iii) the overall amount of variance explained ranged from only 22–29%

suggesting that other factors also influence bonding. Unlike the majority of the literature, de Cock et al. (2016) measured the parental-foetal relationship in both expectant mothers (*n* = 370) and fathers (*n* = 292). In this large study, de Cock et al. (2016) found a similar positive association between mothers'- and fathers'- foetal attachment at 26-weeks gestation and self-reported attachment at 6 and 24 months post-partum. Though promising, shared method variance (from the use of the same questionnaires) may have inflated the result.

There is currently a limited evidence base and a lack of consensus with regards to the message that maternal-foetal relationship is *vital* for the postnatal relationship quality. Yet researchers are often not so careful with their language when discussing this association. Illustrating this point, opening their paper Rossen et al. (2016) state that, "The mothers' felt bond to her infant is *critical* to infant health and wellbeing" (p. 609, emphasis added), and concludes, "Thus, intervening during pregnancy to promote a healthy bond in the postnatal period when feeding, sleeping and other major routines are being established *is important*." (p. 620, emphasis added). One could argue that such causal language is premature. The causal assumptions imply the way in which a mother feels towards the foetus has a direct impact on infants and should be subject to intervention. This assumption is potentially dangerous as low levels of the maternal-foetal relationship (e.g., low levels of affiliative or interactive behaviours) might exist for a variety of good reasons. For example, low maternal-foetal relationship could be a useful coping mechanism in the face of prior loss. To ensure that such conclusions are properly evidence based, the main aim of the current study was to conduct a meta-analysis to establish the strength of associations between expectant parents' thoughts and feelings about their unborn infant and the quality of their interactions with the infant in the postnatal period.

7.1. Moderating Effects of Sample Characteristics and Methodological Contrasts

Beyond improving the reliability of study findings, meta-analyses also offer a valuable opportunity to establish whether methodological and sample characteristics influence the strength of associations. As outlined above, and illustrated in this thesis, investigations of associations between prenatal thoughts and feelings about the unborn infant and postnatal parenting have adopted different designs, used distinct methods and drawn on different samples. To help inform future research in this field, between-study differences were tested as moderators of the association between pre- and postnatal measures.

Compared with prenatal questionnaires, prenatal interviews provide greater depth and detailed information and so it was expected that interview measures would yield stronger

associations with postnatal ratings of parent-infant interaction quality. In particular, unlike questionnaires, interviews go beyond simply asking whether parents consider the foetus to be a person and ask parents to think about specific child attributes. Furthermore, interviews provide a more complex understanding of parents' cognitions, specifically by capturing thoughts about the child, the parent-child relationship and their belief in parents' ability to shape child development. In contrast, the questionnaires are focused on the present and do not require parents to time travel. Thus, interviews might be more sensitive than questionnaires at capturing early indices of parents' tendency to think about future interactions and the infant as a unique individual with specific needs to respond to. In turn, these thoughts may be stronger predictors of parenting than feelings surrounding the experience of pregnancy. It was also expected that the magnitude of the association between prenatal thoughts and feelings about the unborn infant and postnatal observed parenting would vary across different measures of postnatal parenting. In particular, as parent sensitivity has been a primary focus within attachment theory, the area from which these constructs have both stemmed from, it was expected that prenatal measures would show a stronger association with postnatal ratings of sensitivity than ratings of other dimensions, such as conflict.

Another between-study contrast that may reduce the strength of the association is the length of the intervening period between prenatal thoughts and feelings about the unborn infant and postnatal parenting. Two lines of evidence support this view. First, the literature on maternal-foetal relationships indicates that the attachment to the unborn infant strengthens across gestation, such that measures gathered early in pregnancy are likely to display weaker associations with observed postnatal parent-infant interaction. Second, the influence of infants on the quality of parent-infant interaction is likely to grow over time (Larsson, Viding, & Rijsdijk, 2008) such that ratings of parent-infant interaction gathered at later ages are expected to show weaker associations with parents' prenatal thoughts and feelings. However, in this thesis, the null association between prenatal mind-mindedness and sensitivity and coherence and sensitivity was similar in strength at 4 and 14 months postnatal. Taken together, it was hypothesised that the association between prenatal thoughts and feelings and postnatal parent-infant interaction quality would become attenuated as the intervening period increased in length.

Parity is another potential moderator of the strength of the association between prenatal thoughts and feelings and postnatal parent-infant interaction quality. However, findings in this respect are inconsistent. While a review of this field showed no systematic

association between parity and the strength of questionnaire-rated maternal-foetal relationship, studies using the WMCI suggest a more nuanced picture in which parity interacts with parent gender. Specifically, whilst parity did not predict the quality of fathers' prenatal representations (Hall et al., 2014), mothers expecting their first child were less likely than mothers expecting a later-born child to provide disengaged representations (Vreeswijk, Rijk, Maas, & van Bakel, 2015). Given the lack of decisive findings an exploratory approach was adopted to the question of whether parity moderates the strength of the association between prenatal and postnatal measures.

Whilst child gender might also be expected to influence the nature of parent-child interactions, findings from a comprehensive meta-analysis challenge this view (Endendijk, Groeneveld, Bakermans-Kranenburg, & Mesman, 2016). Similarly, Arnott and Meins (2008) reported no contrast in mind-mindedness between expectant parents who knew or did not know their infants' sex. Accordingly, in the current meta-analytic review it was not expected that child gender would moderate the strength of the association between prenatal measures of parents' thoughts and feelings about the unborn infant and postnatal observed parenting.

Furthermore, the association between prenatal measures and postnatal observed parenting may also differ by parent gender. Unfortunately, there is insufficient evidence on this point because fathers are under-represented within studies of early parenting, often due to limited availability or a hesitancy to engage with research or health services (Barker, Iles, & Ramchandani, 2017). In an exceptional study to examine both maternal and paternal-foetal relationships, de Cock et al. (2016) found similar associations between parent-foetal attachment and self-reported attachment for fathers and mothers at both 6 months and 24 months. Furthermore, in this thesis the null association between prenatal mind-mindedness and coherence and sensitivity was similar in strength for mothers and fathers. Theoretically however, fathers' lack of physical connection to the foetus might be expected to attenuate the association between prenatal thoughts and feelings and observed postnatal parent-infant interaction quality (Ives, 2014). I aimed to include data from both expectant mothers and fathers, prioritising data from fathers when studies included both mothers and fathers in order to compensate for the relative scarcity of data on fathers.

Finally, it is noted that developmental psychologists often draw conclusions from Western Educated Industrialised Rich and Democratic (also known as 'WEIRD') samples (Henrich, Heine, & Norenzayan, 2010). Variation within these WEIRD samples is often restricted, notably on the basis of income, education, class, ethnicity, religion and 'risk' status. Studies that do recruit more diverse samples highlight that predictors of parenting are

often sample-specific. In particular, alongside elevated rates of problems in representing or interacting with infants (Sokolowski et al., 2007), high-risk groups are likely to show greater variability such that stronger associations are expected in this meta-analysis between prenatal measures of thoughts and feelings about the unborn infant and postnatal observed parenting in samples classified as high-risk. This hypothesis is consistent with findings from two separate meta-analyses regarding postnatal predictors of parenting (Lovejoy et al., 2000; Paulussen-Hoogeboom et al., 2007).

7.1. Summary

In order to encourage evidence-based decision-making and practice for both parents and clinicians, the current review aimed to integrate the findings from this thesis and empirical studies of the association between expectant parents' thoughts and feelings about the unborn infant and their observed postnatal parenting. To this end, the first main aim was to conduct a meta-analytic investigation of whether expectant parents' thoughts and feelings about the unborn infant show meaningful associations with observed postnatal parenting. The second goal was to establish whether methodological factors (including sample characteristics) moderate the link between prenatal thoughts and feelings about the unborn infant and postnatal parenting quality. Specifically, it was hypothesised that this association would be stronger for (i) interviews compared with questionnaire measures; (ii) ratings of postnatal sensitivity as compared with other parenting dimensions; (iii) studies with a shorter interval between the pre- and postnatal time point; (iv) mothers compared to fathers; and (iv) high-risk groups compared with low-risk samples. Given the absence of decisive data, an exploratory approach was adopted to examine potential moderating effects of parity and child gender.

Methods

7.1. Search Strategy

A literature search was conducted for studies examining the predictive quality of expectant parents' thoughts and feelings about the unborn infant and postnatal observed parenting using electronic databases, including Scopus, EBSCOhost (PsychINFO, Child and Adolescent Studies and PsychArticles) and WorldCat (theses), between January 2016 and August 2017. The references of the final papers were also checked and authors in the field contacted to ask if they had (or knew of) any unpublished results, also known as 'fugitive literature' (Rosenthal, 1994). The stems from the following key words were used separately: 'prenatal*', 'antenatal*', 'pregnan*', 'perinatal*, 'expectant mother', 'expectant father', 'expectant parent', and then in conjunction with the following key words: 'attachment',

‘attribution’, ‘caregiving’, ‘coherence’, ‘criticism’, ‘discourse’, ‘expressed emotion’, intrusive*’, ‘mentalising’, ‘mind-mindedness’, ‘narrative’, ‘observ*’, ‘parent*’, ‘perception’, ‘representation’, ‘responsiv*’, ‘reflective’ ‘sensitiv*’, ‘speech’, ‘speech sample’, ‘warmth’. The names of known measures were also searched, including ‘Working Model of the Child Interview’, ‘IRMAG-R’, ‘Pregnancy Interview’, ‘Maternal-fetal attachment scale’, ‘Maternal Antenatal Attachment Scale’ and ‘Prenatal Attachment Inventory’.

7.1. Study Inclusion and Exclusion Criteria

The search overall yielded 23,132 articles, excluding duplicates, and along with the findings from this thesis, 7 theses. Given the high volume of references, articles were first screened according to the inclusion criteria on the basis of their title and abstract (note the inclusion of nursing journals led to a high volume of medical references). Specifically, studies had to be empirical, published in English, and have a pre- and postnatal time point (20% of abstracts were independently double coded with perfect agreement obtained). Studies were excluded if they did not focus on parent-child interaction quality. Examples of excluded studies ranged from a focus on parents’ wellbeing, co-parenting, their own relationship with their parents (e.g., AAI) or child outcomes (e.g., attachment security, behavioural adjustment) (see Fig. 7.1). Authors were contacted when studies did not report on the association between all pre- and postnatal measures, though some did not respond (e.g., Chrzan-Dętkoś & Łockiewicz, 2015; Thun-Hohenstein, Wienerroither, Schreuer, Seim, & Wienerroither, 2008; M. Wilson et al., 2000). The final sample consisted of 13 studies.

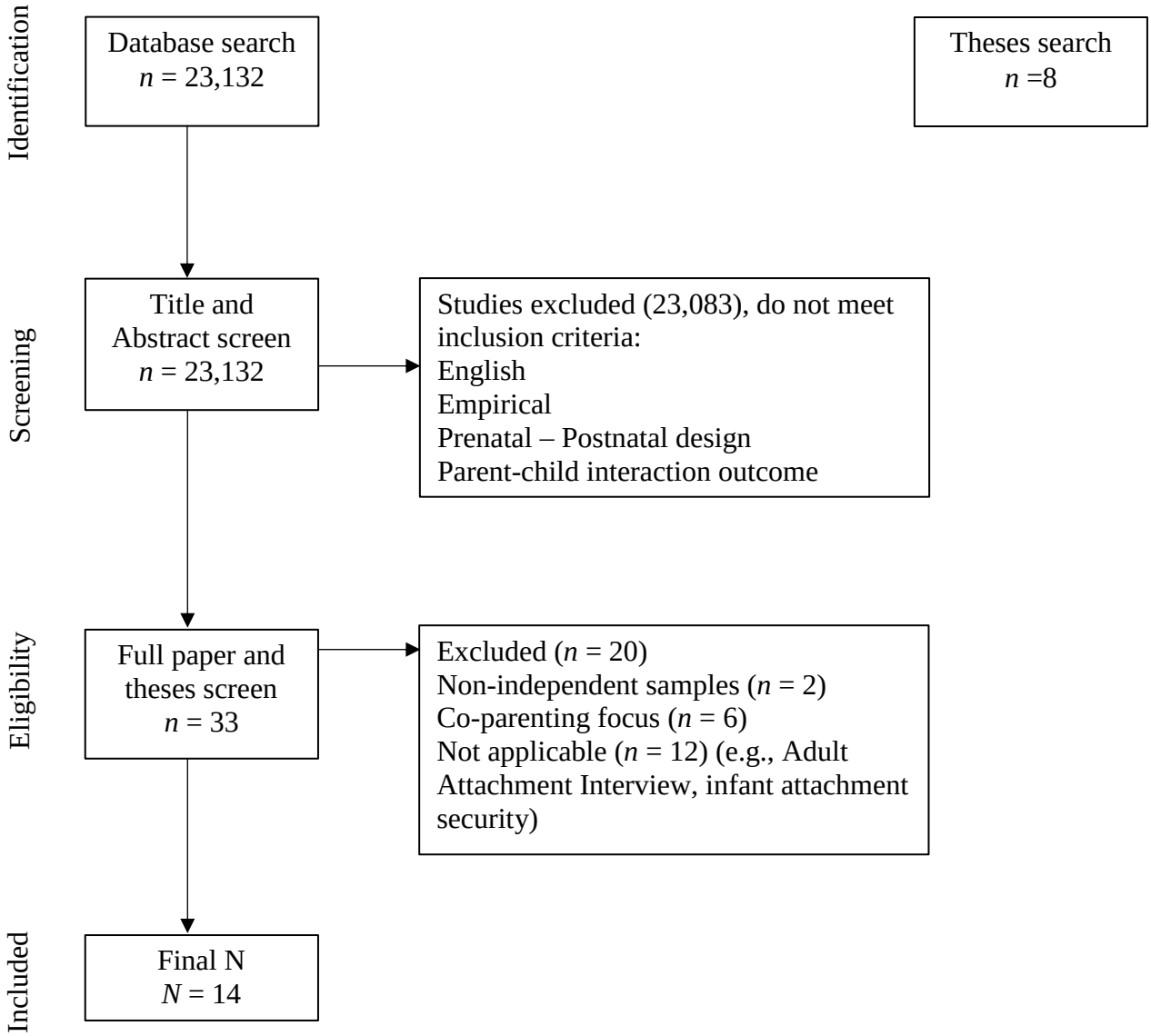


Figure 7.1. PRISMA flow used to identify studies for inclusion in the meta-analysis.

7.1. Study Coding

The 13 studies along with my empirical findings (k = 14) were subject to detailed coding and information regarding participant characteristics, study design and effect sizes were extracted (Table 7.1). Specifically, the prenatal mind-mindedness to postnatal sensitivity at 4 months effect size reported in Chapter 4 was used (note unlike coherence, the mind-mindedness measure has been considered previously within the literature and the prenatal coherence to postnatal sensitivity effect size was similar in magnitude).

7.6.1. Moderators.

Measures. Table 7.2 provides a list of the specific questionnaire and interview measures used during pregnancy as well as the observation measures used postnatally.

Design. The timing of the prenatal measure (i.e., number of weeks gestation) and postnatal measure (i.e., mean infant age) was recorded to create an interval measure to index the length of time between study time points.

Parity. Mother parity was noted and studies were dichotomized as wholly first-time parents (primiparous) or not (both primiparous and multiparous women included in the design).

Female to male ratio. A continuous variable was created to reflect the total number of female to male infants in each study.

Risk status. A study sample was classified as high-risk if the participants, on average, were either (i) from a low socio-economic background (e.g., low income as defined by the OECD poverty line, and/or low parental education, defined as a below age 18 education level) or (ii) experienced clinical risk (e.g., mental health problems, domestic violence). It was not possible to sub-divide risk for analyses due to the low frequency of each risk type in an already small sample of studies.

7.1. Plan of Analysis

Pearson correlation coefficients (r) were used to calculate effect sizes. Studies reporting η^2 effect sizes were transformed to r (k = 2) (using Lenhard & Lenhard, 2016 as discussed by; Rosenthal, 1991). Following Ellis (2010) guidance, effect sizes were interpreted as modest (.10 to <.30), moderate (>.30 to <.50) and large (>.50).

Four of the 14 studies also included fathers (marked with an asterisk in Table 7.1). In these cases, only data from the fathers were included to maximise the possibility of examining parent gender differences. Some studies reported on numerous dimensions of the postnatal parent interaction quality (Lucassen et al., 2015; Maas, de Cock, Vreeswijk, Vingerhoets, & van Bakel, 2016; McMahon et al., 2016; Siddiqui & Hägglöf, 2000; Smaling

et al., 2016). In these cases, the measure related to sensitivity was used to maximise comparability across studies. In the one study with multiple postnatal time points (McMahon et al., 2016), the time point in infancy was chosen in order to maximise comparability. Where authors (Fuller, 1990; Pajulo et al., 2012; Theran et al., 2005) did not provide details as to the number of girls and boys included in their study, the gender distribution was assumed to be equal.

Wilson's (2016) meta-analysis macros for IBM *SPSS* version 24 were used to investigate two questions:

1. Is there a significant association between measures of expectant parents' thoughts and feelings about the unborn infant and their observed postnatal parenting?
2. What methodological features of individual studies moderate this effect?

Following Rosenthal (1984), in order to standardise the distribution of *r,* each independent effect size was transformed from *r* to *Zr* and the analyses were then weighted ($w = n - 3$) to allow for sample size variation. However, Pearson's *r* (95%CI) are reported for ease of interpretation. Hedge's (1992) method was used to calculate the mean effect size. To determine the exactness of the overall effect size, 95% confidence intervals were also calculated. Cochran's *Q* statistic provided an assessment of homogeneity. A significant *Q* suggests heterogeneity in the distribution of effect sizes, thus a random-effects model can be used to analyse the effect sizes. Field and Gillett (2010) emphasised that as social science data is drawn from the real world, where heterogeneity is the norm, a random-effects model should be adopted as this assumes that effect sizes vary randomly between studies. Specifically, the random-effects model assumes two error terms: error due to sampling from within different study populations and error generated as a result of sampling the populations from the population at large. Furthermore, Type 1 error rates are much more likely (5% to 11-28%) when applying a fixed-effects model to heterogeneous data (Field & Gillett, 2010). Thus, findings are more easily generalisable and, if significant, the heterogeneity within the effect sizes can be explored further rather than be assumed to be the result of error.

In order to establish whether the effect sizes were subject to publication bias three different methods were adopted. First of all, a funnel plot of the effect sizes against the sample size was used to explore the data visually. An unbiased sample should produce a graph of data points hanging symmetrically around the mean effect size thus creating the effect of a 'funnel' suggesting effect sizes drawn from smaller samples have greater variability. In contrast, it is suggested that an asymmetric funnel plot would indicate publication bias as smaller samples with smaller effect sizes are not published (Light &

Pillemer, 1984). Second, Rosenthal's (1984) fail-safe *N*, that is the minimum number of null results taken to overturn the observed effect, was calculated to test the effect size resistance to the file-drawer threat. Specifically, the fail-safe *N* should exceed a critical value: 5 times the number of effect sizes plus 10 (i.e., 5*K* + 10) if it is resistant to the file-drawer threat. Whilst valuable and commonly used, Borenstein, Hedges, Higgins and Rothstein (2009) note the problematic emphasis on statistical significance of the fail-safe *N*. Specifically, that statistical and substantive significance are not synonymous and that the formula used to calculate the fail-safe *N* assumes effect sizes in the file-drawer to be zero when in reality they could reflect a range of possibilities, including being negative. Simonsohn, Nelson and Simmons (2014) also note that study findings may be the result of '*p*-hacking', which is the selective publishing of significant analyses, and propose the use of *p*-curves to examine this possibility. The shape of the *p*-curve (i.e., the distribution of *p*-values) is determined by the effect and sample size, with only *p*-values < .05 included. Simonsohn et al. (2014) propose that a genuine effect would produce a right skewed *p*-curve, a lack of effect would produce a flattened, uniform *p*-curve and when the effects are the result of *p*-hacking the *p*-curve would be skewed to the left. With this is mind, a *p*-curve was plotted to help establish whether the research has evidential value.

Results

Table 7.1 summarises the characteristics of the 14 samples, which together included 1,862 parents (*n* = 1109 mothers, M_{age} = 28.69, *SD* = 3.61 years; *n* = 753 fathers, M_{age} = 34.50, *SD* =.71 years) and their children (M_{age} = 9.46, *SD* = 12.52 months). The majority of studies used samples of mothers (*k* = 10) and took place in Europe (*k* = 8) although North America (*k* = 4), Australia (*k* = 1) and South America (*k* = 1) were also represented. The samples were typically recruited from antenatal education classes, hospitals and via leaflets. In line with Downs and Black's (1998) methodological quality checklist, study quality was indexed by the reliability of the key prenatal and postnatal measures (see Table 7.2). Other indices of bias were examined as potential moderators (e.g., sample size). Typically, the studies included in the meta-analysis were of high quality and all studies (aside from the results of this thesis) were published in peer-review journals.

Table 7.1.

Reviewed Studies, Sample Characteristics, Moderator Variables and Study Effect Sizes

Reference		Prenatal					Postnatal				
	n	Parent *M* age	Primip	Risk	Measure	Reliability	Child *M* age (months)	Female: Male	Outcome	Reliability	ES
Alvarenga et al. (2013)	38	29.00		✓	Q	Questionable	8.00	.00	Sensitivity	Good	.48
Arnott & Meins (2008)*	17	35.50			Q	Not reported	6.00	.50	Mind-mindedness	Good	.08
Cairo et al. (2012)*	31	34.34	✓		Q	Good	9.04	1.07	Alliance	Good	.06
Crawford & Benoit (2009)	35	30.29			I	Good	12.00	.84	Atypical behaviour	Good	.64
Foley (2018)*	187	33.84	✓		I	Good	4.00	.82	Sensitivity	Good	.06
Fuller (1990)	32	29			Q	Good	.03	1.00	Sensitivity	Good	.65
Lucassen et al. (2015)*	518	34.30			I	Moderate	51.40	1.06	Sensitivity	Good	-.06
Maas et al. (2016)	273	31.87			Q	Moderate	6.08	.96	Sensitivity	Moderate	.16
McMahon et al. (2016)	132	33.50	✓		Q	Good	7.22	.78	Mind-mindedness	Good	-.12
Pajulo et al. (2012)	19	25.10		✓	I	Good	4.00	1.00	Sensitivity	Not reported	.16
Siddiqui & Hägglöf (2000)	100	30.00			Q	Good	2.66	1.08	Involvement	Good	.51
Smaling et al. (2016)	133	22.86	✓	✓	I	Good	6.02	.85	Sensitivity	Good	.21
Tambelli et al. (2014)	167	32.60	✓	✓	I	Good	4.00	.92	Conflict	Good	.34
Theran et al. (2005)	180	25.00		✓	I	Good	12.00	1.00	Sensitivity	Good	.20

Note. * = data from fathers. Primip = Primiparous sample; Q = questionnaire; I = interview. Reliability code based on interpretation of inter-rater agreement or the Cronbach's α of the questionnaire. ES = effect size.

Table 7.2.
Description of Prenatal and Postnatal Measures.

Time point	Category	Description	*k*	Measures
Prenatal	Questionnaire	Self-reported attachment to fetus	7	Maternal-Foetal attachment scale (Cranley, 1981) Maternal Antenatal Attachment Scale (Condon, 1993) Prenatal Attachment Inventory (Muller, 1993)
	Interview	Representation of the infant, characteristic of parent	7	Working Model of the Child Interview (Zeanah, Benoit & Barton, 1986) Interview of Maternal Representations During Pregnancy-revised (Ammaniti et al., 1999) Five Minute Speech Sample (Magana, 1986) Pregnancy Interview (Slade et al., 2004)
Postnatal	Observation	Free-play	9	Ainsworth Sensitivity Scales (Ainsworth, Bell & Strayon, 1974) Adapted – Bornstein (2008) & Piccinini (2007) Meins & Fernyhough (2006; 2010) NICHD-SECCYD sensitivity scales (Owen, 2002) Adapted – Lewis and Lee-Painter (1974) Adapted – Ainsworth (1971), Lyons-Ruth (1983) & Crittenden (1981) CARE Index (Crittenden, 1981) Mother Infant Coding System (adapted Miller et al, 2002)
		Structured task	5	Favez (2011) family alliance assessment scale AMBIANCE (Bronfman, 1999) Feeding Scale (Chatoor, 1997) Erickson et al. (1990) Nursing Child Assessment Feeding Scale (Barnard, 1978a)

7.1. Overall Effect: Do Measures of Expectant Parents' Thoughts and Feelings About the Unborn Infant Relate to Postnatal Observed Parenting?

To calculate the overall strength and significance of the association between prenatal thoughts and feelings about the unborn infant and postnatal parenting, a random-effects model weighted by the inverse variance was used. The weighted mean effect size (*r*) across the 14 independent correlations was .24, 95% CI [.10, .38] (see Forest plot in Figure 7.2). Although modest, this effect size is significantly greater than zero, $Z = 3.40$, $p = .001$ (see Table 7.3).

Table 7.3.
Mean Effects for the Association between Prenatal Thoughts and Feelings about the Unborn Infant and Postnatal Parenting for All Studies and Moderator Analyses

Contrast	*M*	*k*	*z*	*p*	95%CI
All studies	.24**	14	3.40	.000	[.10, .38]
Parent Gender	*Q* (1, 12) = 6.32, *p* = .012				
Fathers	-.01	4	-.12	.907	[-.24, .21]
Mothers	.32***	10	4.61	.000	[.19, .46]
All 1st time parents	*Q* (1, 12) = 2.78, *p* = .095				
No	.34	9	3.56	.011	[.06, .48]
Yes	.09	5	.71	.644	[-.15, .32]
Risk sample	*Q* (1, 12) = .29, *p* = .591				
No	.21	9	2.45	.015	[.05, .38]
Yes	.29	5	2.50	.013	[.06, .51]
Prenatal measure	*Q* (1, 12) = .16, *p* = .689				
Questionnaire	.27	7	2.54	.011	[.06, .48]
Interview	.21	7	2.12	.034	[.02, .41]
Sensitivity outcome	*Q* (1, 12) =.17, *p* = .683				
No	.27	6	2.45	.013	[.06, .49]
Yes	.22	8	2.37	.018	[.04, .39]

Note. 95%CI = confidence intervals.
** $p < .01$. *** $p < .001$.

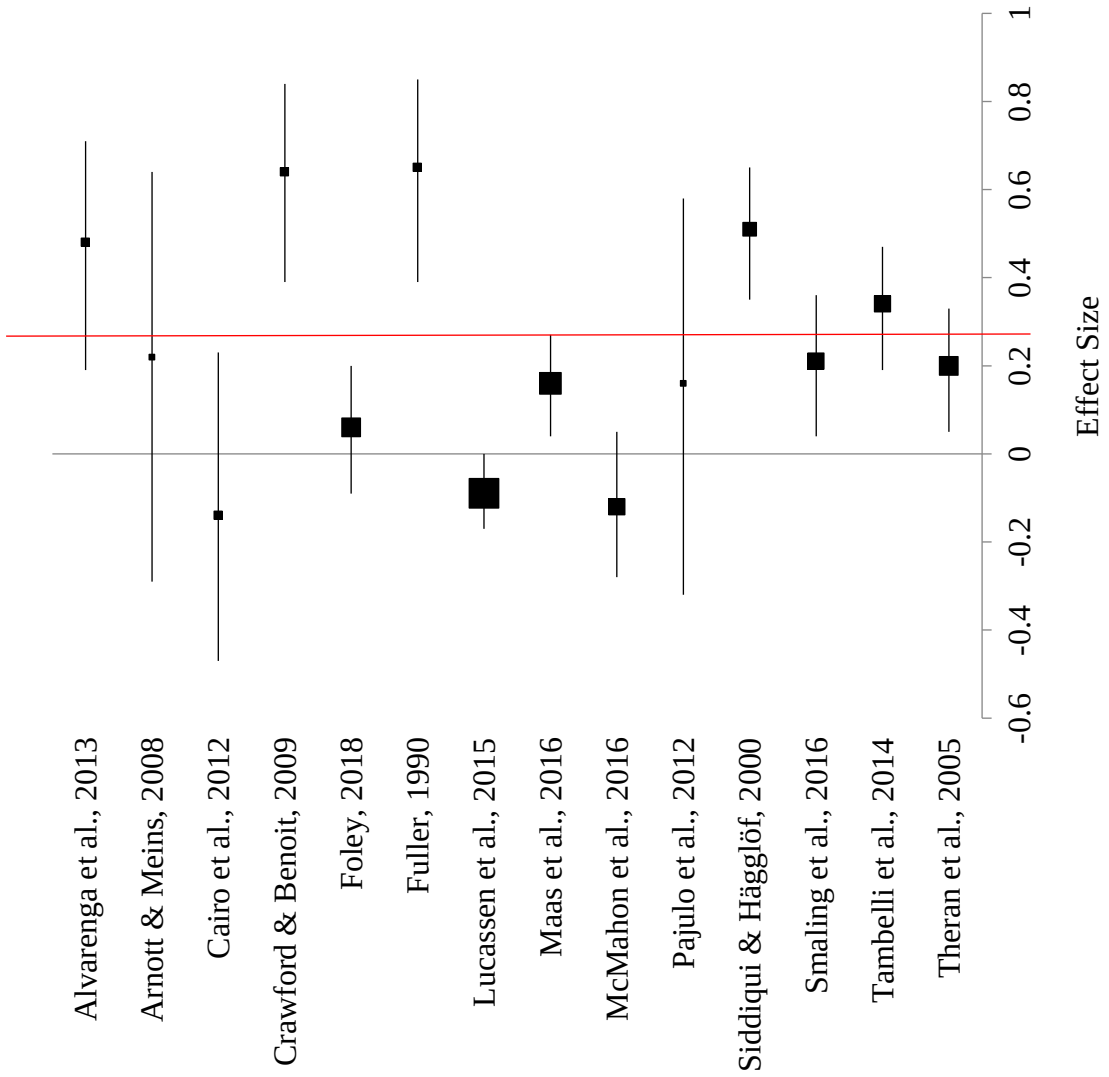


Figure 7.2. Forest plot of individual studies and mean effect size. Bars represent 95% confidence intervals and points correspond with study sample size.

7.8.1. Publication Bias

The funnel plot (see Figure 7.3) suggests the absence of publication bias, with studies distributed symmetrically about the mean effect size. That said, the small number of effect sizes limits the interpretative value of the graph.

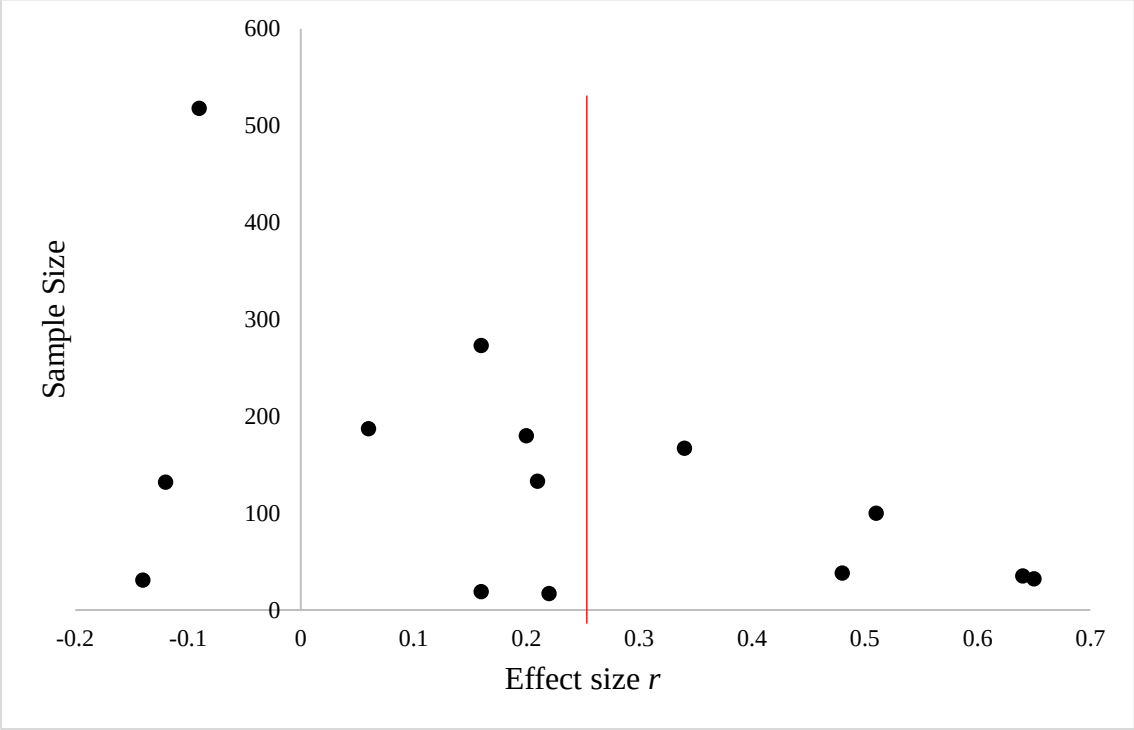


Figure 7.3. Funnel plot illustrating the association between sample size and study effect size.

A fail-safe *N* was calculated to address the file-drawer problem, that is that significant results are disproportionately published, undermining the robustness of the mean effect size. The critical value of 80 was exceeded, with a total of 823 nonsignificant studies needed to reduce the significance of the mean effect size below $p > .05$.

The *p*-curve for the studies indicating a statistically significant association between prenatal thoughts and feelings about the unborn infant and postnatal parenting was plotted (*K* = 9). As seen in Figure 7.4, the *p*-curve was significantly positively skewed, $Z = -7.38$, $p < .001$, suggesting the results are not likely to be the result of selective reporting and as such contain evidential value.

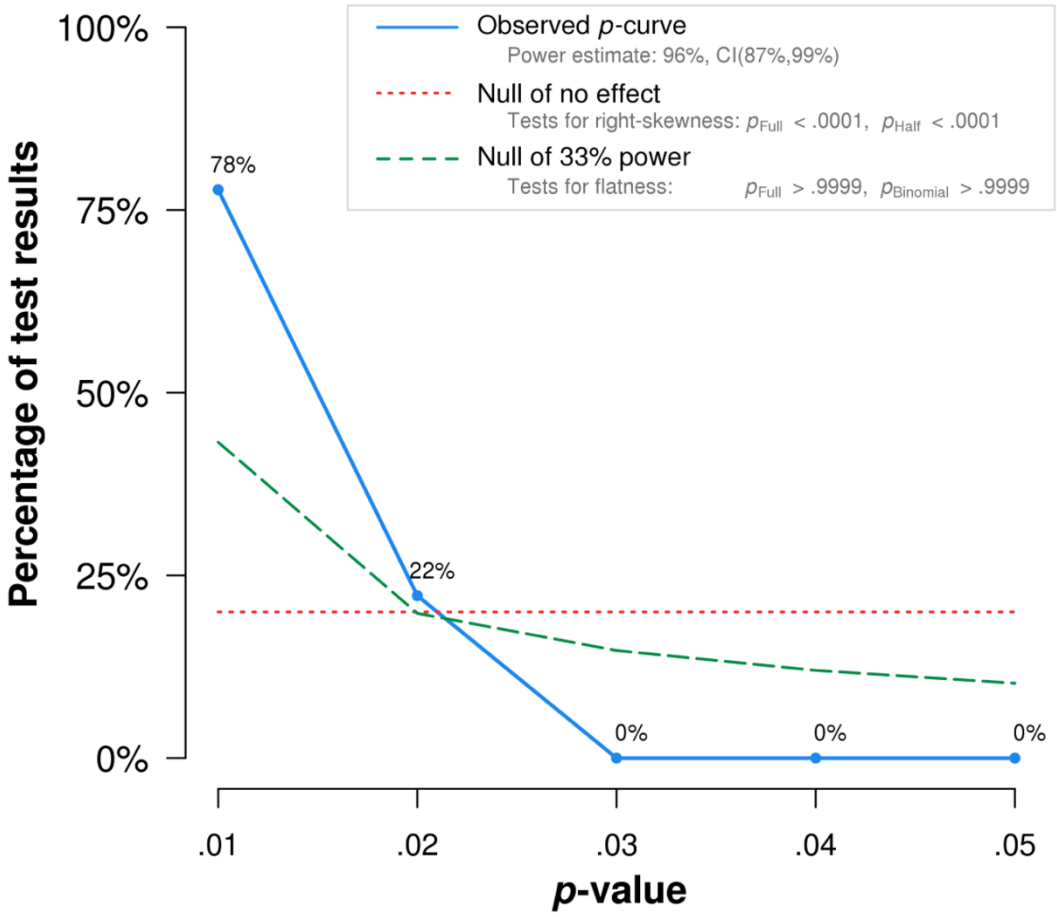


Figure 2.4. *p*-Curve for the detection of publication bias.

7.1. Moderator Analyses: Do Methodological Characteristics Moderate the Relationship Between Prenatal Thoughts and Feelings About the Unborn Infant and Postnatal Measures of Parenting?

The significant heterogeneity statistic, Q (13) = 94.28, $p < .001$, and the stem and leaf plot (see Table 7.4) highlighted the heterogeneity of effect sizes and so reaffirmed the need to look for potential moderators that might account for variability. Studies were divided into categories according to methodological and sample characteristics. To examine heterogeneity between study findings categorical moderator analyses analogous of ANOVA were then conducted. The analysis also provides homogeneity statistics (Q) for both between (Q_b) and

within groups (Q_w). A significant Q_b suggests that the effect sizes are significantly different across different categories of the moderator variable whilst a significant Q_w suggests that the effect sizes are significantly different from zero.

Table 2.4.
Stem and Leaf Plot of the 14 Effect Sizes Included in the Meta-Analysis

Stem	Leaf	Totals
-.1	2	1
-.0	66	2
.0	86	1
.1	66	2
.2	1	1
.3	04	2
.4	8	1
.5	1	1
.6	45	2

A random-effects model weighted by the inverse variance analogous to ANOVA (D. Wilson, 2016) showed that the strength of the association between prenatal assessments of thoughts and feelings about the unborn infant and postnatal observed parenting varied significantly by parent gender, Q_b (1, 12) =6.32, p = .012 (see Table 7.3). Specifically, the effect size for mothers was significant, .32, whilst the mean effect size for fathers was nonsignificant, -.01. As shown in Table 7.3, analyses to explore the potential moderator effects of additional methodological features (type of prenatal measure, sensitivity outcome, parity and risk) yielded nonsignificant results confirming the stability of the effect.

It should also be noted that alternative analyses that used the prenatal coherence to postnatal sensitivity effect size from this thesis (instead of prenatal mind-mindedness) as expected, due to the similar magnitude of effect, did not alter the results presented above.

7.1. Regression Analyses: Do Continuous Study Design Variables Influence the Relationship Between Prenatal Thoughts and Feelings About the Unborn Infant and Postnatal Measures of Parenting?

A random-effects linear regression model was run, using inverse variance weights to account for differences in sample size, to examine heterogeneity between study findings on the basis of continuous moderator variables. Heterogeneity in the effect sizes was not confirmed, Q (3, 10) = 4.68, p = .200. The overall model accounted for 25.52% of the variance in effect sizes. None of the characteristics included (study sample size, ratio of girls, or the interval between the two time points) were significant predictors in the model, suggesting the strength of the association was consistent across sample sizes, gender composition of the sample and the length of time between the prenatal and postnatal measure.

7.1. Focus on Expectant Mothers: Mean Effects and Moderator Analyses

The above analyses used the data from fathers when possible (i.e., the findings from four studies: this thesis; Arnott and Meins (2008); Cairo et al. (2012); Lucassen et al. (2015)). However, in each of these studies parallel findings were also reported for mothers. In order to further check the reliability of the meta-analytic findings the same analyses were re-run using mother-only data.

To calculate the overall strength and significance of the association between mothers' prenatal thoughts and feelings about the unborn infant and postnatal parenting, a random-effects model weighted by the inverse variance was used. Mirroring the findings from the combined mother and father data, the weighted mean effect size (r) across the 14 independent correlations was .24, 95% CI [.11, .38]. Although modest, this effect size is significantly greater than zero, Z = 3.62, p = .000. The significant heterogeneity statistic, Q (13) = 87.63, p < .001 (see Appendix 7.1).

Again mirroring the meta-analyitc results from the combined mother and father data, random-effects model weighted by the inverse variance analogous to ANOVA (D. Wilson, 2016) showed that the strength of the association between assessments of expectant mothers' thoughts and feelings about the unborn infant and postnatal observed parenting did not vary significantly by type of prenatal measure, Q_b (1, 12) = .22, p = .637, sensitivity outcome, Q_b (1, 12) =.26, p = .607, parity, Q_b (1, 12) = 2.22, p = .136, and risk, Q_b (1, 12) =.26, p = .614, confirming the stability of the overall effect.

Finally, the same random-effects linear regression model was run, using inverse variance weights to account for differences in sample size, to examine heterogeneity between study findings on the basis of continuous moderator variables. Heterogeneity in the effect

sizes was not confirmed, Q (3, 10) = 4.49, p = .213. The overall model accounted for 26.58% of the variance in effect sizes. None of the characteristics included (study sample size, ratio of girls, or the interval between the two time points) were significant predictors in the model, suggesting the strength of the association was consistent across sample sizes, gender composition of the sample and the length of time between the prenatal and postnatal measure.

A fail-safe N was calculated to address the file-drawer problem, that is that significant results are disproportionately published, undermining the robustness of the mean effect size. The critical value of 80 was exceeded, with a total of 935 nonsignificant studies needed to reduce the significance of the mean effect size below $p > .05$.

Discussion

A focus on pregnancy and maternal antenatal care is a key strategy for achieving the third United Nations (2015) Sustainable Development Goal to ensure healthy lives and promote lifelong wellbeing. For policy-makers interested in the determinants of positive parenting, pregnancy provides a valuable window of opportunity for interventions. The main goal of this chapter was to test whether variation in expectant parents' thoughts and feelings about the unborn infant predicted individual differences in postnatal observational ratings of parent-infant interactions. Existing studies involving expectant parents have typically adopted two approaches: interviews to obtain parents' representations of the infant and questionnaires to gather information about expectant parents' behaviours, thoughts and feelings towards the unborn infant. These meta-analytic results revealed that each of these methods of assessing prenatal thoughts and feelings showed a modest but significant association with observed postnatal ratings of parent-child interaction quality. While it was hypothesized that the association would be stronger for interview measures than for questionnaires, for sensitivity than other parental outcomes, for studies with a shorter interval between the prenatal and postnatal time points, and for high-risk rather than low-risk samples, none of these contrasts were significant. Interestingly, parent gender was the only significant moderator: associations between prenatal thoughts and feelings and postnatal observed interaction quality were stronger for mothers than fathers. Furthermore, to test whether these differences according to parent gender were genuine and not simply the result of methodological differences between the studies, parallel analyses were conducted using maternal data from each study. Reassuringly, the results from these additional analyses mirrored those from the combined mother and father data, which adds weight to the reported differences in the overall effect according to parent gender.

Below, each of these findings is considered in turn, before discussing the limitations of this meta-analysis and areas for future research. The co-parenting literature not included in the review will also be recognized. Finally, the implications of the results, both in terms of policy, will be considered.

7.1. Different Methods, Similar Results?

Whilst it is well recognised that interview-based measures of expectant parents' representations of their own caregivers during pregnancy predict subsequent parenting and infant attachment security (Fonagy et al., 1993), these findings indicate that prenatal interviews about the unborn infant also have predictive utility. An interesting direction for future research using prenatal interviews would therefore be to adopt a dual focus on both parents' own caregivers and their unborn infants in order to test the interdependence and relative salience of each prenatal representation as a predictor of postnatal parenting. The review also identified five different interview measures of parents' prenatal thoughts and feelings of infants, each typically linked to a different coding system. Another promising avenue for future research would therefore be to evaluate the merits of these alternative interview protocols in order to consolidate findings and establish a sufficient evidence base for conducting a systematic comparison of effect sizes.

The meta-analytic results also showed a surprising but reassuring consistency in associations across studies using interviews and questionnaires. That is, questionnaire-based measures of the parent-foetal relationship also predicted the quality of parent-infant interactions. This is interesting; as alluded to before, though similar in many ways, the questionnaires and interviews clearly differ with regards to developmental timing, with the questionnaires focused on the present experience of pregnancy and the interviews focused on the future child. While it would be premature to equate the parent-foetal relationship with parent-infant attachment, it is clear that this construct warrants further attention. To date, researchers have yet to apply both interviews and questionnaires in the same study. As a result, the relative independence and interplay between the quality of parents' representation of the infant and their concurrent feelings and behaviours towards the fetus as predictors of the quality of postnatal parenting have yet to be established. Given that questionnaires are much more cost-effective than interviews, addressing this methodological gap is another important avenue for future research.

Turning to the postnatal period, the findings again indicated similar results for studies that adopted different outcome measures. Specifically, it was anticipated that the effect size would be stronger for studies that focused upon parental sensitivity rather than other aspects

of parent-infant interaction. The lack of difference in the strength of the association between expectant parents' thoughts and feelings about the unborn infant and postnatal observational ratings of parent-infant interactions may reflect inconsistencies in the measurement and definition of sensitivity. As discussed in Chapter 1, not all sensitivity coding schemes follow Ainsworth's original outline of the construct. Furthermore, nearly every study identified in this meta-analysis applied a different scheme to code the parent-infant observations (see Table 7.2) and so it was not possible to determine whether choice of coding scheme moderated the association between prenatal measures of thoughts and feelings about the unborn infant and observed postnatal interaction quality. A recommendation for the future is for researchers to be more consistent in their choice of methods to allow for further moderation analyses to be conducted.

Counter to expectations, the findings showed that the strength of the association between prenatal and postnatal measures was not stronger for studies with a shorter intervening period. Confirming this, additional moderator analyses not presented showed that the strength of the association did not differ according to trimester or child age. This may reflect the focus on the early postnatal period, as only one study examined parent-child interactions beyond the first 12 months. The addition of longer intervals in future studies may reveal that associations between expectant parents' thoughts about the infant and the quality of parent-infant interactions becomes attenuated over time as children become more active partners in their relationships. It is also important for future research to establish whether variation in these prenatal constructs is associated with later child outcomes. Informed by recent models (e.g., Grusec & Davidov, 2010) that highlight the domain-specific nature of parenting, future research should include several parent and child outcomes in order to identify specific links between particular profiles of prenatal thoughts and feelings and particular parent or child outcomes.

The findings also indicated that the strength of the association between prenatal measures and observed postnatal parent-infant interaction quality was consistent across different sample compositions. In particular, counter to expectations, the association was not stronger for high-risk samples than for low-risk samples. However, this lack of moderation effect may simply reflect the small number of studies recruiting high-risk groups and the inconsistencies in the reporting of sample characteristics. For example, some studies did not provide key information on the socio-economic status (SES) of the sample. In these cases, as research in this area tends to use middle class samples unless clearly examining a risk variable (e.g., Pajulo et al., 2012), it was assumed that there was a lack of SES risk within the

sample. Unfortunately, power restrictions meant that the two risk categories (low SES and clinical risk) needed to be combined and so it was not possible to explore whether different types of risk moderated the association between prenatal thoughts and feelings about the unborn infant and postnatal parenting. In addition, parity also did not moderate the strength of the association. However, the lack of studies that focused explicitly on later-born children meant that first-time expectant parent samples were compared with samples of expectant parents with a mixed experience of parenthood (e.g., first and second time parents). As a result, the null-effect of parity should be viewed with caution. Similarly, it was not possible to glean information surrounding the nature of conception from the majority of the studies, specifically whether or not the pregnancy was planned or assisted reproductive technologies (ART) were used, and these may have a substantial impact on the variation in prenatal scores and potentially subsequent postnatal interactions. For example, Cairo et al. (2012) found that mothers and fathers using ART reported significantly higher foetal bonding than the natural conception group. A review by Gipson, Koenig and Hindin (2008) noted that women with unintended pregnancies were at an increased risk for postnatal depression which subsequently may impact on parent-child interaction quality. However, as these data were not always reported, it was not possible to explore group differences within this review. It is hoped that this review will stimulate further research that has greater sample diversity alongside greater consistency in measurement and reporting.

Within each study included in the meta-analysis, factors that correlated with either the prenatal or postnatal measures. For example, Alvarenga, Dazzani, Da Rocha Lordelo, Dos Santos Alfaya and Piccinni (2013) reported that symptoms of minor psychiatric disorders showed a positive association with postnatal non-sensitive sequences but did not report on the association with the prenatal maternal-foetal relationship. Similarly, Lucassen et al. (2015) collected data on a variety of background measures but did not include these in a correlation table. Unfortunately, the lack of consistency regarding which measures were included or reported constrains the conclusions that could be reached regarding the independence, relative salience or interaction between specific predictors of interaction quality.

7.1. Links between Prenatal Thoughts and Postnatal Interactions are Stronger for Mothers than Fathers

Consistent with Ives' (2014) theoretical proposal that expectant fathers' lack of physical connection to the foetus presents a challenge in developing early close relationships with the infant, empirical evidence indicates that almost half (49%) of paternal prenatal narratives are categorised as disengaged with a further 7% categorised as distorted

(Vreeswijk et al., 2014). In contrast, studies of expectant mothers consistently report that almost two-thirds of narratives can be classified as balanced (Benoit et al., 1997; Vreeswijk et al., 2012). This contrast between expectant mothers' and fathers' ability to construct a balanced representation of their unborn infant may explain the stronger association between prenatal thoughts and observed parenting for mothers than for fathers. That said, it is worth noting that methodological factors may also play an important moderating role. In particular, studies that have used questionnaires rather than interviews indicate greater stability of responses across the transition to parenthood for fathers than mothers (e.g., de Cock et al., 2016). To date however, only a very limited number of studies have included expectant fathers and so testing whether the type of prenatal assessment moderates the contrast in stability for mothers and fathers requires a larger evidence base.

7.1. What About Co-Parenting?

In a previous meta-analysis, Teubert and Pinquart (2010) highlighted the importance of different aspects of co-parenting for child-adjustment, for example co-parenting conflict was modestly associated with child internalising problems. Furthermore, recent research by Latham, Mark and Oliver (2017) emphasised the interaction between co-parenting and coercive parenting, with mothers' harsh parenting associated with child disruptive behaviour only in the context of perceived higher levels of co-parenting. Though surprised by the finding, the researchers propose that the high levels of co-parenting may reflect an acceptance of individual parenting strategies, regardless of their suitability. Due to a focus on individuals, the current review did not consider co-parenting research despite a number of hits during the search. However, it was identified that researchers have used pre- and postnatal versions of the Lausanne Trilogue Play task across the transition to parenthood to tap into key co-parenting constructs, such as cooperation (Carneiro, Corboz-Warnery, & Fivaz-Depeursinge, 2006). The co-parenting dimensions inherently create data pertaining to the dyad and so extracting data for a meta-analysis is complex. Preliminary analyses of the couple data suggest a modest association between pre- and postnatal co-parenting across the transition to parenthood (K = 4, $M\ r$ = .31, 95%CI [.10, .52], Z = 2.89, p = .004) although this should be interpreted with caution as confidence in the heterogeneity of the effect is limited (Q = 6.71, p = .081). A non-significant Q suggests homogeneity in the distribution of effect sizes, thus a random-effects model cannot be used to analyse the effect sizes. As discussed earlier, Field and Gillett (2010) emphasise the use of a random-effects model for social science data is drawn from the real world, where heterogeneity is the norm. Thus, more

research is required to establish if this effect between pre and postnatal co-parenting is robust and generalisable.

7.1. Implications

Rather than adding pressure to expectant parents by attempting to identify key characteristics of a psychologically healthy pregnancy, this review aimed to add clarity to the ongoing debate about prenatal determinants of parenting. There is a delicate balance to be struck between ensuring parents are given the information they need to make decisions and restricting parents' autonomy with regards to their thoughts or behaviours during pregnancy (or beyond). At a time when statistically women have never been safer giving birth, it is sad to hear that many do not feel supported during the prenatal and postnatal period (Plotkin, 2017). The findings of this meta-analysis suggest that expectant parents might also benefit from further discussion surrounding their infant itself – what kind of person do they expect to meet? How are they thinking about the foetus? However, the findings from the current meta-analysis are based on a small set of studies and so it is too early to draw any firm conclusions regarding the utility of evaluating expectant parents' thoughts and feelings. For example, the inability to connect with or think about their unborn infant might be a useful coping strategy or defence mechanism in the face of prior loss or infertility (L. Lee, Mckenzie-Mcharg, & Horsch, 2013). Interviews with women taking part in New FAMS highlight this. For example, one expectant mother said, "*I don't know…think about it, cause (pause) going through IVF and stuff like that, I try not to think too far ahead, because yeah you're worried that it's not gonna happen so you just try to, you know, ignore it for a little bit.*" Equally, an emphasis on thinking or feeling a certain way about the unborn infant may be culturally inappropriate or contribute to prenatal anxiety. Indeed, another expectant mother said, "*I have had kind of, time during the pregnancy where I'd been really worried that I didn't actually feel anything about the bump itself because I know people are supposed to bond with the bump and talk to it and (pause) you know sing to it but I didn't really feel anything…it then started to worry me that i didn't feel these overwhelming love urges towards the alien thing that's in me.*" A lack of maternal-foetal relationship is therefore not synonymous with maternal-foetal conflict, that is a situation where the expectant mothers' desires, for example with regards to medical treatment, are contrary to those that would benefit the foetus (Fasouliotis & Schenker, 2000). That said, the meta-analytic results do suggest that future research into how prenatal thoughts and feelings might matter for postnatal parenting is warranted and may offer promising avenues for tailoring early interventions.

7.1. **Conclusions**

Overall, this review provides a unique contribution to the field by bringing together two strands of research that adopt different methods to capture variability in expectant parents' thoughts regarding their unborn infant. This meta-analysis revealed a stable and significant association between prenatal thoughts and feelings about the unborn infant and postnatal measures of parenting. The only significant moderator of the association was parent gender: associations between prenatal thoughts and feelings and postnatal observed interaction quality were stronger for mothers than fathers. Future research should involve more diverse samples, unpack the role of measurement (in both pre- and postnatal schemes), identify the specificity of the association between prenatal thoughts and feelings and postnatal parent-child interaction quality and ultimately examine associations with child outcomes. In the next and final chapter, I will reflect on these meta-analytic findings and other themes arising from the findings reported in this thesis.

Chapter 8: Discussion

By capturing first-time mothers' and fathers' thoughts, feelings and behaviours through detailed interviews, observations and questionnaires, the aim of this thesis was to provide a rich portrayal of the emergence of parents' capacity to acknowledge, through talk and behaviour, that their infants have independent minds; a process filled with joy, but also elements of confusion, and sometimes pain. In this chapter I reflect on the meta-analytic results presented in Chapter 7 alongside the empirical findings from this thesis and discuss the theoretical and methodological contributions emerging from each. First, however, I outline both the value and constraints of drawing on data from the New Fathers and Mothers Study.

Central to the contribution of this thesis is the inclusion of both mothers *and* fathers. This enabled parallel analyses to be conducted for both parents whilst also ensuring data were analysed in a truly family systems inspired approach. The key findings emerging from this thesis attest to the similarities between mothers' and fathers' talk and behaviour across the transition to parenthood, but also emphasise the varying roles that different subsystems have on influencing the emergence of mothers' and fathers' ability to represent and sensitively respond to their infant as an individual. With this in mind, I conclude by considering the clinical and policy implications of my findings and suggest areas for future research.

8.1. The New Fathers and Mothers Study

Framing this doctoral research within a large-scale, prospective study of both mothers and fathers provided unique opportunities. First, the findings and conclusions are strengthened by the multi-method, multi-informant and multi-time point approach. Also, at a time when the inclusion of fathers seems obvious from a lay perspective, it is worth noting that fathers are still typically only included as an afterthought in the limitations sections of empirical articles on mothers and infants and mothers' transition to parenthood. Moreover, recruiting, interviewing and observing over 200 couples across the transition to parenthood would have been beyond the capabilities of one PhD student. Working in a team ensured that each researcher was able to maintain 'blindness' to specific families, which reduced coder bias (Viswanathan, Berkman, Dryden & Hartling, 2013). Second, being an international study, I was able to draw on the expertise of co-investigators. In particular, colleagues in the Netherlands trained the New FAMS team in the Ainsworth sensitivity scales. Finally, the large sample size enabled the use of statistical analyses that could address the complexity of influences on parents' developing sensitivity. Previous studies have applied APIM to investigate couple adjustment rather than parent behaviours, for example looking at the

impact of perceived parenting agreement on mothers' and fathers' wellbeing and couple relationship satisfaction (Don, Biehle, & Mickelson, 2013). The use of this technique was not originally outlined in the framing study and so my analyses enabled a fresh and unique perspective on the data.

I have directly contributed to New FAMS at all stages of the research process; securing NHS ethical approval, recruiting, collecting data at all three time points, coding interviews and observations from each time point and contributing to the dissemination of research findings to the public, clinicians, academics and charities (please note my specific contribution in Appendix 2.1). Beyond the original scope of the framing study, my PhD questions required families to complete the Who Does What? questionnaire and participate in in-depth interviews, discussing their expectations of parenthood, hopes and fears, at each time point. The prenatal interview was extremely valuable for establishing rapport, which in turn contributed to the very high retention rate of couples over time and ensured that there was enough power to conduct longitudinal analyses. In response to the publication of new findings, I also added the narrative coherence scheme to the coding of the five-minute speech sample, which had never been done before. Serendipitously, colleagues in the Netherlands had pre-established links with Israeli researchers with expertise in parent insightfulness and coherence; thus, the international nature of the study facilitated my contact and training in this scheme. From this basis, two clear methodological contributions of my thesis to the literature are the adaptation of this coding scheme for use during pregnancy and the demonstration of its validity with expectant mothers *and* fathers.

Inevitably there were also certain constraints, the foremost of which pertains to the demographic profile of the New FAMS sample. Asking expectant parents to take part in a study that would involve them being filmed with their infants evidently narrows the pool of willing participants. Reflecting the local population, the couples who took part were overwhelmingly White British, middle-class and well-educated and as such any conclusions drawn about the transition to parenthood are made with the caveat that they apply to this type of first-time parent. This echoes Rothbaum, Rosen, Ujie and Uchida (2002) who note that family systems theory is a lens to look at Western behaviour and functioning and as such researchers should not presume universality or even within-culture applicability.

Despite the sample limitations, five factors deserve note. First, recruitment in this area of research is notoriously difficult yet New FAMS was identified as a shining example of recruitment success by the NHS. Second, whilst income levels are high in the New FAMS sample, Cambridge (and its surrounding villages) is the third most expensive city in the UK

(Lloyds, 2015), as such it can be argued that study families do not necessarily have a large income-to-needs ratio. Third, the constructs of interest in the current study have been identified as universal. Fourth, a main aim of New FAMS was to examine the impact of prenatal wellbeing on infants' developing executive function and from this perspective having a sample that was demographically relatively homogenous enabled important confounds to be minimised, namely variation in income, which is often associated with mental health. Finally, New FAMS has similar demographics to the Becoming a Family Project and other more recent transition to parenthood studies (e.g., New Parents Project - Yavorsky, Kamp Dush, & Schoppe-Sullivan, 2015) enabling comparisons to be made between studies. Thus, although the current sample does not reflect all individuals who are making the transition to parenthood, the conclusions from this thesis remain a valuable contribution.

8.2. Expectant Parents can be Mind-Minded and Coherent

Rather than creating yet more measures, in Chapter 3 I adopted methods that had been successfully used postnatally to measure parents' thoughts and feelings about their children and demonstrated their feasibility in the prenatal context. The five-minute speech sample allows for open-ended responses that, like in-depth interviews, gauge parents' representations of their children, but also has the brevity (both in terms of data collection and coding) that researchers typically value in questionnaires. The application of the narrative coherence coding scheme presents a two-fold novel contribution to the field in terms of demonstrating that it can be successfully used on the *prenatal* speech samples of both mothers *and* fathers. Whilst expectant parents typically describe non-mental attributes that are borderline coherent, they are capable of describing varied attributes of their infant in a coherent manner. However, unlike the study conducted by Arnott and Meins (2008), it was possible to examine variation in the frequency and proportion of mental attributes. This was important for questions guiding subsequent chapters, specifically surrounding the stability of mind-mindedness over the transition to parenthood and the potential importance of prenatal variation in mental attributes for interaction quality.

Reassuringly, this coding appears to have captured meaningful individual differences in both mothers' and fathers' coherence. In other words, a lack of physical connection to the foetus did not appear to significantly impede fathers' ability to talk about their unborn child. Comparing the representations of expectant lesbian mothers, where one is carrying the pregnancy and the other is not, or gay fathers becoming parents via surrogates (e.g., Blake et al., 2017), would provide a stringent test of whether gender, genetic or gestational link

matters for the quality of expectant parents' representations. One way that intended mothers who use a surrogate have been shown to adopt the identity of mother is through participation in the prenatal care of the surrogate (Teman, 2010). In a similar way, becoming involved and helping to carry some of the medical responsibility during pregnancy may help fathers to do the psychological work of transforming the abstract concept of a foetus into a child that will be theirs.

Interestingly only one difference emerged on the basis of parent gender: on average, expectant mothers were more able to focus on the infant and the future parent-infant relationship than were expectant fathers. Echoing this pattern of overwhelming similarities between mothers and fathers, Psychogiou, Netsi, Sethna and Ramchandani (2013) have reported equivalent levels of expressed emotion and warmth in both mothers and fathers of 1-year-olds. Thus, the lack of gender differences in prenatal mind-mindedness and coherence observed in New FAMS is in line with the current consensus that parenting constructs are equally applicable to both mothers and fathers (Fagan et al., 2014).

In New FAMS, the percentage of coherent maternal narratives (41%) was higher than those reported in previous studies with mothers of pre-schoolers (31.55%) (Sher-Censor et al., 2016). However, Sher-Censor's (2016) sample was younger, largely Hispanic (57.75%) and employed in 'blue-collar' professions. Research examining cultural differences in parents' representations of their children is limited. However, in a small-scale study of 42 mother-infant dyads, Minde, Tidmarsh and Hughes (2001) found Canadian mothers' representations scored from the WMCI were more balanced than mothers with immigrant status, suggesting that across cultures it might not be universally appropriate to talk about feelings relating to one's child. Furthermore, as reported in Chapter 3, there was limited variation in expectant parents' scores on the acceptance subscales, most likely due to the community nature of the sample and the planned nature of their pregnancies. Clearly understanding of narrative coherence would benefit from future research with more diverse samples. This call for future research with more diverse samples is echoed in the findings that pregnancy characteristics appeared to have a different impact on dimensions contributing to coherence dependent on parent gender. Compared to parents who conceived naturally, for couples who used ART, expectant mothers were less likely to provide a narrative completely focused on their unborn infant (i.e., stray off-topic) and display lower levels of separateness (i.e., less able to think of their infant as a distinct individual with their own personality). Whilst these findings are based on a small number of couples, thus limiting their generalisability, the results do echo those of a study of 133 mothers by McMahon, Tennant,

Ungerer and Saunders (1999). Specifically, McMahon and colleagues (1999) found, compared to the natural conception group, expectant mothers who used IVF were less likely to report conversations with their unborn infant and more likely to report idealised views of pregnancy. These findings add weight to the argument put forward by McMahon and colleagues (1999) that expectant mothers who use ART may be more likely to adopt a more avoidant coping style during pregnancy in order to buffer themselves against the potential disappointment of the pregnancy outcome. In New FAMS, use of ART was not associated with group differences in dimensions of coherence for expectant fathers. Future research, for example with expectant parents who use a surrogate or lesbian expectant mothers, will provide an interesting test of the experience of ART on the construction of prenatal representations of the infant and whether this is moderated by gender and/or gestation.

8.3. Prenatal Mind-Mindedness and Coherence are Distinct but Associated Constructs

The moderate strength of the correlation between mind-mindedness and coherence presented in Chapter 3 suggests that these constructs reflect distinct aspects of both the parent-child relationship and parent cognitions. Whilst mind-mindedness may be necessary to be coherent, it is not sufficient. This finding represents a significant contribution to the body of work examining parental cognitions, which to date has only examined adults' coherence during the AAI and mothers' observational mind-mindedness (e.g., Bernier & Dozier, 2003; Milligan, Khoury, Benoit, & Atkinson, 2015). Counter to my results, Milligan et al. (2015) found a negative association between mothers' coherence of mind and mind-mindedness. Again, the timing, choice and focus of the measure was important when interpreting such inconsistencies. By assessing mothers' mind-related comments from talk to an 'empty chair' (a technique typically used to active the attachment system), Milligan et al. (2015) did not capture mothers' spontaneous (or the appropriateness of) mind-related comments nor did they capture mothers' representations of their infants. Complex relations appear to exist between different aspects of parent representations and more research is needed to understand the interwoven nature of these factors and how they relate to subsequent parent and child behaviour. In line with the current shift away from focusing on categories (e.g., parenting styles, AAI or strange situation classification) (Smetana, 2017), my results highlight the value of considering dimensions in both mothers and fathers.

8.4. Coherence of Representations is More Closely Linked to Couple Relationship Quality in Expectant Fathers than in Expectant Mothers

Despite the similarities between expectant mothers' and fathers' mind-mindedness and coherence, parent gender differences did emerge in Chapter 3 when looking at associations with other measures. For fathers, higher levels of life satisfaction and greater couple relationship quality were associated with higher ratings of coherence, but this same association was not evident for mothers. As this is the first time the narrative coherence coding scheme has been applied to fathers' speech samples it is unknown whether these gender differences are typical. Moreover, the findings are at odds with some previous postnatal studies. For example, in a study involving 163 families with 12 month olds, Psychogiou et al. (2013) found depression and couple relationship quality was predictive of maternal but not paternal expressed emotion.

8.5. Mothers' and Fathers' Sensitivity and Mind-Mindedness

As predicted in Chapters 4 and 5, parental sensitivity and mind-mindedness both increased over time. Such an increase implies that it is experience and developing a relationship with the infant that count (Golombok, 2015; Lamb, 2012) alongside the infants' growing capabilities to communicate their desires. Furthermore, mind-mindedness and sensitivity were concurrently associated for both mothers and fathers but at different points during infancy. The similarity between parents supports Fagan et al.'s (2014) argument that parenting dimensions are not 'conceptually unique' between mothers and fathers, though it is important not to assume similarity or difference either within or across genders. Testament to this, there were different factors that contributed to within gender variations in these constructs. Only by applying the same methods to assess the thoughts, feelings, representations and behaviours of both mothers and fathers can it be appreciated that the same outcomes might be the result of different processes for different parents, which may be on the basis of gender or simply reflect differences between primary versus secondary caregivers.

8.6.1. Contrasting Levels of Sensitivity

Counter to expectations, in Chapter 4, average ratings of sensitivity during lap-play interactions at 4 months showed a modest contrast, with fathers receiving higher ratings than mothers. However, by 14 months the reverse pattern was evident. It should be noted that the modal ratings of sensitivity were 'inconsistently sensitive' for both parents (i.e., caregivers are more sensitive than insensitive but there might be occasional mismatches between infants' cues and parents' actions). This appears lower than reports with studies of mothers

and their 6 month olds (e.g., Farrow & Blissett, 2014). However, Farrow and Blisset's (2014) scores were based on a 10-minute observation of free-play with toys. It has been acknowledged that researchers interested in parental sensitivity have used a variety of observation settings, such as free-play with and without toys, naturalistic, feeding, teaching tasks, demanding tasks (e.g., 'don't touch') and face-to-face interactions (Mesman & Emmen, 2013). Compared to observations of naturalistic sessions, Tamis-LeMonda, Kuchirko, Luo, Escobar and Bornstein (2017) found that mothers talked more to their 13-month-olds and used a more diverse range of words during structured interactions with toys. Thus, one plausible explanation for this between-study contrast is that the task of engaging with an infant without toys is more challenging as parents must rely on their own repertoire of interaction skills. Moreover, it should also be remembered that Ainsworth's original scheme (1974) was based upon observations of several hours of naturalistic behaviour, a feat that would now be impractical in large-scale studies with limited resources.

In previous studies, mothers have typically received higher ratings of sensitivity than fathers (Hallers-Haalboom et al., 2017) but this is not always the case; for example, Braungart-Rieker et al. (2001) reported no difference in parental ratings at 4 months. One possible explanation for the modest contrast observed in Chapter 4 at 4 months is that the instruction to "play with your child as you usually do" appeared to have elicited different kinds of activities from mothers and fathers. In particular, additional coding of the lap-play observations for 'playfulness', as indicated by variation in play types (e.g., pretence, physical), cues (e.g., visual, auditory) and intensity (e.g., energy level), highlighted that mothers were more likely than fathers to sing nursery rhymes or engage in action games involving parts of their infants' bodies (Basilio, Laverty, & Hughes, 2017). Though usually warm and playful in nature, such interactions are inherently parent-led and as such tend to lead to reduced scores for sensitivity. Supporting this, Basilio et al. (2017) showed that playfulness and sensitivity were inversely related.

Equally, recent studies regarding the predictive utility of early sensitivity have focused on the importance of contextual contrasts, with parents' sensitive responses to infant distress showing much stronger predictive utility than more general sensitivity (Leerkes et al., 2016). It is possible that different findings would have emerged in parents' sensitivity had it been measured in relation to distress. Thus, methodological factors may be partly responsible for the difference in mothers' and fathers' sensitivity rather than a fundamental difference between mothers and fathers during infancy. On the other hand, it might be the case that mothers' sensitivity is more subject to change during infancy, especially as taking on the

primary caregiver role provides mothers with more opportunities to refine their ability to tune into their infants' cues. Mothers' parenting may be more subject to child-driven effects than is fathers', as illustrated by the contribution of infant affect and surgency to mothers' sensitivity at 14 months, discussed further below.

8.6.2. Contrasting Levels of Stability

Despite increases in sensitivity and mind-mindedness for both mothers and fathers, individual differences were not equally stable. In particular, individual differences in fathers' (but not mothers') sensitivity showed stability over time. This contrast is at odds with findings from Hallers-Haalboom et al. (2017) who reported stability in both mothers' and fathers' sensitivity. However, their study focused on parental responses to toddlers and pre-schoolers during the challenging 'Don't Touch' task. As noted earlier, one possible account of this instability might rest on mothers' greater experience with the infant. However, recalling the influence of child characteristics on mind-mindedness, it was not the case the fathers' sensitivity was equally stable towards all infants. On closer inspection, the stability of New FAMS fathers' sensitivity held for parents of sons but a different story emerged for parents of daughters (a finding that is discussed in greater depth later in this chapter).

In contrast to sensitivity, the use of APIM in Chapter 5 made clear that there was greater stability for mothers' mind-mindedness than fathers'. It could be the case that the greater maternal stability reflects the continuation of a connection to the infant that develops during pregnancy and grows in the first year. Fathers' reduced stability is also reflected in the finding that additional factors (e.g., couple relationship quality and child characteristics) contributed to an increase in fathers' mind-mindedness across the transition to parenthood. Taken together, these findings suggest that fathers' representations are more likely to change and that this change is more susceptible to influence from other factors. Fathers who provided descriptions of their infants during pregnancy that were rated as 'incoherent' were more likely to make greater gains in their mind-mindedness over time. This is reminiscent of findings with the WMCI. Vreeswijk et al. (2014) reported that expectant fathers were more likely than mothers to shift from providing unbalanced representations of their infant during pregnancy to balanced representations at 12 months. It could be simply that these 'incoherent' fathers have more room for improvement. Alternatively, as the child develops, their behaviour might help the father develop a more vivid and mind-minded representation, as reflected by the unique contribution of infant characteristics to this gain (i.e., affect at 4 months).

Interestingly for fathers, mind-mindedness assessed during pregnancy but not mind-mindedness at 4 months predicted mind-mindedness at 14 months. One informal impression formed whilst coding is that it is perhaps worth considering in the future whether when asked to imagine their infant, expectant fathers describe features of an older child rather than thinking about the infants' first few months of life. Typifying this, during pregnancy one father said, *"my life is based around sport, and it would be nice to be able to share that with my child…I'm hoping that my child will have the same passion for it that I do. Or a passion for anything else similar. I mean if it's music that they take a particular interest in, then they can do that."* However, at 4 months, the same father was focused on the present, *"if he's hungry or if he needs changing or if he's really tired he'll have a whinge for up to five minutes and then that it's it, back to sleep, so he's really easy to kind of get along with."* Overall, these findings add to the notion that prenatal and postnatal mind-mindedness might reflect different constructs, particularly for fathers. As a result, the representational measure may not provide comparable indices of mind-mindedness at different points across the transition to parenthood.

8.6.3. Different Determinants

Testament to their being distinct constructs, mind-mindedness and sensitivity had different determinants, which were unique for mothers and fathers. Chapter 5 aimed to increase theoretical understanding of the representational measure of mind-mindedness by extending its use across the transition to parenthood with both mothers and fathers.

The tasks of describing the imagined infant during pregnancy versus the physical child are clearly different, but in line with prior research mind-mindedness in each case appeared unrelated to variation in demographics or wellbeing. Echoing Demers et al. (2010), ratings of infant temperamental distress were associated with higher levels of paternal mind-mindedness at 4 months. Previous and contradictory findings (e.g., Meins et al., 2001) have been based upon the observational measure of mind-mindedness for mothers. Overall, the findings presented in Chapter 5 suggest that the task of responding to one's child in the moment is different to being asked to reflect upon the child as a person during an interview.

In terms of infant influences, infants who used smiling to elicit parental responses during the 'still-face' episode had fathers who displayed higher levels of mind-mindedness at 14 months, further suggesting that child behaviour may stimulate parental thought. This finding brings to mind a review by Mesman et al. (2009) that identified that infants who used more eliciting behaviour during the still-face episode with their mothers were more likely to be classified as securely attached in the strange situation. It could be that such behaviours

promote positive parent-child interactions, which facilitate the development of secure attachments. Alternatively, it could be the case that these parents are already more sensitive and so these infant behaviours are early indices of infant security (i.e., the infant does not react to the rupture in the interaction by increasing negative affect because they know their parent will re-engage). Specifically, the lack of reduction in positive affect during the still-face might reflect infants' capacity to independently regulate their emotions, at least for a short time. Due to constraints on the framing study, unfortunately it was not possible to conduct the strange situation paradigm with the current sample.

Child characteristics were also influential for mothers' and fathers' sensitivity at 14 months, as reported in Chapter 6. For fathers, higher ratings of sensitivity were marginally associated with greater infant receptive vocabulary. A simple explanation of this result rests upon the ease with which parents can both understand and respond to their infants' cues appropriately if the infant has some understanding of their parents' requests or verbal attempts to initiate play. It was noted in Chapter 5 that fathers' mind-mindedness at 4 months was associated with their sons' greater receptive vocabulary at 14 months. Early mind-mindedness may foster infant language development, which might in turn influence parents' ability to respond sensitively. Evidence to support this idea comes from a low-intensity video-based randomised control trial aimed at promoting infant language in 142 families (McGillion, Pine, Herbert, & Matthews, 2017). When their infants were 11 months old, participants were allocated to a month-long intervention either promoting caregiver contingent talk, that is, talking about what is currently the focus of infants' attention, or dental health. Families were subsequently seen at 12, 18 and 24 months. Compared to the parents in the dental control group, parents in the contingent-talk intervention group talked more at 12 months and a greater proportion of this talk was contingent. At 18 months, the intervention group had outperformed the control group in terms of infant expressive vocabulary. Conceptually there are clear links between contingent-talk and mind-mindedness. However, it should be noted that in Chapter 5, infant vocabulary was measured via parent-report at 14 months. It could therefore be that more mind-minded parents attribute a higher level of understanding to their infants, rather than infant receptive vocabulary serving as a sensitivity stimulant.

For mothers, sensitivity ratings were higher at 14 months when their infants were concurrently reported as displaying higher levels of surgency. This stands in contrast to Planalp et al. (2013), who found mothers were more likely to respond in a sensitive manner when their infant was rated as showing lower levels of surgency. Infant surgency is linked to

the personality dimension extraversion and characterised by high activity levels, impulsivity and a drive for engagement. Typically, parents find it harder to respond in a sensitive manner to infants with more demanding or tiring temperaments. However, it has been noted that such behaviour can stimulate sensitivity in highly-educated samples (e.g., (e.g., Kotila et al., 2014). Overall, the contribution of infants' behaviour to parents' mind-mindedness and sensitivity at 14 months supports the notion of parent-child relationships as transactional in nature.

Turning to parents' behaviour, parents' prenatal mind-mindedness and coherence did not explain any unique variance in parents' sensitivity at either 4 or 14 months. This finding stands in contrast to the overall significant association between expectant mothers' thoughts and feelings about their unborn infant and postnatal parenting quality presented in the meta-analysis in Chapter 7. However, a nonsignificant relation still provides an important theoretical contribution to the field and should not rule out further inquiry. Indeed, as discussed in the previous chapter, key lessons emerged from the meta-analysis reported in Chapter 7: there is inconsistent measurement of dimensions of parenting (both pre- and postnatally) and a very limited pool of data on fathers. Interestingly, while parent gender moderated the strength of this association, choice of prenatal measure did not and additional analyses with only maternal data add strength to this finding. However, it should be noted that the limited number of studies measuring expectant fathers' thoughts and feelings about the unborn infant and subsequent interaction quality does not rule out the possibility that type of prenatal measure might moderate the strength of the association for fathers.

Consistent with Belsky's (1984) model, individual characteristics were strong influences on parents' sensitivity. Higher levels of paternal education was associated with higher paternal sensitivity at both 4 and 14 months, and marginally higher maternal sensitivity at 14 months. This is consistent with Hall et al.'s (2014) finding that more educated fathers were more sensitive in their interactions with their infants at 1, 6 and 24 months. The finding reported in Chapter 6 adds further support to the arguments in the recent Social Policy Report produced by the Society for Research in Child Development. Specifically, Teti, Cole, Carbrera, Goodman and McLoyd's (2017) first recommendation to improve the quality of parent-child interactions, and subsequent child outcomes, is that policies should focus on increasing the chance of individuals graduating high school and completing some tertiary education.

In terms of prenatal expectations, mothers' higher predicted involvement in childcare during pregnancy was marginally inversely related to her sensitivity at 14 months. During

pregnancy, on average, both expectant parents expected that mothers would be more involved in caregiving despite the majority endorsing an egalitarian view of parenting. Yet, by 4 and 14 months this imbalance in childcare was greater than anticipated by either parent. However, the findings from Chapter 6 suggest that the nature of prenatal expectations of parenthood and not simply violations of these expectations are important. This is in line with the findings from an earlier small-scale study of 45 couples. Specifically, McHale and Rotman (2007) found mothers' pessimism about future parenthood (e.g., a negative outlook of parenthood, expected unfairness in the division of childcare) was associated with poorer co-parenting cohesion at 3 and 5 months. Future research examining data from prenatal interviews that probed further into expected involvement may be used to investigate whether there are identifying features of mothers who, even during pregnancy, expected to shoulder the burden of childcare, which may explain their later reduced sensitivity.

8.6. Mind-Mindedness: A Precursor to Sensitivity in Mothers but not Fathers

Prospective studies are ideally designed to answer the question of whether mind-mindedness precedes sensitivity and identify the extent to which these constructs are conceptually distinct (McMahon & Bernier, 2017). The findings from Chapter 6 add weight to the notion that mind-mindedness is a precursor to sensitivity. However, this tentative conclusion is accompanied by caveats, notably that this association was true (i) for mothers but not fathers and (ii) when mind-mindedness was assessed in early infancy rather than in pregnancy.

To date, research examining parental mind-mindedness in relation to sensitivity during infancy has been restricted to mothers (Zeegers et al., 2017). Thus, though modest in magnitude, the finding that mind-mindedness during infancy appears to stimulate mothers' but not fathers' sensitivity is consistent with the proposed developmental unfolding of sensitivity tested by Laranjo et al. (2008). Such differences may reflect different developmental pathways for fathers (e.g., Lundy, 2013; Lundy & Fyfe, 2016). Though similar associations between mothers' and fathers' mind-mindedness and behaviour have also been reported (e.g., Lundy, 2003). However, these findings were seen in parents of pre-schoolers and not infants. Clearly to inform theory it is important for research to encompass different developmental periods.

Recent research on the conceptually related measure of insightfulness also suggests that being able to think about one's child in a more nuanced and comprehensive manner is beneficial for parent-child interactions. In the first study to examine fathers' insightfulness, Marcu, Oppenheim and Koren-Karie (2016) found similar proportions of 'insightful' mothers

and fathers and more positive family triadic observations when both mothers and fathers were rated as 'insightful' compared with families where one or both parents were categorised as 'noninsightful'. However, as the focus was upon co-parenting behaviour it is not possible from Marcu et al.'s (2016) findings to tease apart how paternal insightfulness contributes to individual parent behaviour. More fine-grained analysis of specific insightfulness subscales would help further understanding of the extent to which specific dimensions of parental mentalising are distinct from one another, whether or not these precede or relate to sensitivity and how this might differ for mothers and fathers.

8.7. Mind-Mindedness: A Precursor to Sensitivity in Early Infancy but Not Pregnancy

The use of the representational measure enabled mind-mindedness to be assessed during pregnancy, which allowed questions regarding the development of sensitivity to be examined across the perinatal period in Chapters 4 and 6. However, it was only postnatal mind-mindedness assessed during early infancy, rather than prenatal mind-mindedness, that contributed to sensitivity at 14 months. Arnott and Meins (2008) found that being able to say anything at all during pregnancy was important for mothers' later appropriate mind-related talk, whilst for expectant fathers being able to provide a mind-related description during pregnancy was associated with an increased likelihood of using both more appropriate and non-attuned mind-related comments during later father-infant interactions. However, additional comparisons of parents' sensitivity in New FAMS on the basis of mental comments as present or absent did not reveal any group differences in sensitivity. On the one hand, this finding might suggest that prenatal mind-mindedness is in some respects conceptually different and therefore might be associated with outcomes not assessed in this thesis. On the other hand, as previously discussed, prenatal mind-mindedness may be associated with parents' sensitivity to distress (Leerkes, Nayena Blankson, & O'Brien, 2009). Critically, parents' sensitivity towards different cues is not equally predictive of child outcomes. McElwain and Booth-Laforce (2006) illustrated this point in their examination of data collected as part of the NICHD Study of Early Child Care. Specifically, they found greater maternal sensitivity to distress (e.g., responses to infant cries or frets) rather than non-distress (e.g., responses to social gestures, expressions) during free-play at 6 months increased the odds of infants being classified as securely attached at 15 months.

Another illustration of this point is exciting new research that has highlighted the importance of considering context when examining differences between mothers and fathers. Specifically, fathers' sensitivity during book reading but not during free-play was associated

with children's higher cognitive abilities at age 2, even when controlling for paternal depression, education, age and maternal sensitivity (Sethna et al., 2017). In contrast, fathers' engagement during free-play was positively associated with children's cognitive abilities.

Alternatively, it might be that the hypothesised indirect effect of prenatal mind-mindedness via postnatal mind-mindedness operates via the behavioural rather than representational mechanism: that is, through appropriate mind-related comments made during early infancy. Indeed, Arnott and Meins (2008) found fathers who made a mind-minded comment during pregnancy were more likely to use appropriate mind-related comments during interactions with their infants at 6 months. It is also possible that there are sleeper effects of prenatal mind-mindedness that have an impact on parents' sensitivity during toddlerhood or the pre-school years.

8.8. Mind-Mindedness and Sensitivity: Conceptually Distinct?

Given that mind-mindedness and sensitivity were neither equally stable, nor necessarily a precursor to one another, and showed different concurrent links for mothers and fathers, it is clear that they are not simply synonymous. For fathers, the two constructs were more strongly linked after the first year of life, whilst for mothers, the positive association was evident in early infancy. As noted earlier, there was some inconsistencies between studies in reporting positive relations between maternal mind-mindedness and sensitivity (e.g., Camberis et al., 2016; Rosenblum et al., 2008) though meta-analytic results suggest an overall positive association between mentalising and sensitivity (Zeegers et al., 2017). Yet it should also be remembered that the findings presented in this thesis are based on the representational, rather than the observational, measure of mind-mindedness.

In a study that adopted the representational measure of mind-mindedness, McMahon and Meins (2012) found that in a sample of 86 mothers and their 4-year-old children (a sample with similar demographics to the families taking part in New FAMS), mind-mindedness was not associated with sensitivity. However, mind-mindedness was positively associated with non-hostility (i.e., low levels of frightening or critical behaviour). My findings add to this evidence base and a clear future direction of research is to explore associations with other parenting behaviours and, crucially, examine whether these are the same for both mothers and fathers. Such analyses are in line with a shift towards thinking about the multi-faceted nature of parenting and suggest that the association between parents' thoughts, feelings and behaviours and children's outcomes may be context-specific (Smetana, 2017).

Recent research examining fathers' reflective functioning suggests that associations should have been found between fathers' mentalising and sensitivity during infancy. In a sample of 81 fathers, Imrie, Golombok and Jadva (2017) assessed parental reflective functioning from the Parent Development Interview and found that fathers' reflective functioning was strongly associated with their sensitivity, structuring, non-intrusiveness and non-hostility during interactions with their 10 month olds. However, though similar in education level to the fathers taking part in New FAMS, all of Imrie et al.'s (2017) sample had conceived using ART and the time between the decision to have their child and conception was on average just under 6 years. Whilst there were no group differences in reflective functioning according to type of treatment (e.g., egg donation, IVF), there was no natural conception control group with whom to compare these results. Yet waiting up to 6 years to conceive suggests that not only were these infants much wanted but these fathers also had a substantial period of time to reflect on becoming a father and had also demonstrated clear commitment to the parent role. Thus, the strong magnitude of the associations may reflect the unique nature of this sample. Imrie et al. (2017) also found that first-time fathers (54% of the sample) were also marginally more likely to display higher levels of reflective functioning, although all fathers were in the moderate to high end of the scale. Presumably because of their longer route to parenthood, these fathers were, on average, much older than those in New FAMS. Recent research has shown older fathers are less likely to view themselves primarily as the financial providers (Macon, Tamis-LeMonda, Cabrera, & McFadden, 2017), indicating that they are more likely to spend more time with their infants.

Imrie et al.'s (2017) findings, combined with the results in Chapter 3 that mothers (but not fathers) who had used ART to conceive scored lower on some dimensions of coherence than mothers who had conceived naturally, suggests that the nature of the transition to parenthood should not be overlooked when examining how parents think about and interact with their infant. This is especially relevant as the number of people becoming parents via 'non-traditional' routes continues to grow. For example, in the UK the number of live births following IVF treatment has steadily increased from 904 in 1991 to 13,909 in 2013 (i.e., 0.3% to 2.1% of all infants born) (HFEA, 2016)

It should also be noted that although mind-mindedness and reflective functioning both capture aspects of mentalising, they are different concepts. Illustrating this point, Riva-Crugnola, Ierardi and Canevini (2018) completed the AAI with 85 Italian mothers (half of whom were adolescents, < 21 years old) and coded mind-related comments used during free-play interactions with their 3-month-old infant. Unlike adolescent mothers, adult mothers'

reflective functioning was positively related to their sensitivity and use of positive mind-related comments during interactions. For adolescent mothers, coherence of mind was positively related to their tendency to make developmentally appropriate mind-related comments, but no other associations with mind-mindedness were found. Unlike the results presented in Chapter 6, there were no significant correlations between any index of mind-mindedness and mothers' sensitivity irrespective of age. Riva-Crugnola et al. (2018) argue that these different associations should be expected, as reflective functioning is a more global capacity than mind-mindedness, which is rooted in the parent-infant relationship. Their study also used the observational measure of mind-mindedness, which may be subject to specific child-driven effects. For example, parents must respond to their infant in the moment rather than reflect on their infant as a person. Few studies have examined the concordance between interview and observation measures during infancy (note McMahon et al., 2016, is an exception) but it is worth noting that talking about and talking to one's child are not the same thing. Indeed, different indices of parents' tendency to use mental state talk when talking about and to their child are not equally associated with children's theory of mind (Devine & Hughes, 2017b). Returning to Riva-Crugnola et al.'s (2018) study, it is noted that the researchers do not present any comparable evidence for fathers. This, combined with the differences in associations between different cognitions and different types of mind-mindedness according to mothers' age, highlights the need for more comprehensive research with more diverse samples. Such research could increase understanding about for whom, and in which situations, different aspects of parents' thoughts and feelings about their infants are associated with the extent to which they sensitively respond to them and subsequent child outcomes.

8.9. Permeable Boundaries between Family Subsystems: Fathers' Mind-Mindedness and Sensitivity are More Susceptible to Influence

A striking difference between parents, outlined in Chapter 5, was the importance of partner measures. Specifically, mothers' mind-mindedness and infants' affective responses during interactions with their mothers at 4 months each predicted variation in fathers' mind-mindedness at 14 months but the converse associations were nonsignificant. This asymmetry suggests that the way mothers talk to their partners about their child (i.e., describing mentalistic attributes) and about their interactions with their child, influences fathers' representations of the infant. Fathers in New FAMS spent very little one-on-one time with their infant during their first year and so this reliance on second-hand information or observing mother-infant interactions might in turn mean that, at least for fathers, mind-

mindedness is relational, but fundamentally encompasses relationships outside of the father-child dyad.

Adding weight to this argument, gains in paternal mind-mindedness over time were most strongly predicted by mothers' reports of couple relationship quality. It could be the case that mothers who are more content in their couple relationship are more likely to discuss both their child and interactions with their child with their partner, which may in turn increase fathers' tendency to think of their infant as an individual with a mind. Alternatively, greater couple relationship quality might reduce the possibility of maternal gate-keeping, which may allow father-infant relationships and in turn their mind-minded representations of the infants to develop.

Interesting new research following 120 Finnish couples (demographically similar to New FAMS) across the transition to parenthood also emphasises the importance of mothers' perception of the couple relationship for the quality of family interactions (Korja et al., 2016). Specifically, variation in mothers' but not fathers' reports of couple relationship quality during pregnancy was associated with individual differences in the quality of triadic interactions when infants were 18 months old. Situated in the context of Finnish policies supporting both mothers' and fathers' participation in childcare and recent reports that men, on average, spend more time with their school-aged children than mothers (OECD), Korja et al.'s (2016) finding is of particular interest and arguably lends support to the fathering vulnerability hypothesis, that is, that fathers' parenting is more vulnerable to spill-over from the couple relationship (Cummings et al., 2004).

Explanations for this gendered-effect of couple relationship quality on fathers' parenting typically rest on (i) the father-infant relationship being less distinct from the mother-infant relationship (Cummings et al., 2004) and (ii) the father role being less culturally prescribed and as such subject to greater external influence (Doherty, Kouneski, & Erickson, 1998). Others have also noted that men are more likely to use withdrawal as a coping mechanism in the face of relational distress, which in turn may lead to withdrawal in other relationships (Cummings, Merrilees, & Ward George, 2010). It seems that progressive and inclusive social policies, as evidenced in Finland, cannot necessarily change entrenched attitudes, resulting in a continuation of this impact on fathers' parenting in particular. However, that is not to say that this asymmetric effect will be seen in future generations. Nevertheless, by focusing on couple relationship quality rather than conflict, my results add to the literature on spill-over as not necessarily negative. That is, transitioning to parenthood with a solid foundation has a particularly positive benefit, in terms of both fathers' parenting

and mothers' and fathers' wellbeing (as indicated by the interrelated nature of couple relationship quality, parents' psychological distress and life satisfaction).

Mothers' individual characteristics were also associated with fathers' sensitivity. Specifically, mothers' confidence in her parenting role at 4 months was inversely related to fathers' sensitivity at 14 months. An explanation of this association might hinge on fathers' perceived need to be actively involved in caring for their infants that in turn influences their ability to gain experience of responding to their infants' cues. Fathers with partners who felt very confident in their parenting role at 4 months may have perceived their partner to be the 'expert' and, as such, may have deferred responding to infant signals to their partner, in turn reducing their sensitivity by 14 months. Other researchers have reported similar spill-over effects. For example, in a questionnaire-based study of 74 families, Goodman, Lusby, Thompson, Newport and Stowe (2014) found that high levels of maternal depression at 3 and 6 months predicted greater paternal accessibility and engagement (though not responsibility) at 12 months. Future research would benefit from extending examination of spill-over effects outside of the typical focus on the couple relationship.

In contrast to fathers, it has been argued that the mothers' relationship with the infant is inherently more separate from the couple relationship and so may be less subject to outside influence (Cummings et al., 2004). Indeed, unlike the father-infant relationship, the mother-infant relationship often develops in the absence of the other parent. Therefore, the extent to which the primacy of the parent-child subsystem to mothers' parenting reflects biological differences or differences relating to being a primary or secondary caregiver requires further consideration. The growth of 'home-maker' father households will provide an interesting means to investigate this idea (Livingston, Parker, & Kilbanoff, 2014; ONS, 2016b).

8.10. The Role of Infant Gender

New FAMS was informed by an ongoing longitudinal study focused on maternal and child risk factors for developing conduct problems (Wirral Child Health and Development Study; WCHADS). In keeping with Simpson's paradox (1951), findings from WCHADS have highlighted the importance of considering gender differences before dismissing null associations seen in the sample overall (e.g., Braithwaite et al., 2017 on the differential impact of exposure to heightened levels of prenatal cortisol). Unlike WCHADS, using data from New FAMS it was also possible to consider variation according to both parent and child gender, which proved to be enlightening.

In their meta-analysis of 126 observational studies of 15,034 families, Endendijk et al. (2016) reported that there were no overall differences in autonomy supportive parenting for

boys and girls from either mothers or fathers. However, there was a moderating effect of time; studies conducted during the 1970s and 1980s reported more autonomy supportive strategies for boys whilst studies conducted since the 1990s have reported more autonomy supporting strategies for girls. This is in line with the finding reported in Chapter 4 that mothers responded in modestly more sensitive ways to girls than boys. Evidently there has been a difference between the strategies used by parents with girls and boys but by considering the studies overall the effect becomes null (Endendijk et al., 2016). Clearly shifts in societal ideas about the behaviour of children and parents is important; currently egalitarian ideas surrounding parenthood and the equal treatment of boys and girls are prevailing, though perhaps more dominant in those from higher socio-economic backgrounds. Today parents may feel more conscious about treating their children equally (especially as was the case in New FAMS during video interactions) and so researchers must take a more nuanced approach to examine the ways in which parents' cognitions might influence parenting differently according to child gender.

Furthermore, in Chapter 4 it was reported that mothers' sensitivity was stable, and that mothers' sensitivity at 4 months was a powerful driver of fathers' later sensitivity with their daughters. This robust partner effect suggests that fathers with daughters may attempt to model their partner's interaction style. Classic Baby X studies have highlighted the power of gender in determining adult interactions with infants (Seavey et al., 1975) and it may be that when faced with a child of the opposite gender, fathers turn to mothers to gauge the 'right' way to interact. In their review, Bornstin, Putnick, Bradley, Deater-Deckard and Lansford (2016) noted that, compared with mothers, fathers tend to hold more explicit gender stereotypes and are more concerned about conformity behaviour.

This partner effect is also consistent with other reports, for example in their study of 74 families, Deschênes et al. (2014) found that mothers' parenting behaviour at 12 months but not family socio-economic status (SES) was significantly associated with fathers' parenting behaviour at 18 months. However, there was an interaction between mothers' behaviour and SES, such that the positive association between mothers and fathers was significantly more likely in families of higher than lower SES. This moderation effect might be particularly relevant for the New FAMS sample. It has been noted that families of higher SES are less likely to hold traditional views about parenting and that there is a tendency for greater paternal involvement in childcare within such families (Cabrera, Shannon, & Tamis-LeMonda, 2007).

As previously discussed, Endendijk et al.'s (2016) meta-analysis downplayed the influence of both parent and infant gender on parenting. Overall, parents were rated as only slightly more controlling of boys than girls and critically both parents were more controlling with boys than girls. However, there were significant age-related differences in the contrasts, with studies of parents with infants under 2 years reporting much stronger effect sizes for gender-differentiated parenting compared with studies with parents of older children (i.e., significantly higher than parents with 2 – 4-year-olds and parents with children over 4). It is worth noting, however, that only 10 of the 39 studies that focused on the youngest age group included both mothers and fathers. As such, the stronger differentiation on the basis of infant gender reported in Chapter 4 may not be an anomaly but simply reflective of the need for more research in this area with both parents. With this in mind, it is unusual that (Endendijk et al., 2016) did not report the fail-safe *N* for their effects or other details of publication bias and so the true extent of the null contrast between mothers and fathers may be masked. Ultimately, parental control stands in opposition to sensitivity, and the findings from Chapter 4 suggest that infant gender may be a particularly pertinent factor in organising parents' behaviour during infancy.

However, the differences according to child gender appear restricted to the postnatal period. Specifically, the meta-analytic results presented in Chapter 7 showed that the positive association between parents' thoughts and feelings about their unborn infant and their later observed parenting was not moderated by an imbalance of child gender in the sample. This is consistent with other meta-analytic findings that have not reported stronger associations between maternal mentalising and sensitivity in studies with a higher percentage of girls (Zeegers et al., 2017). Yet it should also be noted that studies included in my meta-analysis did not typically report on the proportion of expectant parents who knew the sex of the infant and whether this impacted upon expectant parents' thoughts and feelings during pregnancy or their subsequent parenting. Within New FAMS, due to power restrictions, it was not possible to examine associations between expectant parents' mind-mindedness and coherence and later sensitivity according to knowledge of infant gender across the transition to parenthood (e.g., known – male, unknown – female). However, future research examining the full international New FAMS sample (i.e., Cambridge, New York and the Netherlands) will have the power to conduct such analyses and be able to consider the developmental reach of gender differences in parental cognitions, though it is important to recognise that expectant parents who chose to find out the sex of their infant during pregnancy may be different from their peers who do not.

8.11.1. Being a "Daddy's Girl"

Compared to fathers of sons, fathers of daughters were more mind-minded at 4 months, showed greater gains over time and gave more mind-minded descriptions when their daughters showed lower levels of positive affect after the 'still-face' episode at 4 months. These findings from Chapter 5 are in line with novel research undertaken by Mascaro, Rentscher, Hackett, Mehl and Rilling (2017) in which 69 fathers of 1 – 2-year-olds wore an electronically activated recorder that recorded ambient sounds for 50 seconds every 9 minutes for two days a week. Analysis of these recordings revealed that fathers of girls used significantly more language related to sadness and the body, and that this language was analytical in focus, than did fathers of boys. This increased use of language related to sadness highlights how early gender socialisation begins (i.e., the implicit tendency to equate emotions with females). The researchers also postulate that this may create a cycle whereby increased emotion talk with girls encourages them to both use these terms more and subsequently elicit more of the emotion, which may have important implications for their later relationship quality and health-related help-seeking behaviour (Mascaro et al., 2017). The score of mind-mindedness used in this thesis combined different types of mental attributes, such as cognitive, emotion and desire terms and did not discriminate according to attribute valence. As such, it was not possible to examine whether fathers used more emotion terms when talking about their daughters and whether the nature of the emotion (i.e., negative or positive) was particularly important. It will be interesting in the future to establish whether similar gender differences can be identified within the data.

8.11.2. Being a "Mummy's Boy"?

As explained in Chapter 6, the cross-lagged association from mind-mindedness at 4 months to sensitivity at 14 months was present for mothers with sons but not daughters. If mothers' sensitivity is more subject to change in relation to boys, then it follows that other factors are likely to influence behaviour. Likely candidates here include child factors. A meta-analysis of gender differences in infant temperament reported that the dimension of surgency was higher in boys than girls (Hyde, Else-Quest, Alibali, Knuth, & Romberg, 2006). This seems unlikely to be the case with regards to the findings presented in this thesis; although surgency was associated with mothers' sensitivity at 14 months, the association did not differ in magnitude according to child gender. Furthermore, in their review of 46 meta-analyses within psychology and developmental research, Bornstein et al. (2016) confidently argue that sex differences in child behaviour do not exist. Specifically, of the 124 effect sizes examined, 30% were negligible, and 48% were small. Thus, if boys and girls do not behave

differently, then it seems likely that it is parents' perception of difference that might be driving different associations. Zeegers et al.,'s (2017) review found no moderating effect of the ratio of girls in the sample on the strength of the overall association between mothers' mentalising and sensitivity. However, gender differentiation tends not to be explicit and might not necessarily manifest in parents' ability to make appropriate mind-related comments in the moment. Instead, it may be that the representations parents hold of their girls and boys are different, which in turn shapes behaviour. More research is needed to replicate the current results and to further unpack parents' cognitions about boys versus girls.

8.11. Clinical and Policy Implications

This thesis offers several key lessons for stakeholders interested in improving parent and child outcomes. Firstly, the findings suggest that strengthening the couple relationship is an obvious target. In a New FAMS participation evaluation questionnaire, one father acknowledged that in terms of parenthood "*the biggest strain is on your relationship as a couple, it's so important to remember how you were before children.*" Poignantly this echoes conclusions from the Cowan's original study (1992), which also demonstrated the importance of targeting the couple relationship to help individuals experience a positive adjustment to parenthood. The findings of this thesis, from a new generation of first-time parents, add to this body of evidence. That is not to say that previous findings have simply been ignored. Pruett et al. (2017) reviewed the findings from more than 1,300 couples who had taken part in adaptations of the Support Father Involvement program in the USA, Canada and the UK. These interactive sessions for couples led by a male and female facilitator focus on five domains, including wellbeing (e.g., spotting signs of depression), couple relationship (e.g., communication skills), parenting (e.g., involvement, stress), three generational patterns of parenting and balancing life stress and social support. Compared to father-only groups or control groups that focus on the importance of the father, the couple group showed the most benefits, including lower levels of parenting stress, stable couple relationship satisfaction and improved communication skills (P. Cowan, Cowan, Pruett, Pruett, & Gillette, 2014; P. Cowan, Cowan, Pruett, Pruett, & Wong, 2009). In the UK, families who at baseline showed high levels of dysfunction benefitted most from these sessions (Casey et al., 2017). Thus, the evidence base has continued to grow but currently such programmes are often primarily targeted at 'at-risk' groups.

In contrast, the results of this thesis would suggest that it is not just within 'high-risk' groups that couple relationship quality exerts an impact upon parenting and, as such, it seems that 'low-risk' groups may also benefit from support. A simple way to reach a wide

demographic could be to adapt the content of NHS antenatal classes, especially as classes that currently touch upon these topics, such as National Childbirth Trust antenatal classes, have a restricted reach (e.g., attendance for 2016-2017 was 80,000 families overall) and a homogeneous attendee profile. Recent results from a couple-focused transition to parenthood programme, Family Foundations, corroborates the idea of far-reaching benefits for the general population (Feinberg, Jones, Kan, & Goslin, 2010). In their randomised control trial, Feinberg et al. (2016) followed 312 couples and compared the intervention group, who took part in five prenatal and four postnatal classes focused on enhancing the co-parent relationship, with a control group, who received written materials on child development. At 10 months post-partum, the intervention group displayed higher co-parenting positivity, higher individual parenting positivity (an aggregate combining affection, sensitivity and support for exploration), reported greater couple communication and fewer symptoms of anxiety or depression. These results are promising and cost-benefit analysis suggests that the benefits are five times the initial costs (D. Jones, 2015).

New FAMS was not an intervention, but it is possible that taking part in a study about the transition to parenthood may have, unintentionally, changed participants' views and behaviours. In a participation evaluation questionnaire, one father said, "*it's taught me that talking and sharing things helps – helped me to communicate to my wife as a new parent easier.*" Another mother said the study had provided her with a "*good opportunity to reflect.*" Being prompted to think about their experience of the transition to parenthood, parenting and their infant, in a context where researchers are genuinely interested in what they have to say may have had a positive impact on different dimensions of their lives. Asking parents to think about their infant at each time point may have also helped drive the increase in mind-mindedness over time. When asked if taking part had changed their thoughts or behaviour, one father responded, "*prenatally especially – personified the baby as something to have a relationship with, not just some unknown thing!*" Clearly, asking parents to think about their infant elicited thoughts and feelings that, if untapped, might not have surfaced in some of the parents in the study, though it seems that in order to measure whether parents' representations are mind-minded and coherent, these representations have to be prompted. However, it should be noted that at no point did any of the parents have any indication as to what was being examined within the speech samples.

As previously discussed, postnatal mind-mindedness was related to parents' sensitivity and both constructs changed over time, providing more evidence that prompting parents to think about their infant as a person with unique thoughts, feelings and desires is a

useful avenue for intervention. A recent proof of principle study highlighted the value of a mind-mindedness-focused video-feedback intervention for mothers who had experienced severe post-partum mental health difficulties that led to their hospitalisation in a mother and baby unit (Schacht et al., 2017). The intervention group (N = 22) watched footage of their interactions with their infant on admission and a clinician directed mothers to think about what their infant was currently feeling and experiencing or, in the case of non-attuned mind-related comments, offered a contrasting view of the infant's behaviour. The control group received standard care that aimed to increase mothers' awareness of their infant's behaviour and their own parenting efficacy but did not direct them to focus on the infant's mind. The intervention group showed a marginal increase in appropriate mind-related comments from admission to discharge and a significant decrease in non-attuned mind-related comments. Compared to mothers who received standard care, at a follow-up when the infant was 15-months-old, infants of mothers from the intervention group were more likely to be classified as securely attached and less likely to be classified as displaying insecure-disorganised attachment. Sadly, this follow-up group only consisted of nine mothers, thus limiting the generalisability of these findings. Moreover, the researchers did not report any details of changes in other dimensions of parenting. The findings do however highlight the potential benefits of a simple, single-session intervention. Again, moving outside of a high-risk clinical population, it seems that asking parents to think about their baby in a more mind-minded and multi-dimensional way could be a simple but effective intervention. Such an intervention might be easier to administer and evaluate than more complex behavioural-focused interventions. For example, health visitors could encourage parents to think about their infant beyond simply eat, sleep, change, repeat.

In addition, it is clear that fathers' mental health also deserves attention. When asked at the annual garden party for study families about the impact of participation in New FAMS, one father commented that "*it's been reassuring that other dads have felt similar to me re depression and anxiety and lessened the feelings of 'it's just me'.*" Perhaps asking about mental health and being given general study findings about this prompted this participant's recognition that other men experience changes in their mental health across the transition to parenthood. Such recognition has the potential to benefit both individuals and families, whether in terms of reassurance or prompting help-seeking behaviour, the latter of which is typically delayed in men (Vogel, Wester, Hammer, & Downing-Matibag, 2014). This suggestion also fits in with recent calls to screen fathers' mental health (e.g., BBC news item 25th October 2017), although NICE do not currently have any plans to change their guidance.

In terms of mothers, a recent survey found that, counter to NICE guidelines, a fifth of women had not been asked about their mental health at the 6-week postnatal check-up (NCT, 2017). With this in mind, it seems that it is important to keep the topic of parents' mental health within public consciousness and that research findings, including those presented in this thesis, are disseminated beyond academic circles.

Alongside the continued need to raise awareness of parental mental health problems, it seems gender equality campaigns such as "HeForShe" are as important as ever. The different results presented in this thesis for parents of girls and boys highlight the continued need to make people aware of their implicit gender biases, both in terms of their conceptions of girls and boys on the one hand, and mothers and fathers on the other. In this thesis, infant girls and boys showed no differences in their behaviour, thus suggesting that differences are in the eye of the beholder. In addition, expectant mothers and fathers showed similar levels of mind-mindedness and coherence, suggesting that in terms of representations of their infants, men and women may enter parenthood from a similar starting point and, as such, have the same potential to 'tune in' to their infants' thoughts and feelings. Notwithstanding this, mothers influenced fathers' thoughts and behaviours postnatally (i.e., sensitivity and mind-mindedness). The narrative of the mother as the 'expert' may lead to undue pressure on mothers to feel the need to get things 'right'. For fathers, these dominant social messages, combined with a relative reduced level of experience with the infant, might result in them feeling the need to model their partner. Therefore, it is worth acknowledging that mothers and fathers might require support at different points in the transition to parenthood.

8.12. Future Directions

Exciting possibilities for future research arise from addressing outstanding questions and alternative explanations for findings proposed from the results of previous chapters. In particular, an examination of the relations between parents' representational mind-mindedness, parents' sensitivity to distress and parents' use of appropriate and non-attuned mind-related comments will provide a more complete picture of the nature of the association between mind-mindedness and sensitivity. In New FAMS, observations of infant bath-time were collected separately for mothers and fathers, and though beyond the scope of this thesis, future work coding parents' sensitivity during a more naturalistic situation or in the distress-provoking still-face or 'Don't Touch' task, may highlight different associations with parents' coherence and mind-mindedness and/or later child outcomes. By establishing the feasibility of using the representational measure during infancy, it is possible to test whether representational mind-mindedness also precedes observational mind-mindedness and, as

such, whether they are interchangeable methodologically during infancy. From this foundation, it will be possible to examine whether, in terms of child or parenting outcomes, it is more important for parents to be mind-minded during interactions, or in the representations they hold about their children. Such findings have important significance for interventions: should both be targeted? Is change in one also associated with change in the other?

Looking at relations with child outcomes will also test the extent to which mind-mindedness and sensitivity are synonymous and whether this is the same for mothers and fathers. Furthermore, the extent to which prenatal mind-mindedness and coherence are associated with child outcomes is a question that has until now not been asked. In this thesis, a higher proportion of mind-minded attributes in mothers' speech samples at 4 months was associated with fewer displays of negative child affect during the stressful 'Don't Touch' task at 14 months. This task requires the infant to regulate their emotions and behaviour by not touching a set of attractive toys for two minutes and only playing with a white cuddly toy for a further two minutes and so could be seen as a naturalistic example of putting children's 'hot' executive functions to the test (i.e., self-regulation versus a 'cold' executive function such as working memory). Bernier, Carlson and Whipple (2010) reported links between maternal mind-mindedness and child impulse control and found that maternal mind-mindedness rather than autonomy support explained gains in child executive function performance from 18 to 26 months. Future analyses with the current sample will be able to establish whether mind-mindedness (both concurrent and gains over time) explains variation in individual differences in later naturalistic and experimenter-led tests of executive function.

Aside from those presented in this thesis, other possibilities to further examine the importance of what and how expectant parents talk about their unborn infants may be pursued in the future. For example, in their study of 86 mothers and their 4-year-olds, McMahon and Meins (2012) found that representational mind-mindedness was associated with low levels of hostility but only positive mind-mindedness was associated with sensitivity. Critically, a range of different constructs can be coded from parents' speech samples and these may be differentially associated with later parent or child outcomes (Sher-Censor, 2015; Weston et al., 2017). In future work, I look forward to applying the narrative coherence scheme, for the first time, to the speech samples given by mothers and fathers during infancy.

Infant gender emerged as a key factor of influence in the current study and so it seems that a fruitful avenue for future research would be to look at the extent to which expectant parents use gendered terms when describing their future infant and expected relationship.

Studies using the AAI have highlighted how important parents' own relationships with their caregivers are in determining their future relationship with their infant (Fonagy et al., 1993). Perhaps knowledge of infant sex encourages parents to think about different relationships (e.g., a mother-son versus father-son relationship) when constructing their own representations of their infant, which may in turn influence behaviour.

My findings also suggest that it might be prudent to consider both representational and observational mind-mindedness as potential mediators of the association between mothers' attachment representations and sensitivity. Researchers are developing more complex models to try to understand the link between mothers' attachment representations and infant attachment security. For example, Leerkes et al. (2015) have brought together different theoretical perspectives to look at complex interactions between different levels of cognition, affect and behaviour. The explanatory power of these models might also benefit from considering parents' coherence of mind in regard to their (unborn) infant and not just their own caregivers. To date such complex models have only be specified to predict mothers' sensitivity and it seems the time is right to consider their applicability to fathers. The results presented in this thesis suggest that models predicting fathers' sensitivity should consider the father's co-parent and infant gender.

In addition to eliciting parents' expectations of their unborn infants, the in-depth interviews conducted as part of New FAMS also tapped into parents' expectations about parenthood, parents' roles, the division of child care and more general hopes and fears. Unfortunately, due to time and resource constraints, it was not possible to transcribe and conduct qualitative analysis on these interviews. In the future, and given the findings of this thesis, I will be able to look at specific groups for whom the transition to parenthood was particularly difficult, for example those who experienced a significant drop in couple relationship quality or a high level of mismatch between expectations and the actual division of childcare. Additionally, it would now also be possible to look at those individuals who showed a dramatic increase or decrease in their mind-mindedness or those who consistently showed at 4 and 14 months high or low levels of sensitivity. Post-hoc thematic analysis (e.g., Braun & Clarke, 2006) of these interviews will allow for a deeper understanding of these individuals and bring to life the individual voices of parents arguably lost in structural equation modelling. In particular, it will be interesting to see whether it would have been possible to identify which couples would show such a trajectory.

As an international study, New FAMS provides opportunities to replicate findings across the three sites. Though this thesis focuses on the family-system, clearly couples do not

become parents in a social vacuum. As noted by Bronfenbrenner (1986), the family system is embedded within other important systems that influence parenting and child outcomes. The three sites in New FAMS differ remarkably with regards to parental leave and so comparing parents across these three sites will provide an indirect measure of how government policies impact parenting. A recent small-scale study suggests that this is a fruitful avenue of research. In their study of 49 English and Danish fathers of pre-schoolers, Tharner, Altman, and Væver (2016) found that the length of fathers' paternity leave was associated with higher mind-mindedness.

The parents in New FAMS will be followed up at least until their child's second birthday and it will be interesting to see whether the mind-minded nature of parents' representations of their child becomes more stable or continues to change. Just as Darwin reflected on his developing son over the first years of life, so too did the parents taking part in this research. Asking parents to reflect at different points in time was beneficial not only from a research perspective, but also for the parents themselves. As one parent put it:

"*Well this, in particular, this study has really allowed us to, allowed me to explore my kind of feelings around [child] and how I feel about the family and [child] as well so it's been really nice to kind of explore that with you guys and to have, just to have that sort of five minutes thinking where it's not all about [child]. She's brought so much joy to the whole family. It's manically hard and as bloody annoying as it is sometimes dare I say it, and frustrating, it's the most rewarding job in the world and it's lovely to be able to shout it from the rooftops to you guys so thank you very much*".

8.13. Summary

The transition to parenthood heralds a host of life changes; first-time parents are on a steep learning curve and accordingly their thoughts, feelings and behaviour towards their infants change over time. The current study aimed to further scientific understanding of the development of mothers' and fathers' representations of, and sensitivity towards, their infant during pregnancy and across the first year of life. Advancing the field, the current study broke new ground by establishing that expectant parents can construct coherent narratives of their unborn child and that these vary in the extent to which they describe mind-related attributes. Mothers' prenatal talk showed meaningful but different links with mothers' (but not fathers') sensitivity towards their sons and daughters during early toddlerhood. Through the lens of family systems theory it was established that compared to mothers, fathers' representations and behaviour were more susceptible to the influence of both the couple

relationship and mothers' thoughts and behaviour. It is hoped the findings presented here stimulate future research that appreciates the interwoven nature of family life to examine how these factors during the transition to parenthood relate to children's outcomes. These findings have clear implications at both theoretical and policy levels and contribute to ongoing societal debates about gender equality and the mechanisms through which parent factors influence child development.

Appendices

2.1. Details of My Contribution to the Research Process

Timeline	**2014**			**2015**				**2016**				**2017**			
Wave	**Apr Jun**	**July Sep**	**Oct Dec**	**Jan Mar**	**Apr Jun**	**July Sep**	**Oct Dec**	**Jan Mar**	**Apr Jun**	**July Sep**	**Oct Dec**	**Jan Mar**	**Apr Jun**	**July Sep**	**Oct Dec**
Ethics															
Pilot															
Recruitment															
Prenatal HV															
4 months HV															
14 months HV															

Key: HV= home visit.

Wave	Activity	Specific Responsibilities
Ethics	Completion of Research Ethics Committee form	[1] Completing online form [2] Creation of participant information sheets and consent forms [3] Sourcing and compiling validated questionnaires
	Responsible for Research and Development approval at Addenbrookes and Hinchingbrooke Hospital	[1] Liaising with hospital [2] Overseeing research passport process for all team members
	Amendments	[1] Completing online form [2] Updating protocol
Pilot	Recruitment	[1] Sole responsibility: five first-time mothers and fathers recruited
	Home visits (prenatal, 4 month and 14 months)	Sole responsibility [1] Scheduling [2] Developing interview With co-team member [3] Interview [4] Conducting observations
Recruitment	Daily ultrasound clinic	Sole responsibility [1] Every week day. September – November 2014 [2] 10 days a month. November 2014 – May 2015.
	Nearly new sales	Twice a month (weekend)
	Yoga/antenatal classes	Once a week (evening)
T1: Prenatal	Prenatal home visit	Sole responsibility – 70 families. [1] Scheduling [2] Completion of questionnaires [3] Biological samples [4] Conducting individual sensitive interviews (x2) Second interviewer for 40 families. Including HV at evenings and weekends.
T2: 4 months	Two home visits (one for each parent)	Sole responsibility – 68 families (150 visits, including third visits due to incomplete data):

		[1] Scheduling [2] Completion of questionnaires [3] Conducting individual sensitive interviews [4] Conducting observations Second researcher for 40 families. Including HV at evenings and weekends.
T3: 14 months	Single home visits	Sole responsibility – 68 families (75 visits, including second visits due to incomplete data): [1] Scheduling [2] Completion of questionnaires [3] Conducting individual sensitive interviews (x2) [4] Conducting observations (x2) [5] Biological samples [6] Cognitive testing – infant and parent (x2) Second researcher for 40 families. Including HV at evenings and weekends.
T1	Narrative Coherence coding	[1] Training with Dr Sher-Censor [2] Adapted manual [3] Double coding of 15% five-minute speech sample (FMSS) – reliability completed with Anja Lindberg [4] Individual coding - 440 interviews s coded
T1 – T3	Mind-Mindedness coding	[1] Transcription of FMSS [2] Adapted manual [3] Double coding of 20% FMSS – reliability completed with Rory Devine [4] Individual coding - T1: 442 interviews coded - T2: 398 interviews coded - T3: 392 interviews coded Total: 1232
T2 – T3	Ainsworth Sensitivity coding	[1] Training – Leinden University (3 days) [2] International reliability set (N = 60) [2] Video-based coding 130 families
Dissemination	User and clinician engagement	Annual garden parties (2015, 2016, 2017) Baby Brain Club, Rosie Hospital, March 2016. Brazelton Centre Conference, September 2016. I secured ESRC funding to run a free antenatal event: "Honest Conversations with New Parents", November 2017. National Childbirth Trust Research Advisory Group, speaker and expert panel member, November 2017.
	Meta-analysis	Sole responsibility for all aspects of meta-analytic review (i.e., search, screening, analyses, interpretation). Assistance provided by Amanda Aldercotte to assess the reliability of inclusion/exclusion of abstracts (20%).

2.2. Participant Information Sheet

Information Sheet
New Fathers and Mothers Study (New FAMS)

We are excited to invite first time parents to take part in the New Fathers and Mothers Study (funded by the Economic and Social Research Council, ESRC). We will interview expectant first time parents in the Rosie Birth Centre and follow families up as their children grow. Previous research has focused on mothers but we will include fathers to examine the similarities and differences in how parents influence their young children. This study also uses new methods to look at the stress hormone cortisol (taken from saliva samples).

Who can take part? We are looking for expectant parents who speak English as their first language and who are at least 21-years-old at their baby's 20-week scan and who will be living together when their baby is born.

What would taking part involve? 200 families will be selected to take part in an in-depth study involving home visits at 4, 14 and 24 months. These will involve filming parent-infant play and will be scheduled at times that suit fathers and mothers (including evenings and weekends if needed). Parents will be shown (via dvd) how to use a cotton swab to give saliva samples.

All other eligible families will be invited to take part in a general study involving online questionnaires when the children are 14 months old.

Possible benefits? We hope that families taking part will gain an extra understanding of their babies' development. Families taking part in the in-depth study will receive dvds of the visits. All families will be paid for their time and receive annual newsletters with information about study findings.

Possible disadvantages/risks? This study does not bring any risks to families, but some people may find it difficult to talk about experiences. Any family who needs support will be put in touch with relevant health professionals.

Further information. All information and saliva samples will be used for research purposes only and kept securely locked and confidential (complying with the Data Protection Act). Participants are free to opt out of any part of the study activities or to withdraw from the study at any time without giving a reason. This study has ethical approval from the NHS and the University of Cambridge.

2.3. Participant Consent Forms

Consent Form
New Fathers and Mothers Study: Prenatal Interview

Please initial box

1. I confirm that I have read the information sheet for the New Fathers and Mothers Study. I have had an opportunity to consider the information, ask questions and received satisfactory answers. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that the New Fathers and Mothers Study team will contact my health visitor to check that my baby has been delivered safely. ☐

4. I understand that anonymous information collected about me may be used to support other research and shared with other researchers. ☐

5. I understand that we may be chosen for either the general or the in-depth study, which involves saliva samples and home visits when my infant is 4, 14 and 24-months old. ☐

6. If selected, my family would be happy to be contacted at each phase of the in-depth study to decide if we would like to take part. ☐

7. I agree to take part in the questionnaire-based interview that is the first phase of the general part of the study. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person taking consent	Date	Signature

This study has been approved by the Cambridge Psychology Research Ethics Committee and by the local NHS Ethics Committee.

Consent Form
New Fathers and Mothers Study: First Home visit

Please initial box

1. I confirm that I have read the information sheet for this wave of the New Fathers and Mothers Study. I have had an opportunity to consider the information, ask questions and received satisfactory answers. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that anonymous information collected about me may be used to support other research and shared with other researchers. ☐

4. I understand that I can opt out of specific questions or tasks without consequence. ☐

5. I agree to take part in the home activities with my baby and the questionnaire-based interview. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person taking consent	Date	Signature

This study has been approved by the Cambridge Psychology Research Ethics Committee and by the local NHS Ethics Committee.

Primary Caregiver Consent Form
New Fathers and Mothers Study: Second Home visit

Please initial box

1. I confirm that I have read the information sheet for this wave of the New Fathers and Mothers Study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that anonymous information collected about me may be used to support other research and shared with other researchers. ☐

4. I understand that my infant and I can opt out of specific questions or tasks without consequence. ☐

5. I agree to participate in this study by completing the home activities with my infant, the questionnaire-based interview, the cognitive assessments and using the cotton swab to collect saliva from my infant over two days at three different times in the day (morning, noon and late afternoon). ☐

6. I agree to my infant participating in this study by completing the cognitive assessments ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person taking consent	Date	Signature

This study has been approved by the Cambridge Psychology Research Ethics Committee and by the local NHS Ethics Committee.

2.4. Within-person Correlations between the GHQ, STAI and CESD at each time point

Wave	Measure		
	GHQ	STAI	CESD
Prenatal			
GHQ	-	.43	.73
STAI	.35	-	.53
CESD	.67	.51	-
4 months			
GHQ	-	.54	.69
STAI	.51	-	.65
CESD	.65	.57	-
14 months			
GHQ	-	.45	.59
STAI	.37	-	.57
CESD	.53	.57	-

Note. GHQ = General Health Questionnaire; STAI = State-Trait Anxiety Inventory; CES = Centre for Epidemiologic Studies Depression Scale. Mother below diagonal, father above diagonal.

2.5. Prenatal Parent Questionnaire Descriptive Statistics

	Mother				Father			
	M (*SD*)	Mode	Range	Skew (*SE*)	*M* (*SD*)	Mode	Range	Skew (*SE*)
GHQ	1.93 (2.14)	0	0 – 12	1.59 (.17)	1.48 (2.09)	0	0 – 11	2.03 (.17)
CESD	29.77 (5.88)	28	20 – 54	.95 (.17)	27.81 (6.12)	28	20 – 53	1.28 (.17)
STAI	10.70 (2.91)	12	6 – 18	.21 (.17)	11.16 (2.71)	12	6 – 18	.13 (.17)
Satisfaction with Life Scale	9.93 (4.13)	12	5 – 35	1.86 (.17)	11.61 (4.65)	10	5 – 30	1.06 (.17)
Self-efficacy	83.50 (12.93	81	51 – 112	-.21 (.17)	82.30 (13.39)	77	38 – 108	-.48 (.17)
Couple Satisfaction	89.56 (7.13)	95	58 – 97	-1.42 (.17)	88.19 (8.88)	95	58 – 97	-1.32 (.17)
Couple Conflict	11.67 (2.14)	12	7 – 19	.26 (.17)	11.91 (2.27)	10	7 – 20	.45 (.17)
WDW involvement	3.86 (.65)	3.25	7 – 20	-.06 (.17)	4.38 (.60)	4.13	2.50 – 6.25	.00 (.17)

2.6. 4-month Parent Questionnaire Descriptive Statistics

	Mother				Father			
	M (*SD*)	Mode	Range	Skew (*SE*)	*M* (*SD*)	Mode	Range	Skew (*SE*)
GHQ	1.53 (2.17)	0	0 – 11	1.88 (.17)	1.75 (2.25)	0	0 – 12	2.00 (.17)
CESD	28.58 (6.72)	22	20 – 55	1.20 (.18)	29.13 (6.88)	26	20 – 54	1.39 (.18)
STAI	10.16 (2.83)	11	6 – 20	.49 (.18)	11.18 (3.12)	12	6 – 22	.34 (.18)
Satisfaction with Life Scale	10.08 (3.99)	10	5 – 28	1.33 (.18)	11.71 (4.59)	10	5 – 30	1.14 (.18)
Self-efficacy	90.79 (11.34)	96	59 – 112	-.45 (.18)	85.92 (11.11)	84	47 – 111	-.45 (.18)
Couple Satisfaction	84.68 (8.01)	92	54 – 95	-1.32 (.18)	67.69 (5.50)	72	46 – 78	-1.24 (.18)
Couple Conflict	7.25 (1.64)	7	5 – 20	2.62 (.18)	11.83 (2.19)	12	7 – 19	.70 (.18)
WDW involvement	3.06 (.78)	3.63	1.25 – 6.25	.44 (.18)	3.55 (.73)	2.88	1.75 – 5.75	.21 (.18)
WDW satisfaction	1.97 (.75)	2	1 – 4	.86 (.18)	2 (.92)	2	1 – 5	.98 (.20)
WDW violation of expectation	-.81 (.73)	-.75	-3.13 – .88	-.09 (.18)	-.80 (.72)	-.75	-3.25 – .88	-.04 (.18)

2.7. Descriptive Statistics for 4-month Infant Measures

	Mother				Father			
	M (*SD*)	Mode	Range	Skew (*SE*)	*M* (*SD*)	Mode	Range	Skew (*SE*)
ITQ Distress	3.66 (1.02)	3.14	1.71 – 6.5	.23 (.18)	3.75 (1.07)	4	1.71 – 8	.71 (.18)
ITQ Duration of Orientation	4.25 (1.09)	4	2 – 7	.21 (.18)	4.25 (1.12)	4	1.5 – 7	.10 (.18)
Infant Positive Affect ('Still-Face' effect)	1.03 (.82)	1	-2 – 3	-.19 (.18)	.82 (.91)	1	-1 – 3	.27 (.18)
Infant Positive Affect (Recovery effect)	.59 (.90)	0	-2 – 3	.44 (.18)	.36 (.80)	0	-2 – 3	.49 (.18)
Infant Positive Affect ('Carry-over' effect)	.44 (.80)	0	-2 – 2	.06 (.18)	.46 (.87)	1	-1 – 3	.20 (.18)

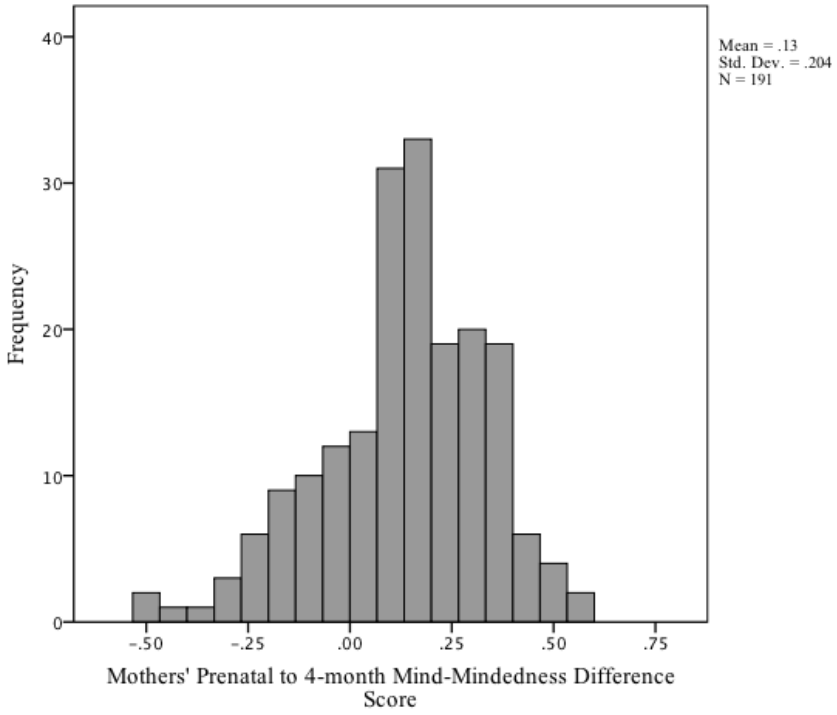
2.8. 14-month Parent Questionnaire Descriptive Statistics

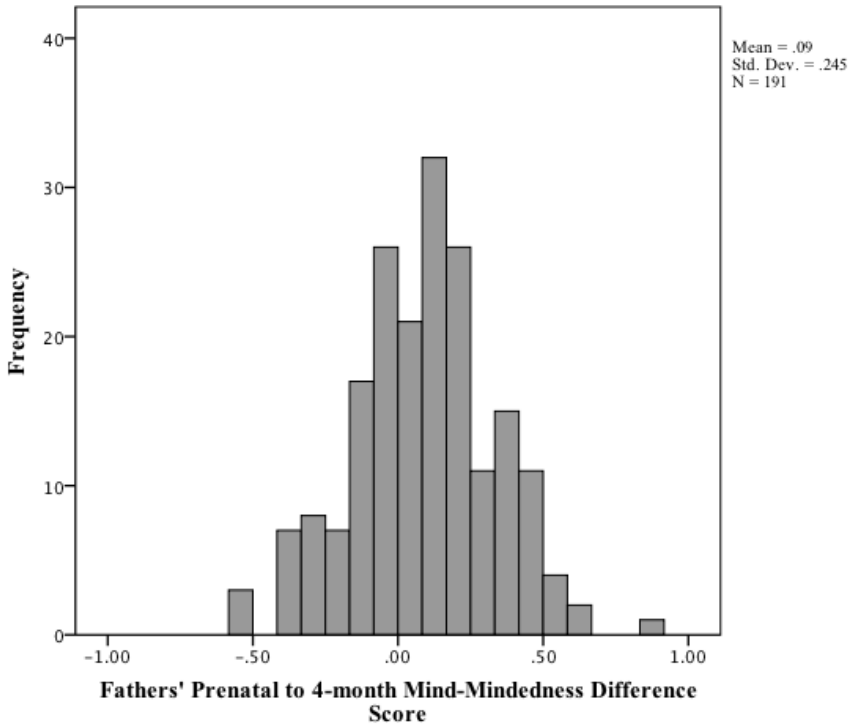
	Mother				Father			
	M (*SD*)	Mode	Range	Skew (*SE*)	*M* (*SD*)	Mode	Range	Skew (*SE*)
GHQ	1.55 (2.16)	0	0 – 11	1.76 (.18)	1.45 (2.19)	0	0 – 12	2.15 (.18)
CESD	28.86 (6.65)	24	20 – 50	.97 (.18)	29.41 (7.09)	24	20 – 55	1.12 (.18)
STAI	10.91 (2.84)	12	6 – 19	.09 (.18)	10.77 (2.73)	10	6 – 18	2.73 (.25)
Satisfaction with Life Scale	10.98 (4.06)	10	5 – 25	1.04 (.18)	12.56 (5.36)	9	5 – 35	1.26 (.18)
Couple Satisfaction	77.30 (10.20)	86	42 – 91	-.94 (.18)	76.45 (11.54)	89	38 – 91	-1.04 (.18)
Couple Conflict	12.22 (2.20)	12	7 – 19	.38 (.18)	12.18 (2.34)	11	7 – 20	.52 (.18)
WDW involvement	3.74 (1.05)	3.50	1.13 – 7.63	.36 (.18)	3.92 (.99)	3.25	1.50 – 7.50	.40 (.19)
WDW satisfaction	1.95 (.83)	2	1 – 4	.94 (.18)	1.98 (.79)	2	1 – 4	.90 (.18)
Division of housework	3.83 (1.67)	5	1 – 8	.38 (.17)	5.66 (1.48)	5	2 – 8	-.41 (.18)

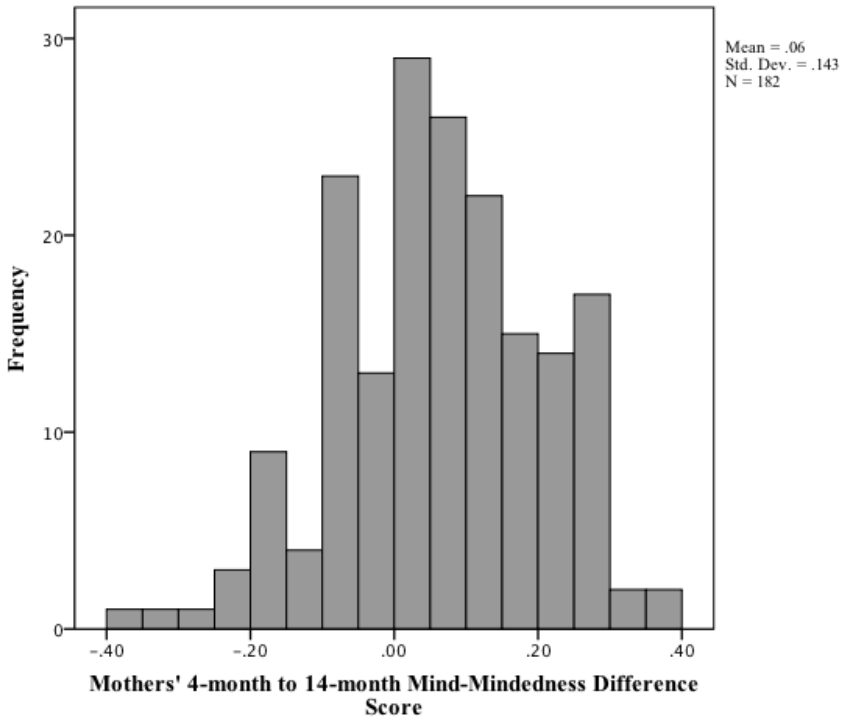
2.9. Descriptive Statistics for 14-month Infant Measures

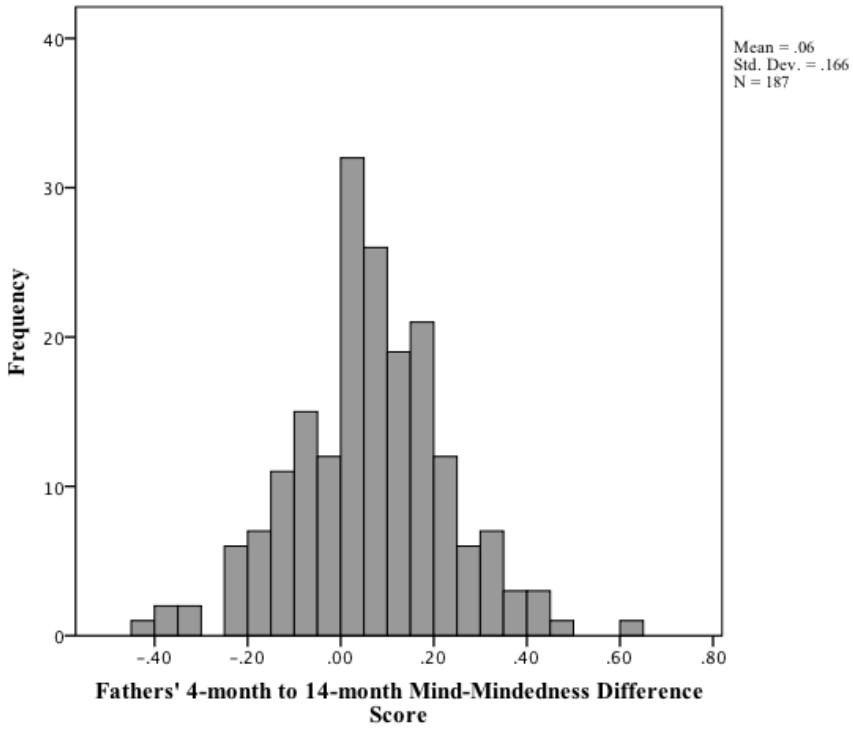
	Mother				Father			
	M (*SD*)	Mode	Range	Skew (*SE*)	*M* (*SD*)	Mode	Range	Skew (*SE*)
ECBQ Distress	30.99 (7.30)	34	12 – 56	.58 (.18)	-	-	-	-
ECBQ Surgency	65.34 (9.28)	68	37 – 84	-.67 (.18)	-	-	-	-
ECBQ Effortful Control	55.31 (8.68)	57	30 – 77	-.18 (.18)	-	-	-	-
Infant Negative Affect (Don't Touch)	2.45 (1.37)	1	1 – 6.25	1.07 (.18)	2.48 (1.41)	1	1 – 7	1.03 (.17)
Infant Positive Affect (Don't Touch)	1.67 (.63)	1	1 – 4.25	1.41 (.18)	1.54 (.57)	1	1 – 4	1.22 (.18)
Infant Receptive Vocabulary	26.67 (15.68)	28	1 – 77	.76 (.18)	-	-	-	-

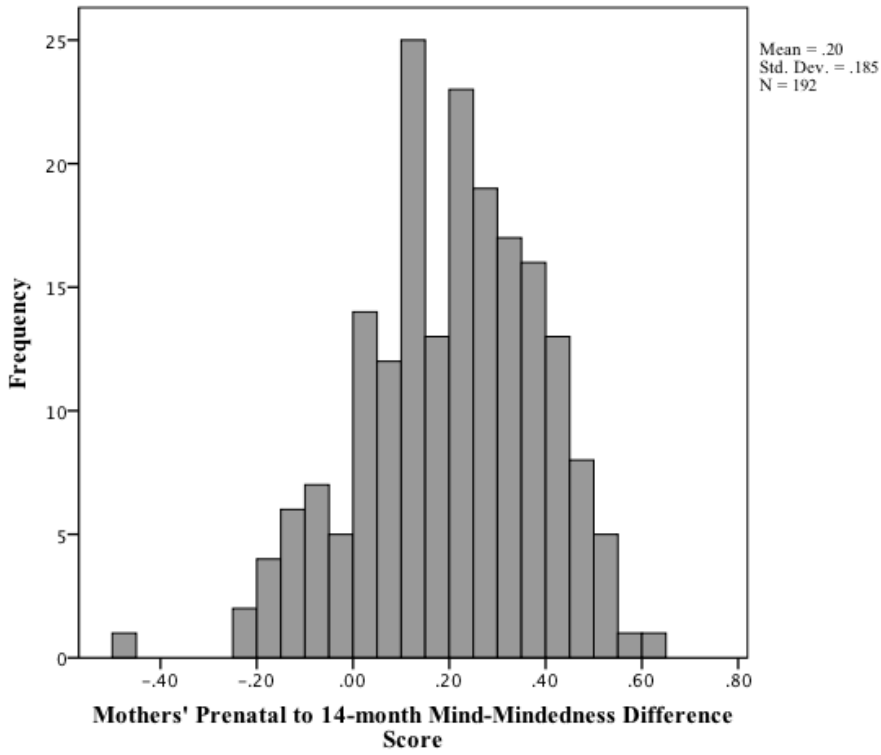
5.1. Histograms illustrating the distributions of parents' mind-mindedness difference scores

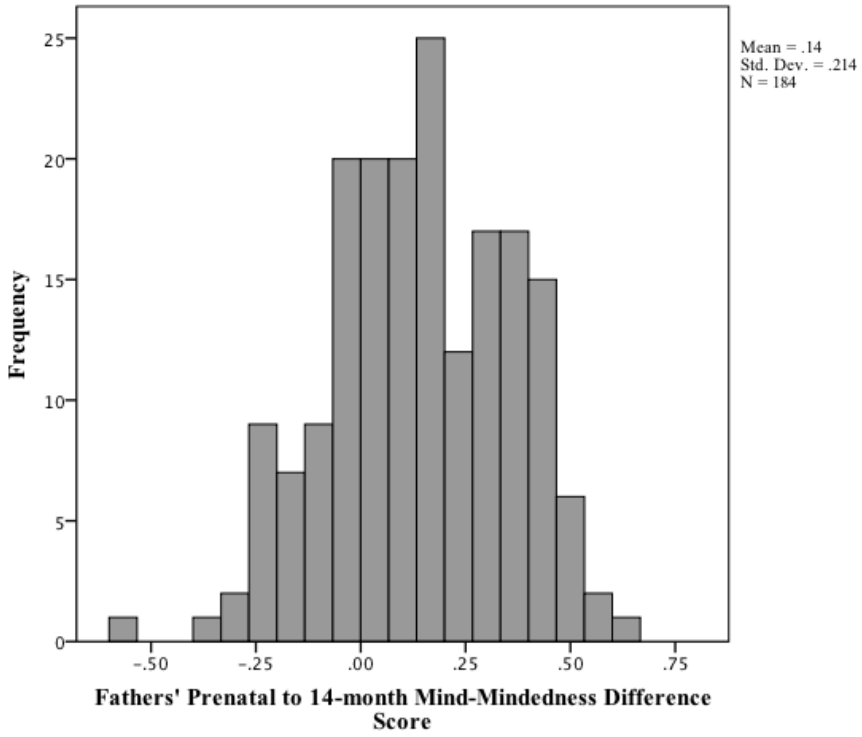





Mean = .06
Std. Dev. = .143
N = 182
Frequency
30
20
10
0
-.40
-.20
.00
.20
.40
Mothers' 4-month to 14-month Mind-Mindedness Difference Score


Mean = .06
Std. Dev. = .166
N = 187
Frequency
40
30
20
10
0
-.40
-.20
.00
.20
.40
.60
.80
Fathers' 4-month to 14-month Mind-Mindedness Difference Score


Mean = .20
Std. Dev. = .185
N = 192
Frequency
25
20
15
10
5
0
-.40
-.20
.00
.20
.40
.60
.80
Mothers' Prenatal to 14-month Mind-Mindedness Difference Score


Mean = .14
Std. Dev. = .214
N = 184
Frequency
25
20
15
10
5
0
-.50
-.25
.00
.25
.50
.75
Fathers' Prenatal to 14-month Mind-Mindedness Difference Score

6.1. Between-person Correlations between Demographics and Wellbeing and Sensitivity

	Mother		Father	
	4m Sensitivity	14m Sensitivity	4m Sensitivity	14m Sensitivity
Age	.14^{+}	.07	.08	-.05
Education	.01	.18*	.13^{+}	.08
Ladder	.02	-.04	.23**	-.01
Prenatal				
Income	.11	.02	.12	-.01
Mental Health Factor Score	.11	.14*	.06	-.03
Satisfaction with life	.05	-.02	.04	.08
4 months				
Income	-.04	.04	-.03	-.04
Mental Health Factor Score	.07	-.00	.06	.04
Satisfaction with life	-.05	-.07	-.02	-.03
14 months				
Income	.10	-.03	.03	-.04
Mental Health Factor Score	.06	.04	.10	.09
Satisfaction with life	.05	-.05	.08	.02

Note. + $p < .10$; * $p < .05$; ** $p < .01$.

6.2. *Between-Person Correlations between Parents' Self-Efficacy, Couple Relationship, Childcare Responsibility and Sensitivity*

	Mother		Father	
	4m Sensitivity	14m Sensitivity	4m Sensitivity	14m Sensitivity
Prenatal				
Self-efficacy	-.06	-.13+	-.08	-.14+
Couple relationship quality	.11	.01	-.10	.03
WDW involvement	.02	.09	.04	-.02
4 months				
Self-efficacy	.01	-.09	-.09	-.22**
Couple relationship quality	.14*	.05	-.04	.04
WDW involvement	.06	-.01	.11	.14+
Dissatisfaction with WDW	-.01	.06	-.03	-.14+
WDW violated expectation	-.05	-.09	.09	.17*
14 months				
Couple relationship quality	.10	.00	-.07	-.11
WDW involvement	-.00	.12	-.01	-.00
Dissatisfaction with WDW	-.11	-.03	-.03	.03
WDW violated expectation	-.12	.14+	-.06	-.11
Division of housework	-.08	.03	-.04	-.03

Note. + $p < .10$; * $p < .05$.

7.1. *Mean Effects for the Association between Expectant Mothers' Thoughts and Feelings about the Unborn Infant and Postnatal Parenting for All Studies and Moderator Analyses*

Contrast	*M*	*k*	*z*	*p*	95%CI
All studies	.24	14	3.62	.000	[.11, .38]
All 1st time parents		*Q* (1, 12) = 2.22, *p* = .136			
No	.33	9	3.61	.000	[.15, .51]
Yes	.11	5	.98	.327	[-.11, .34]
Risk sample		*Q* (1, 12) = .26, *p* = .614			
No	.22	9	2.65	.008	[.06, .38]
Yes	.29	5	2.60	.009	[.06, .50]
Prenatal measure		*Q* (1, 12) = .22, *p* = .637			
Questionnaire	.28	7	2.75	.006	[.08, .48]
Interview	.21	7	2.23	.026	[.03, .40]
Sensitivity outcome		*Q* (1, 12) =.26, *p* = .607			
No	.28	6	2.71	.000	[.08, .49]
Yes	.21	8	2.49	.013	[.05, .38]

Note. 95%CI = confidence intervals.
** $p < .01$. *** $p < .001$.

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