VOLUME I

RESEARCH COMPONENT

EXPLORING PARENTS' RELATIONSHIP WITH THEIR BABY FROM PREGNANCY TO INFANCY

BY

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OVERVIEW

This thesis is submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology at the University of Birmingham. The thesis consists of two volumes which illustrate research (Volume I) and clinical work (Volume II). All identifying information has been anonymised to ensure confidentiality.

Volume I

This volume contains three chapters. The first chapter is a review of the literature studying the relationship between maternal-foetal attachment and postnatal infant outcomes. The second chapter is a qualitative study exploring first-time parents' experiences of becoming a parent and the relationship with their baby. The third chapter is a public domain briefing document, providing an accessible summary of the literature review and empirical paper.

Volume II

The second volume of the thesis contains four clinical practice reports (CPRs) and the abstract of a fifth which was presented orally. The first CPR details the case of a 30-year-old woman presenting with generalised anxiety formulated from a cognitive behavioural and psychodynamic perspective. CPR2 is a service evaluation of multi-disciplinary team members' referrals to psychological services in a secondary care Community Mental Health Team (CMHT). CPR3 presents a single-case experimental design that assessed the effectiveness of supporting a 19-year-old male with a learning disability with his anxiety and the removal of his arm splints. CPR4 outlines an example of using psychological consultation whilst working on an inpatient ward for older adults. The final report is the abstract of an oral presentation of a case study of an 11-year-old boy presenting with anger.

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IS MATERNAL-FOETAL ATTACHMENT ASSOCIATED WITH POSTNATAL INFANT OUTCOMES? A SYSTEMATIC REVIEW

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ABSTRACT

Background: The links between the mother-infant relationship and later child outcomes have been well documented. It has been recognised that the relationship between a mother and her child begins prior to birth, a concept referred to as maternal-foetal attachment. Literature is increasingly interested in determining whether the relationship between a mother and her foetus is influential on the infant following birth.

Aim: To systematically examine and synthesise the published literature studying the relationship between maternal-foetal attachment (MFA) and the mother-infant relationship and other postnatal infant outcomes up to 26 months.

Method: A systematic search of three databases was conducted in order to identify published research focusing on MFA and postnatal infant outcomes. Four hundred and seventy-two papers were screened against an inclusion and exclusion criteria, which resulted in a total of 16 papers for the final review. Papers were assessed for quality prior to the synthesis of results.

Results: Results showed a relatively consistent relationship between MFA assessed in pregnancy and the mother-infant relationship, with higher reported MFA during pregnancy being associated with higher postnatal attachment and bonding. These results were found to be weak to moderate in strength and were generated from predominantly average-good quality studies. Less consistent results were found regarding MFA and other postnatal infant outcomes and the quality of studies was found to be variable.

Conclusions: The review found evidence to support an association between MFA and the postnatal mother-infant relationship, with higher MFA being linked to better

quality of mother-infant attachment. Results regarding the association between MFA and other infant outcomes were less consistent and require further exploration. Future research is required to explore the pathways between MFA, mother-infant attachment and later outcomes. The findings of this review have implications for antenatal detection and prevention of potentially compromised postnatal attachment relationships.

INTRODUCTION

The links between the early mother-infant attachment relationship and later child outcomes have been well researched[1], with findings demonstrating consistent links between secure mother-infant relationships and child brain development, emotion regulation and mental health throughout life (Gerhardt, 2006; Schore, 2001; Weich, Patterson, Shaw, & Stewart-Brown, 2009). More recently, it has been increasingly recognised that the relationship between a mother and her child begins to develop prior to the child being born; that is, whilst the child is a foetus.

In a classic paper, Cranley (1981) suggested that during the 9 months of gestation, a dynamic process takes place whereby both physical development of the foetus and psychological transformation of a woman into a mother are occurring. Maternal-foetal attachment (MFA) is a term that is used to describe the relationship that exists between a pregnant women and her foetus. MFA has been defined as "the extent to which women engage in behaviours that represent an affiliation and interaction with their unborn child" (Cranley, 1981, p.282). Since Cranley's paper, the concept of MFA has been redefined to include cognitive and emotional attributes such as the thoughts and fantasies of the mother (Müller & Ferketich, 1993). Researchers have identified MFA as being a multidimensional construct, including cognitive, emotional and behavioural attributes (Doan & Zimerman, 2008). MFA is demonstrated in behaviours that show care to the foetus including nurturance (e.g. eating well), comfort (e.g. rubbing the bump) and physical preparation (e.g. purchasing baby clothes) (Salisbury, Law, LaGasse, & Lester, 2003).

[1] Attachment relationships exist between a baby and their primary caregiver (this is not limited to mothers). However, the current review is concerned with attachment to the foetus and therefore focuses primarily on the maternal-foetal relationship.

Early theoretical accounts suggest that over the pregnancy period, women have a growing awareness of the foetus and affection for the unborn child begins to develop (e.g. Pines, 1972). Women have been known to express an affiliation to the foetus and have perceived the foetus as a real person as early as the first trimester (Leifer, 1977). As the pregnancy progresses throughout the trimesters, attachment with the foetus is known to increase particularly after quickening, when the foetus first begins to move (e.g. Berryman & Windridge, 1996; Bloom, 1995; Van Bussel, Spitz, & Demyttenaere, 2010b).

There is ongoing debate regarding the use of the term 'attachment' in describing the mother-foetal relationship. Bowlby (1969) originally described attachment as the relationship the child has with the parent whereby the child seeks care, security and protection from the caregiver. This definition of attachment is based on a bidirectional relationship, whereas MFA refers to the unidirectional relationship between the mother and the growing foetus, which can only be investigated via the mother. It has therefore been argued that what is being measured prenatally is a different phenomenon (Redshaw & Martin, 2013). It has been suggested that instead of MFA being based on an attachment system (care-seeking), it is more conceivable for it to be defined by the 'caregiving system' (Walsh, 2010). Walsh (2010) argues that despite much of the literature referring to the term incorrectly, most researchers seem to be working with ideas that are conceptually, if not theoretically, similar and therefore findings from this literature should not be discredited.

To date, much research has focused on factors that influence MFA. Previous reviews by Cannella (2005) and Alhusen (2008) have considered a range of factors

that affect MFA such as substance abuse, mental health and demographic variables. The review by Cannella (2005) demonstrated mixed and inconsistent findings across studies of MFA with results indicating that MFA is relatively unaffected by demographic variables. An updated review found that factors such as maternal depression, anxiety and substance abuse pose a threat to the reported level of MFA whereas factors such as higher socioeconomic status, stable family relationships and social support are linked to higher MFA (Alhusen, 2008).

Less is known about how indicators of attachment during pregnancy may be related to attachment behaviours and other outcomes during the postpartum period and beyond. Over recent years, there has been an increasing interest in whether MFA is an important requirement in promoting optimal maternal-infant relationships and other infant outcomes. It is essential that clinicians and researchers gain a comprehensive understanding of the implications of MFA levels in order to support optimal development of infants.

The current review aims to systematically examine and synthesise the published literature studying the relationship between maternal-foetal attachment and postnatal infant outcomes. The importance of the early mother-infant relationship for optimal child development has been consistently highlighted (e.g. Schore, 2001; Weich et al., 2009). Yet, if the mother-infant relationship stems from attachment during the pregnancy period, then this too may be important in understanding and promoting optimal child development and early prevention of difficulties relating to the postnatal mother-infant relationship. The literature concerning the association between MFA and postnatal infant outcomes has increased over recent years but is yet to be systematically reviewed.

This review aims to answer the following question: Is there evidence that maternal-foetal attachment is associated with postnatal infant outcomes and what is the quality of evidence?

METHOD

Literature Search Strategy

A comprehensive search was conducted between February 2015 and January 2016 to identify relevant articles. Articles were identified by systematically searching three electronic databases (Embase, Medline and PsycINFO), forward searching (using Web of Science) and reviewing reference lists from the final included articles.

Electronic Database Search

An electronic database search of Embase (1974 to January 2016), PsycINFO (1967 to January week 2 2016) and Medline (1946 to January week 1 2016) was undertaken on 17th January 2016 using the search strategy shown in Table 1.

Search strategies A and B were combined and resulted in 472 papers. See Figure 1 for a flow chart of the search strategy and the number of articles excluded at each stage.

From the 472 initial articles found, duplicates were removed and initial inclusion criteria were applied (see Table 2). Papers were initially limited based on language, journal and article type. Titles and abstracts were then accessed for the remaining 209 articles, of which 192 papers were excluded. Many of these excluded papers were found to study variables during pregnancy but did not follow-up women or infants following the birth. Forward searching and hand searching identified a possible 2 further papers. Papers were screened against inclusion criteria developed specifically for the review question, which resulted in a total of 16 papers for full review.

Table 1: Review search strategy.

Search	Keywords	Search terms
A	Maternal-foetal attachment	"mother fetus relationship"(term exploded) OR "maternal fetal attachment" OR "maternal foetal attachment" OR "maternal fetal relationship" OR "maternal foetal relationship" OR "maternal fetal bonding" OR "maternal foetal bonding" OR "prenatal bonding" OR "prenatal attachment" OR "antenatal attachment" OR "antenatal relationship" OR "prenatal relationship" OR "antenatal attachment representation*" OR "antenatal representation*" OR "prenatal representation*" OR "mothers internal representations" OR "prenatal attachment representation*" OR "mothers representations" OR "expectant parents" OR "expectant mothers"
B	Postnatal infant outcome	"Postnatal attachment" OR "post-natal attachment" OR "postnatal relationship" OR "post-natal relationship" OR "postnatal bonding" OR "post-natal bonding" OR "mother infant attachment" OR "infant mother attachment" OR "mother child attachment" OR "mother infant relationship" OR "mother child relationship" OR "mother infant interaction" OR "mother child interaction" OR "postpartum bonding" OR "post-partum bonding" OR "postpartum relationship" OR "post-partum relationship" OR "postpartum attachment" OR "post-partum attachment" OR "psychosocial development" OR "child development" OR "cognitive development" OR "infant development" OR "child outcomes" OR "emotional development" OR "temperament" OR "social development" OR "child wellbeing" OR "child well-being" OR "emotional wellbeing" OR "emotional well-being" OR "neonatal outcomes" OR "infant attachment security" OR "postnatal infant development"

Forward searching and hand searching reference lists

Forward searching was conducted using Web of Science. One additional article was identified as relevant to the review question (Chrzan-Detkos & Lockiewicz, 2015).

Reference lists of the articles retrieved in full text were also searched for any relevant papers that may not have been identified in the database search. One paper

was identified (Bloom, 1995) when searching reference lists, however following full-text inspection it was found that this paper measured maternal behaviour as the outcome and was therefore excluded.

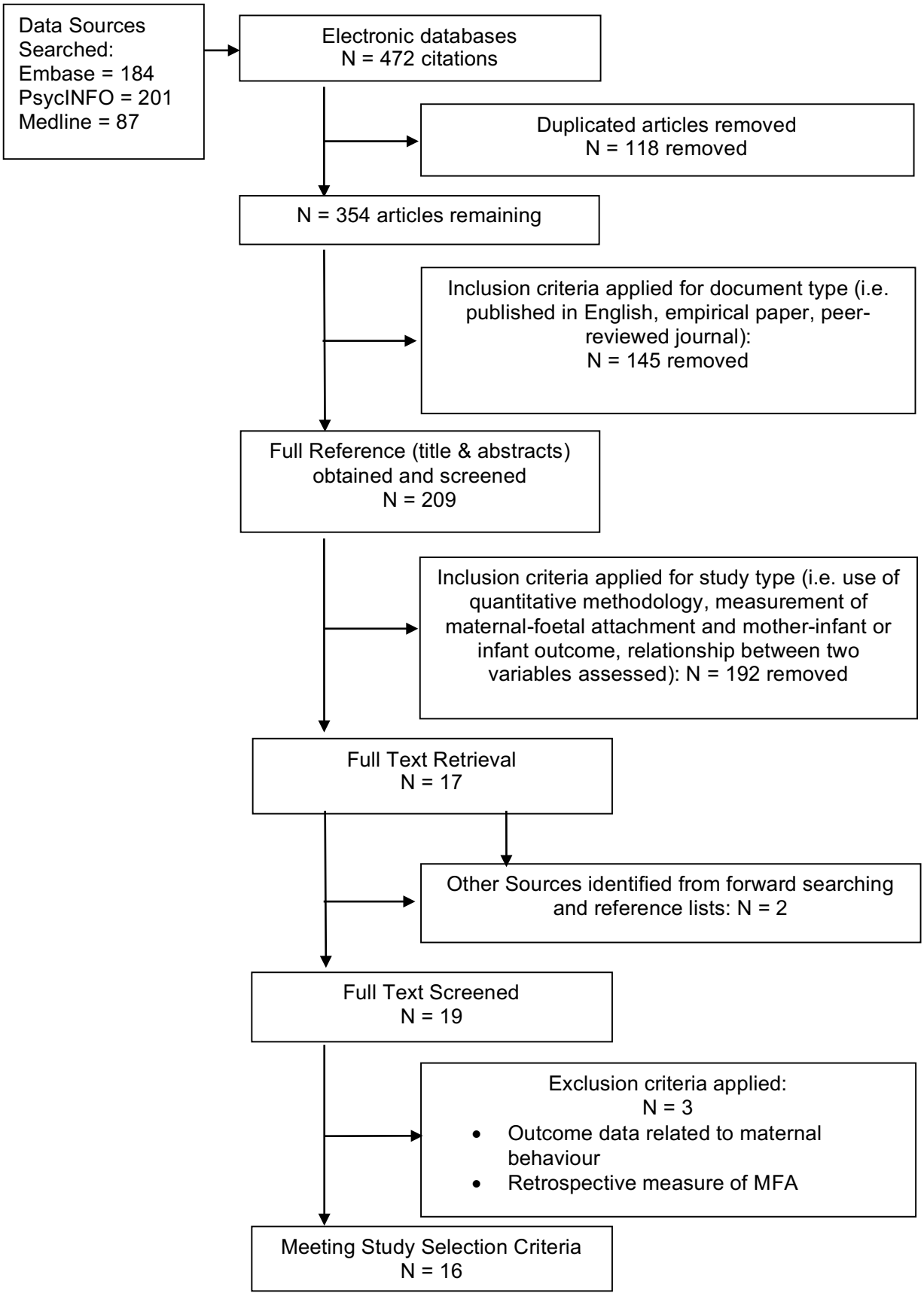


Figure 1: PRISMA flow diagram of search strategy and articles obtained

Inclusion and Exclusion Criteria

Articles identified from the search strategy were reviewed against the criteria shown in Table 2.

Table 2: Inclusion and exclusion criteria for the review

Inclusion Criteria *Include if meets all of the following:*	**Exclusion Criteria** *Exclude if any of the following are met:*
- Peer-reviewed journal article published in English - Empirical study - Use of quantitative methodology - Maternal-foetal attachment measured, including mothers' representations of their unborn child[2] - Postnatal mother-infant or infant outcomes measured - Study focusing on the relationship between maternal-foetal attachment and postnatal infant outcome - Women, couples or both	- Non-research papers e.g. review papers, position papers, conceptual papers - Dissertations and conference abstracts - Articles studying mothers own representations of attachment[3] - Articles measuring postnatal maternal or parental outcome/behaviour (e.g. maternal involvement, maternal sensitivity) - Retrospective measure of MFA

Extracting Key Results from Individual Studies

Key results were defined as any outcome representing the association between the maternal-foetal relationship and postnatal infant outcomes. All retrieved articles meeting the inclusion criteria included children under the age of 2 years and therefore, for the purposes of this review, all children were classed as 'infants'. Table 3 shows the measures used in the reviewed studies including a brief description of their aim and focus of measurement.

[2] Mothers' representations of their unborn child refer to a mother's internal subjective experience of the relationship with their unborn child (Zeanah & Benoit, 1995) and are considered to be an indicator of later infant attachment (e.g. Benoit et al., 1997; Huth-Bocks et al., 2004).

[3] 'Mothers' own representations of attachment' refer to the way in which the mother recalls her own childhood experiences of attachment with her own mother (e.g. Fonagy, Steele, & Steele, 1991).

Table 3: Measures of MFA and infant outcomes used in the reviewed studies.

Measure (Authors)	Description of measure
MFA	
Child Concept Questionnaire (Gloger-Tippelt, 1992)	29-items questionnaire measuring cognitive and emotional aspects of a mothers' mental representation of her present and future child. Five subscales: desirability of unborn child; anxiety about the child's health; body concept of the unborn child; relationship with the unborn child; and the child as an individual after birth.
Maternal Antenatal Attachment Scale (MAAS; Condon, 1993)	19-item questionnaire measuring feelings, behaviours and attitudes towards the foetus. Two subscales: quality of affective experiences or attachment, and intensity of preoccupation with the foetus.
Maternal-Fetal Attachment Scale (MFAS; Cranley, 1981)	24-item questionnaire measuring the behaviours that indicate affective involvement and interaction with the unborn child. Five subscales: differentiation of self from foetus; interaction with the foetus; attributing characteristics and intentions to the foetus; giving of self; and role taking.
Prenatal Attachment Inventory (PAI; Muller, 1993)	21-item questionnaire measuring affectionate attachment between a mother and her foetus. No subscales (affectionate attachment considered to be a single concept).
Working Model of the Child Interview (WMCI; Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994)	Semi-structured interview assessing mothers' representations of attachment to their child. Modified to reflect future tense to assess MFA. Three classifications: balanced, disengaged and distorted (Benoit, Zeanah, Parker, Nicholson, & Coolbear, 1997). Balanced narratives include both negative and positive affect, richness of detail and a sense that the mother is engaged in her relationship with the unborn child. Disengaged narratives may lack detail and integration, and show the mother communicating with a lack of emotional and personal involvement. Distorted narratives include inconsistent affect, with the mother being unable to focus on the relationship with her unborn child.

Measure (Authors)	Description of measure
Infant Outcomes: Mother-infant attachment	
How I Feel About My Baby Now scale (HIFBN; Leifer, 1977)	10-item questionnaire designed to measure mother-infant attachment in the form of the mother's feelings about her infant.
Maternal Attachment Inventory (MAI; Muller, 1994)	26-item questionnaire designed to assess the affectionate attachment that develops between a mother and her infant. No subscales (affectionate attachment considered to be a single concept).
Maternal Postnatal Attachment Scale (MPAS; Condon & Corkindale, 1998)	19-item questionnaire measuring a woman's level of attachment to her infant.
Strange Situation (SS; Ainsworth, Blehar, Waters, & Wall, 1978)	Laboratory procedure used to assess mother-infant attachment. Infants are observed in relation to proximity seeking, contact maintenance, avoidance and resistance. Four classifications: secure, insecure-avoidant, insecure-ambivalent and disorganised (added by Main & Soloman, 1990). Secure infants are at ease when the mother is present, use her as a secure base for exploration, cry in her absence and seeks proximity to her and settles on reunion. Insecure-avoidant infants may cry in the absence of their mother but actively avoids contact on reunion. Insecure-ambivalent infants seek contact with the mother to the extent that exploration does not occur, becomes very upset on separation and has difficulty being settled by her on reunion. Disorganised infants show contradictory behaviours or affects occurring simultaneously including incomplete or undirected movements and behavioural stilling.
Working Model of the Child Interview (WMCI; Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994)	Semi-structured interview assessing mothers' representations of attachment to their child. Three classifications: balanced, disengaged and distorted (Benoit, Zeanah, Parker, Nicholson, & Coolbear, 1997). Balanced narratives include both negative and positive affect, richness of detail and a sense that the mother is engaged in her relationship with the child. Disengaged narratives may lack detail and integration, and show the mother communicating with a lack of emotional and personal involvement. Distorted narratives include inconsistent affect, with the mother being unable to focus on her child and the relationship with her child.

Measure (Authors)	Description of measure
Infant outcomes: Mother-infant interaction	
Funke Mother-Infant Interaction Assessment (FMII; Funke-Furber, 1978)	20-item measure used to assess mother-infant interaction during observations. Four categories: eye contact; mother's degree of acceptance of her infant; physical closeness; and quality and amount of verbal stimulation.
Munich Clinical Communication Diagnostic Scales (Papousek, 1996)	Used to assess videos of mother-infant interaction. Mother variables and child variables included. Mother variables: intuitive parenting competence and regulatory abilities. Child variables: eye contact and interaction readiness.
Nursing Child Assessment Feeding Scale (NCAFS; Barnard, 1978)	76-item measure used to assess parent and infant characteristics during observations. Four subscales: sensitivity to cues; response to distress; social-emotional growth fostering; and cognitive growth fostering.
Infant outcomes: Mother-infant bonding	
Mother-to-Infant Bonding Scale (MIBS; Taylor, Atkins, Kumar, Adams, & Glover, 2005)	8-item screening questionnaire consisting of statements describing an emotional response (loving, resentful, neutral, joyful, dislike, protective, disappointed and aggressive).
Postpartum Bonding Questionnaire (PBQ; Reck et al., 2006)	25-item questionnaire assessing a mother's feelings or attitudes towards her baby. Four subscales: impaired bonding; rejection and anger; anxiety about care; and risk of abuse.
Infant outcomes: Other	
Ages and Stages Questionnaire (3rd edition) (ASQ-3; Squires, Bricker, & Potter, 1997)	Includes a series of 21 age-specific questionnaires from age 1 month to 5.5 years used to evaluate developmental milestones. Five developmental domains: communication; gross motor; fine motor; problem solving; and personal-social.
Early Infant Temperament Questionnaire (EITQ; Medoff-Cooper, Carey, & McDevitt, 1993)	76-item questionnaire for assessing parents' reports of infant temperament under age 4 months. Nine subscales: activity; rhythmicity; approach/withdrawal; adaptability; mood; intensity; threshold; persistence; and distractibility.
Revised Infant Temperament Scale (RITQ; Carey & McDevitt, 1978)	A revised version of the EITQ. A 95-item questionnaire used to assess parent reports of infant temperament at 4-8 months of age. Nine subscales: activity; rhythmicity; approach/withdrawal; adaptability; mood; intensity; threshold; persistence; and distractibility.
Sleep/Activity Record (SAR; Barnard, 1999)	Sleep log designed for parents to keep track of infant sleep onset, number of awakenings and length of waking/sleep.

Key results and characteristics of the 16 studies were extracted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). A summary of these data are presented in Table 4.

Table 4: Summary of main characteristics and findings of the reviewed papers (in chronological order)

Author (year) Country	N at time point 1	N at final time point	Sample*	Design	Measure of MFA Time point(s)	Outcome variable - outcome measure Time point(s)	Key findings	Limitations	Quality rating
Alhusen, Gross, Hayat, Woods, & Sharps (2012) **USA**	167	166	Vulnerable women (e.g. low income, majority African-American, single)	Prospective, longitudinal	MFAS 24-28 weeks gestation	Neonatal outcomes – gestational age & birth weight Birth	Significant negative relationship between MFA and neonatal outcomes ($p<0.05$).	Limited, specific sample. Neonatal outcomes grouped as 'adverse' or 'no adverse outcome'.	0.81
Alhusen, Hayat, & Gross (2013) **USA**	81	81	Vulnerable women (e.g. low income, majority African-American, single)	Prospective, longitudinal	MFAS 24-28 weeks gestation	Early childhood development – ASQ-3 14-26 months	MFA found to be a positive significant predictor of early childhood development ($p<0.001$).	Subsample of 2012 study. Mothers' reports of infant development.	0.78
Benoit, Parker, & Zeanah (1997) **Canada/USA**	96	81	Predominantly married and educated women from upper-middle-class backgrounds	Prospective, longitudinal	WMCI 28-40 weeks gestation	Attachment – SS & WMCI 11 months	Significant concordance between classification in pregnancy and WMCI and SS at 11 months (both $p<0.001$).	Sample skewed towards balanced and secure attachment - not representative. Recruitment reported briefly (reader referred to another paper).	0.33

Author (year) Country	N at time point 1	N at final time point	Sample*	Design	Measure of MFA Time point(s)	Outcome variable - outcome measure Time point(s)	Key findings	Limitations	Quality rating
Chrzan-Detkos & Lockiewicz (2015) **Poland**	162	64	Well educated Polish women	Prospective, longitudinal	MFAS Mean 31 weeks gestation	Bonding – PBQ Mean 8 weeks	Moderate negative correlation between MFAS role taking subscale and PBQ anxiety about care subscale ($p<0.05$). No other significant correlations.	Measures translated to Polish. Mothers' reports of bonding. Large range of infant age (1-20 weeks) when bonding measured.	0.43
Damato (2004) **USA**	214	139	Mothers of twins; predominantly white, married, educated	Prospective, longitudinal	PAI Mean 26.5 weeks gestation	Attachment – MAI Mean 9.8 weeks	Significant correlation between average prenatal and postnatal attachment scores ($p<0.001$).	One postnatal measure per twin. Measures used mainly researched in singleton pregnancies. Sample from support group – investment of mothers. Mothers' reports of postnatal attachment.	0.73

Author (year) Country	N at time point 1	N at final time point	Sample*	Design	Measure of MFA Time point(s)	Outcome variable - outcome measure Time point(s)	Key findings	Limitations	Quality rating
Della Vedova (2014) **Italy**	146	107	Partnered, nulliparous women, low-risk pregnancy	Prospective, longitudinal	PAI 28-40 weeks gestation	Temperament – EITQ 3 months	PAI significantly correlated with EITQ persistence subscale ($p<0.001$). No other scales were significantly correlated to PAI.	Postnatal attachment measured but correlation with prenatal attachment not reported. Mothers' reports of infant temperament.	0.50
Dubber, Reck, Müller, & Gawlik (2014) **Germany**	80	30	Predominantly married, educated women	Prospective, longitudinal	MFAS 32 weeks gestation	Bonding – PBQ 12 weeks	MFA significantly correlated with postpartum bonding ($p<0.05$). Higher prenatal attachment associated with lower reported bonding impairment.	Small final sample. Translated MFAS to German – not validated. Focus on postpartum bonding, not attachment. Mothers' reports of bonding relationship.	0.77
Fuller (1990) **Canada**	32	32	Described as 'low-risk'	Prospective, longitudinal	MFAS 35-40 weeks gestation	Mother-infant interaction – NCAFS & FMII 2 & 3 days	MFA significantly and positively associated with mother-infant interaction for both NCAFS and FMII (both $p<0.001$).	Small sample. Impact of being observed 2-3 days postpartum. 9 of 32 women were first-time mothers – still learning, impact of tiredness.	0.32

Author (year) Country	N at time point 1	N at final time point	Sample*	Design	Measure of MFA Time point(s)	Outcome variable - outcome measure Time point(s)	Key findings	Limitations	Quality rating
Huth-Bocks, Levendosky, & Bogat (2004) **USA**	206	189	44% of women reported domestic violence during pregnancy	Prospective, longitudinal	WMCI 28-40 weeks gestation	Attachment – SS 12-13 months (mean 13.3 months)	Prenatal representations of caregiving were significantly related to infant attachment at 1 year ($p<0.05$).	Representations of infant and of self-as-mother combined to form one prenatal attachment representation of caregiving construct.	0.57
Huth-Bocks, Theran, Levendosky, & Bogat (2011) **USA**	206	173	44% of women reported domestic violence during pregnancy	Prospective, longitudinal	WMCI 28-40 weeks gestation	Attachment – SS Mean 13.3 months	Significant concordance in attachment classifications over time when classifications grouped as balanced/ non-balanced ($p<0.01$).	Same sample as 2004 study.	0.57
Müller (1996) **USA**	207	196	Predominantly nulliparous, married, educated women	Prospective, longitudinal	PAI Latter part of pregnancy (details not provided)	Attachment – MAI & HIFBN 1-2 months (mean 29 days)	Significant correlation found between PAI and MAI scores ($p<0.001$). Correlation also found between PAI and HIFBN ($p<0.05$).	Limited sample, not diverse. Mothers' reports of postnatal attachment.	0.61

Author (year) Country	N at time point 1	N at final time point	Sample*	Design	Measure of MFA Time point(s)	Outcome variable - outcome measure Time point(s)	Key findings	Limitations	Quality rating
Spletzer, O'Beirne, & Bishop (2009) **Canada**	90	63	First-time mothers, low risk pregnancies	Prospective, longitudinal	PAI 35-40 weeks gestation	Sleep – SAR 1 week & 3 months	Relationship between PAI score and sleep segments, longest sleep at 1 week and 3 months not significant ($p>0.05$). Significant relationship between PAI and total sleep at 1 week ($p<0.05$).	29% drop out rate due to participants feeling overwhelmed. Mothers' reported sleep log.	0.53
Theran, Levendosky, Bogat, & Huth-Bocks (2005) **USA**	206	180	44% of women reported domestic violence during pregnancy	Prospective, longitudinal	WMCI 28-40 weeks gestation	Attachment – WMCI 1 year	Significantly stable classifications from pregnancy to one year ($p<0.001$).	Same sample as two studies by Huth-Bocks and colleagues (2004; 2011) but consideration of contextual variables. Mothers' reports of postnatal attachment relationship.	0.60

Author (year) Country	N at time point 1	N at final time point	Sample*	Design	Measure of MFA Time point(s)	Outcome variable - outcome measure Time point(s)	Key findings	Limitations	Quality rating
Thun-Hohenstein, Wienerroither, Schreuer, Seim, & Wienerroither (2008) **Austria**	109	73	NR	Prospective, longitudinal	Child Concept Questionnaire 28-40 weeks gestation	Mother-infant interaction – video of interaction** 3 months	Weakly significant correlation between relationship with unborn child and mean infant eye contact (p=0.08).	Used non-validated Munich Clinical Communication Scale to assess interaction.	0.64
Van Bussel, Spitz, & Demyttenaere (2010b) **Belgium**	403	202	Predominantly married or living with partner, educated, employed women	Prospective, longitudinal	MAAS 8-15 weeks, 20-26 weeks & 30-36 weeks gestation	Early mother-infant bond – MPAS, PBQ & MIBS 8-12 weeks & 20-25 weeks	Significant correlations reported between the three antenatal measures and the total MPAS, PBQ and MIBS scores (all p<0.0001).	Mothers' reports of mother-infant bond.	0.57
White, Wilson, Elander, & Persson (1999) **Sweden**	91	62	Low-risk pregnancy; first or second child	Prospective, longitudinal	MFAS 28-40 weeks gestation	Temperament – RITQ 8-9 months	No relationship reported between temperament and prenatal attachment (p-value not reported).	Mothers' reports of infant temperament. Questionnaires translated to Swedish - not validated.	0.37

*Further detail regarding sample reported in results section
**Analysed using the Munich Clinical Communication Diagnostic Scales
NR, Not reported

Quality Assessment

The quality of included studies was assessed using a quality checklist developed by Tooth and colleagues (Tooth, Ware, Bain, Purdie, & Dobson, 2005). This 33-item checklist was chosen as it was specifically designed to assess the quality of reporting of longitudinal observational study designs. Items in the checklist covered aspects including the study rationale and population, recruitment, measurement and biases, data analysis, and generalizability of results (see Table 5 for details). Minor alterations were made to the checklist including developing clearer definitions regarding ambiguous items, editing apparent duplicate items (items regarding generalizability) and omitting items deemed irrelevant to the studies under review (e.g. were longitudinal analysis stated?) (for full details see Appendix 1).

Each item on the adapted 30-item checklist was rated as either reported (yes), not reported (no) or not applicable to report. Not reported also included instances where the item was inadequately reported or the reader was referred to another publication for specific details. The Tooth et al. (2005) checklist was deemed to be appropriate as it takes into account specific issues related to longitudinal research designs, such as sample size at follow up and whether missing data are accounted for in analysis.

In order to reduce the subjectivity of the quality assessment and increase inter-rater reliability, a second rater assessed three (19%) papers for quality. Inter-rater agreement was high (83-86%) and any discrepancies discussed prior to agreement and final scoring.

Quality of reporting across studies

Table 5 shows the total number of articles that reported each item along with the number of studies that the item was applicable for. The percentage of applicable items that were reported is also shown.

All papers sufficiently reported study objectives and hypotheses and the number of participants at the beginning of the study. Other generally well reported items included methods of data collection, reliability of measures in the study sample and numbers of participants at each stage.

External validity may have been weakened by the fact that over one third of studies did not report eligibility criteria and several did not comment on consenters and non-consenters. However, many studies did comment on the extent to which the results could be generalised.

Internal validity may be compromised by inadequate reporting on items such as missing data and accounting for loss to follow up, both common issues in studies with an observational longitudinal design. Lack of reporting also suggests that confounding factors may have been insufficiently considered and may result in inaccurately estimating the effect of variables under investigation and reduce internal validity.

Inadequate reporting of several items results in the inability to accurately determine the extent to which studies may be at risk of bias. Therefore, conclusions that are drawn from reviewed studies with poor reporting should be considered tentatively.

Table 5: Quality checklist items reported across studies.

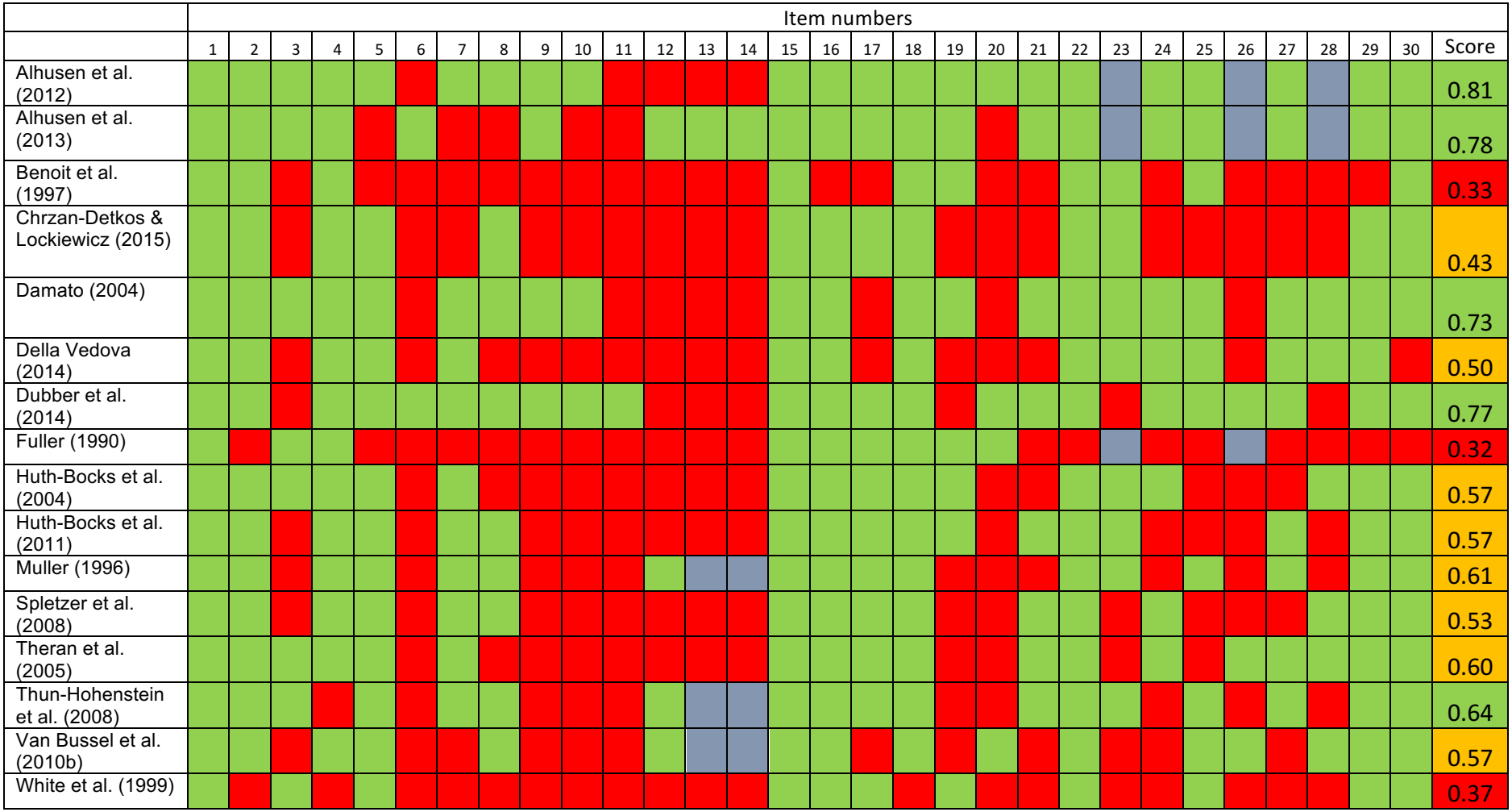
Item	Criterion	No.	%
Study rationale and population			
1	Are the objectives or hypotheses of the study stated?	16/16	100
2	Is the target population stated?	14/16	88
3	Is the sampling frame stated?	8/16	50
4	Is the study population defined?	14/16	88
Recruitment			
5	Are the study setting (venues) and/or geographic location stated?	13/16	81
6	Are the dates between which the study was conducted stated or implicit?	2/16	13
7	Are eligibility criteria stated?	10/16	63
8	Are issues of 'selection in' to the study mentioned?	9/16	56
9	Is the number of participants justified?	4/16	25
10	Are numbers meeting and not meeting the eligibility criteria stated?	3/16	19
11	For those not eligible, are the reasons why stated?	1/16	6
12	Are the numbers of people who did/did not consent stated?	4/16	25
13	Are the reasons that people refused to consent stated?	1/13	8
14	Were consenters compared compared with non-consenters?	1/13	8
15	Was the number of participants at the beginning of the study stated?	16/16	100
Measurements and biases			
16	Were methods of data collection stated?	15/16	94
17	Was the reliability (repeatability) of measurement methods mentioned?	12/16	75
18	Was the reliability of measurement methods measured in the study sample?	15/16	94
19	Was the validity (against a gold standard) of measurement methods mentioned?	8/16	50
20	Was the validity of measures established in the current sample?	4/16	25
21	Were any confounders mentioned?	8/16	50
22	Was the number of participants at each stage/wave specified?	15/16	94
Data analysis			
23	Were reasons for loss to follow-up quantified?	7/13	54
24	Was the missingness of data items at each wave mentioned?	8/16	50
25	Was the type of analyses conducted stated?	10/16	63
26	Was loss to follow-up taken into account in the analysis?	3/13	23
27	Were confounders accounted for in analyses?	9/16	56
28	Were missing data accounted for the in the analyses?	6/14	43
Generalisability of results			
29	Was the impact of biases assessed qualitatively?	14/16	88
30	Was there any discussion regarding generalizability of results?	14/16	88

Quality of reporting in individual studies

Quality of reporting within and across each of the 16 studies is shown in Table 6, with green indicating reported (scoring 1), red indicating not reported (scoring 0), and blue indicating items not applicable. A numerical score was calculated by dividing the number of items reported (green) by the number of relevant items (red and green), with a higher score indicating a higher proportion of relevant or applicable items reported (i.e. better reporting). Each paper's quality score and ratings for each item are shown in Table 6. Furthermore, overall quality scores were rated into red, amber and green categories corresponding to the 25th, 50th and 75th percentiles.

The average overall quality score was 0.57. Studies demonstrating relatively poor quality of reporting (with total scores falling below the median 0.57) include Benoit et al. (1997), Chrzan-Detkos & Lockiewicz (2015), Della Vedova (2014), Fuller (1990), Spletzer et al. (2009), and White et al. (1999). Particularly well reported studies include those by Alhusen and colleagues (Alhusen et al., 2012, 2013) and by Dubber et al. (2014), all scoring over 0.75.

Table 6: Quality review summarising the quality of reporting within and between papers



RESULTS

Study Characteristics

Sixteen published studies were included in the review. Studies were carried out across eight different countries (Austria, Belgium, Canada, Germany, Italy, Poland, Sweden and USA) with many (50%) taking place in the USA. All studies were prospective and longitudinal in design.

Sample

Study sample sizes ranged from 32 to 403 pregnant women (mean = 156) at time point 1 with follow-up samples ranging from 30 to 202 mother-infant dyads (mean = 115). The mean attrition rates for all studies was calculated to be 23% (range 0-63%). All studies utilised a convenience sampling method.

Participants

Pregnant women (age, demographics)

Studies varied in relation to the demographics of the pregnant women included (see Table 7 for a summary). Fifteen of the 16 studies reported the mean age of pregnant women and one study reported only the age range of women participants. The average age of pregnant women across studies was 26.3 years. Eleven of the 16 studies reported the ethnicity of the sample. Of these eleven, 9 studies had a predominantly Caucasian sample. Both studies by Alhusen and colleagues had a sample consisting of predominantly African-American women (Alhusen et al., 2012, 2013).

Six studies included a sample of women who were predominantly Caucasian (range 91-100%), married or partnered (78.5-98.6%) and aged 28 or over. Of these samples, five also provided information on women's education level, which was generally high (e.g. 15 years education; university degree). Five studies had samples including a larger proportion of African-American (24-93%) and single (48-54%) women. These samples had women aged 25 or younger with a lower education level (majority educated to high school level) and a mean income below £15,000. Two studies did not provide sufficient information on the sample (Thun-Hohenstein et al., 2008; White et al., 1999).

The majority of studies (N = 13) included women who were both primigravida (a woman who is pregnant for the first time) and multigravida (women pregnant for at least the second time). Two studies solely recruited primigravida women (Della Vedova, 2014; Spletzer et al., 2009) and one studied women pregnant with twins (Damato, 2004).

Table 7: Summary of demographic variables for pregnant women

Author (year)	**Age (mean** years**)**	**Ethnicity**	**Income**	**Education**	**Partnered/ married**	**Primigravida/ Multigravida**	**Demographics of initial sample or follow-up (n)**
Alhusen et al. (2012)	23.3	93% African-American	86% less than £15,000	67% less than high school	54% single; 34% partnered (not married)	32% primigravida	Follow-up (166)
Alhusen, Hayat & Gross (2013)	23	93% African-American	86% less than £15,000	67% less than high school	54% single; 34% partnered (not married)	Mix	Initial (166)
Benoit, Parker & Zeanah (1997)	29.2	100% Caucasian	NR	Mean 15.6 years	98% married	46% primigravida	Initial (96)
Chrzan-Detkos & Lockiewicz (2015)	28.7	NR	NR	65.4% university	All married or partnered	92% primigravida	Follow-up (64)
Damato (2004)	32.1	97.8% white	53.9% more than £46,000	NR	98.6% married	Twins	Follow-up (139)
Della Vedova (2014)	31.2	100% Italian	NR	43.9% high school; 37.5% university	78.5% married	All primigravida	Follow-up (107)
Dubber et al. (2014)	32.8	NR	NR	47% university	80.4% married	Mix	Subsample (80)
Fuller (1990)	26.7	NR	NR	NR	97% married	28% primigravida	Sample (32)
Huth-Bocks et al. (2004)	18-40 (range)	63% Caucasian; 25% African-American	Median monthly income £1,118	45% high school or less	50% single; 40 % married	Mix	Initial (206)
Huth-Bocks et al. (2011)	25.4	63% Caucasian; 25% African-American	Median monthly income £1,118	45% high school or less	50% single; 40 % married	Mix	Initial (206)
Muller (1996)	28	91% white	74% more than £23,000	Mean 15 years	91% married	93% primigravida	Timepoint 1 participants (207)
Spletzer, O'Beirne & Bishop (2008)	29.8	91% Caucasian	73% £38,000 or more	54% university degree or higher	95% married or partnered	Primigravida	Unknown

Author (year)	Age (mean years)	Ethnicity	Income	Education	Partnered/ married	Primigravida/ Multigravida	Demographics of initial sample or follow-up (n)
Theran et al. (2005)	25	63% Caucasian; 24% African-American	Mean monthly income £1,500	87% high school	48% single; 41% married	44% primigravida	Follow-up (180)
Thun-Hohenstein et al. (2008)	29.2	NR	NR	56% more than 9 years	NR	58% primigravida	Follow-up (73)
Van Bussel & Spitz (2010b)	30.4	93.5% Belgium women	NR	74.9% tertiary education	92.4% married or partnered	47.5% primigravida	Unknown
White et al. (1999)	26.2	NR	NR	NR	All married or partnered	64.8% primigravida	Initial (91)

NR, Not reported

Infant (age, gender)

Infant age, often demonstrated by the follow up points within each study, ranged from birth (within 48 hours of delivery) to 26 months of age. Some studies provided additional information on infants, including infant gender (Benoit, Parker, & Zeanah, 1997; Damato, 2004; Dubber et al., 2014; Müller, 1996; Thun-Hohenstein et al., 2008) and birth weight (Damato, 2004; Della Vedova, 2014; Dubber et al., 2014). The mean percentage of male infants was 50.7% (range 48.1% to 55%). Mean infant birth weight was 3.3kg (7lbs 5oz) for studies of singleton pregnancies and 2.6kg (5lbs 10oz) for the twin study.

Assessment Measures

Maternal Measures

All studies used one measure of MFA. Five different measures were used to assess MFA, including four self-report questionnaires and one structured interview. Most commonly used measures were the Maternal-Fetal Attachment Scale (MFAS; Cranley, 1981) [6 studies], Working Model of the Child Interview (WMCI; Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994) [4 studies] and Prenatal Attachment Inventory (PAI; Muller, 1993) [4 studies]. The WMCI was originally designed to inquire about caregiver's perceptions of their infant's characteristics and the relationship with their infant, and therefore was modified for use antenatally.

Some studies also assessed for potentially confounding variables, including maternal depression (Alhusen et al., 2013; Damato, 2004; Della Vedova, 2014; Dubber et al., 2014; Huth-Bocks et al., 2011; Thun-Hohenstein et al., 2008), pregnancy related anxiety (Della Vedova, 2014; Dubber et al., 2014), maternal health

practices (Alhusen et al., 2012), maternal perceived social support (Della Vedova, 2014; Huth-Bocks et al., 2004; Huth-Bocks et al., 2011), domestic violence (Huth-Bocks et al., 2004; Huth-Bocks et al., 2011; Theran et al., 2005), marital status (Huth-Bocks et al., 2004; Huth-Bocks et al., 2011), maternal age (Thun-Hohenstein et al., 2008) and other perinatal variables such as method of delivery, maternal health and infant birth weight (Damato, 2004).

Infant Outcome Measures

Eleven of the 16 studies measured an outcome related to the mother-infant relationship including attachment (n=6), bonding (n=3) and interaction (n=2). A variety of measures were used. In relation to attachment, three studies used the Strange Situation (Ainsworth et al., 1978), two used the WMCI, two used the Maternal Attachment Inventory (Muller, 1993) and one used How I Feel about my Baby Now (Leifer, 1977), with some studies using more than one measure. There was no consistency in use of measures for bonding or interaction. Only one measure, used by Fuller (1990), the Funke Mother-Infant Interaction Assessment (Funke-Furber, 1978), was unpublished. Measures such as the Strange Situation benefit from not relying solely on mothers' reports and allow for objective observation, often coded by more than one rater.

Other outcomes included neonatal outcomes (n=1) comprising of gestational age and birth weight, childhood development (n=1) measured by the Ages and Stages Questionnaire (3rd edition, Squires, Bricker, & Potter, 1997), infant temperament (n=2) assessed by the Revised Infant Temperament Scale (Carey & McDevitt, 1978) and Early Infant Temperament Questionnaire (Medoff-Cooper et al.,

1993), and sleep (n=1) measured using the Sleep/Activity Record (Barnard, 1999). All measures, except for neonatal outcomes, were reliant on mothers' reports.

Timing of MFA measure

All studies measured MFA during pregnancy. Furthermore, all studies measured MFA at one time point except for one study that measured it once during each trimester (Van Bussel et al., 2010b). Most (n=11) studies assessed MFA during the third trimester when the women were between 28 and 40 weeks of pregnancy. Three studies reported measuring MFA during the second trimester, two of which were 24-28 weeks gestation (Alhusen et al., 2012, 2013) and one at a mean of 26.5 weeks gestation (Damato, 2004). One paper did not specify when MFA was measured, only stating that it was measured 'during the latter part of pregnancy' (Müller, 1996).

Timing of Infant Outcome Measure

Infant outcome measures were obtained at varying time points from birth up to 26 months of age. Three studies measured infant outcomes at two follow-up time points (Fuller, 1990; Spletzer et al., 2009; Van Bussel et al., 2010b) whereas the majority assessed infant outcomes at one time point only. The majority of infant outcomes were measured between birth and 3 months of age (n=11). Seven studies assessed outcomes in infants aged from 20-25 weeks to 14-26 months. No clear pattern was evident in terms of type of infant outcome and follow-up time. Outcomes related to the mother-infant relationship were measured when infants were aged between one month and 13 months.

Study Design

All papers utilised a prospective longitudinal design, following participants from pregnancy through to the postnatal period and beyond. The potential relationship between MFA and postnatal infant outcomes was investigated over this time.

Study Outcomes

For the purpose of this review, postnatal infant outcomes were divided into two groups consisting of outcomes relating to the mother-infant relationship (including attachment, interaction and bonding[4]) and other outcomes.

Maternal-Foetal Attachment and Mother-Infant Relationship

Eleven studies explored the relationship between MFA and mother-infant relationship. All studies reported at least one statistically significant result regarding this relationship.

Significant correlations between MFA and maternal-infant attachment were reported by three studies (Damato, 2004; Huth-Bocks et al., 2004; Müller, 1996). Results by Huth-Bocks et al. (2004) suggest that higher prenatal attachment scores are associated with greater postnatal attachment security. Similarly, Damato (2004) and Müller (1996) reported a modest positive correlation between pre- and postnatal attachment scores (r=0.38 and r=0.41, respectively). In addition, Damato (2004)

[4] The terms 'attachment' and 'bonding' are often used interchangeably, however there are distinct differences between the terms (Redshaw & Martin, 2013). Bonding refers to the feelings a mother has towards her infant whereas attachment refers to the dyadic relationship developed between mother and child (Dubber et al., 2014). The attachment relationship is then represented in the way that the child learns to elicit care – his/her attachment style (Bowlby, 1969).

reported that MFA explained 14.5% of the variance in postnatal attachment scores (after controlling for covariates) whilst Müller (1996) reported that PAI scores explained 17% of MAI scores. However, these studies assessed attachment at varying times postnatally (from 9.8 weeks to 13.3 months). Furthermore, the study by Damato (2004) was based on mothers pregnant with twins, a pregnancy that is considered to be medically higher risk and commonly incurs complications, which may have an impact on the attachment relationship during and after pregnancy. Despite this, results from these relatively high quality studies consistently suggest a weak to moderate strength relationship exists between pre- and postnatal attachment.

Four papers reported concordance in attachment classifications from pregnancy to infancy (Benoit et al., 1997; Huth-Bocks et al., 2004; Huth-Bocks et al., 2011; Theran et al., 2005). Significant concordance was found in classifications from pregnancy to 11-13 months of infant age (Benoit et al., 1997; Huth-Bocks et al., 2004). However, these results should be considered in light of the poor overall quality score of the study by Benoit et al. (1997). Additionally, Huth-Bocks et al. (2004) based results on a 'prenatal representations of caregiving construct' that included both representations of the infant and of the self as a mother, which differs to other studies solely concerned with the infant. The two remaining studies (Huth-Bocks et al., 2011; Theran et al., 2005) found differing results depending on how classifications were grouped. When assessing concordance in 'balanced', 'disengaged' and 'distorted' groups varying results were found (one significant and one non-significant). Whereas when the groups were split into 'balanced' and 'non-balanced', results were significant in both studies (Huth-Bocks et al., 2004; Theran et

al., 2005). Overall, Huth-Bocks et al. (2011) reported that MFA classifications were not concordant with the observed mother-infant attachment relationship at follow-up. Factors such as resources (e.g. income), domestic violence, maternal support and maternal depression were reported to be linked to changes in representations over time (e.g. from non-balanced in pregnancy to secure in infancy). On the whole, results do not appear to show consistent or conclusive findings regarding the concordance of attachment classifications from pregnancy to the postnatal period. It should also be noted that results from studies by Huth-Bocks et al. (2004), Huth-Bocks et al. (2011) and Theran et al. (2005) were all based on the same original sample.

Fuller (1990) and Thun-Hohenstein et al. (2008) both studied the association between MFA and postnatal mother-infant interaction (without specifically assessing attachment). Fuller (1990) reported that MFA was significantly and positively related to reported mother-infant interaction at two and three days of infant age. However, this study has a poor overall quality score, therefore results should be considered cautiously. Thun-Hohenstein et al. (2008) were concerned with mothers' representations of the unborn child and observed mother-infant interaction using videos. They reported a 'weakly significant' correlation ($p=0.08$) between mothers' antenatal representations of the child and mean infant eye contact at three months of age. Additionally, maternal representations were found to predict infant interaction readiness (observed facial expression, gestures, vocalisations, focus of attention etc.). Despite having an average overall quality score, Thun-Hohenstein et al. (2008) failed to use a validated measure to assess videos of postnatal mother-infant interaction. Results from these studies concerning MFA and mother-infant interaction

do not indicate consistently significant findings which, coupled with the average-poor quality of studies, suggests that reliable conclusions cannot be drawn.

Three studies were concerned with the relationship between MFA and postnatal mother-infant bonding (Chrzan-Detkos & Lockiewicz, 2015; Dubber et al., 2014; Van Bussel et al., 2010b). All three studies reported a significant correlation between MFA and reported postpartum bonding scores. For example, higher attachment in pregnancy was found to be associated with lower bonding impairment (Dubber et al., 2014). Despite having a good overall quality score, results by Dubber et al. (2014) were based on a small final sample (n=30). Congruent results were found by Van Bussel et al. (2010b) where MFA measured at three time points during pregnancy was found to significantly correlate with three different self-report postnatal bonding measures (MPAS, PBQ and MIBS) at 8-12 and 20-25 weeks. Furthermore, measures of MFA were positively associated with the MPAS pleasure and quality subscales and negatively correlated with subscales concerning impaired bonding and rejection on the PBQ. Chrzan-Detkos & Lockiewicz (2015) reported a significant negative correlation between the MFAS role taking subscale and the PBQ anxiety about care subscale, but no other significant correlations were found. Overall, the majority of findings suggest that a positive significant association exists between MFA and postnatal mother-infant bonding.

Many studies assessed demographic variables in relation to MFA and the postnatal mother-infant relationship. Maternal education level was the only factor that was reported to be significantly related to the mother-infant relationship. Four studies reported that maternal education was significantly associated with the postnatal mother-infant relationship and therefore controlled for this variable in the analysis

(Damato, 2004; Dubber et al., 2014; Huth-Bocks et al., 2011; Van Bussel et al., 2010b). Results showed that more highly educated mothers report lower postnatal attachment. However, this result was not supported by Müller (1996) who reported that only marital status significantly influenced pre- and postnatal attachment scores.

Few studies also considered contextual variables that may influence the correlation between MFA and the mother-infant relationship. MFA and postpartum depression were both found to be significant contributors to postnatal attachment, with greater MFA and lower maternal depression being linked to higher postnatal attachment (Damato, 2004). Similarly, Dubber et al. (2014) reported that postpartum depressive symptoms in mothers was a significant factor when explaining postpartum bonding. Several contextual variables were found to be involved in the likelihood of concordant or discordant attachment classifications (i.e., whether women who were 'balanced' during pregnancy went on to have secure infants or whether classifications changed). Women with balanced MFA classifications and later had securely attached infants were found to be more likely to have higher income, a partner, less prenatal domestic violence and more adaptable infants (Huth-Bocks et al., 2011). Women with balanced classifications during pregnancy and later had insecurely attached infants were found to be more likely to have lower income, be a single parent, have experienced domestic violence during pregnancy and have greater postnatal depressive symptoms (Huth-Bocks et al., 2011; Theran et al., 2005). Conversely, women who moved from non-balanced classifications in pregnancy to having securely attached infants were more likely to have a higher income, a consistent partner, less depressive symptoms and higher prenatal social support.

In summary, a fairly consistent relationship was reported between MFA assessed in pregnancy and the mother-infant relationship, with higher reported MFA during pregnancy being associated with higher postnatal attachment and bonding. These findings appear to be moderate in strength and are generated from predominantly average-good quality studies. Consistencies in results appear to exist despite differences in when and how MFA and mother-infant attachment or bonding were assessed. Study results concerning the association between MFA and mother-infant interaction appear to show weak findings and are based on poor quality studies. Based on two good quality studies, high risk contextual factors, in particular postpartum depression, appear to be salient in the relationship between MFA and the mother-infant relationship.

Maternal-Foetal Attachment and Other Infant Outcomes

Five studies investigated the relationship between MFA and an infant outcome that did not concern the mother-infant relationship. These outcomes consisted of gestational age and birth weight, infant temperament, sleep, and aspects of early development.

Two studies reported on the relationship between MFA and infant temperament. Della Vedova (2014) found no significant correlations between MFA and infant temperament at age 3 months measured by the EITQ. Furthermore, MFA was not found to be significantly correlated with any of the EITQ dimensions, except for the persistence dimension suggesting that higher MFA is associated with increased length of time that a baby can sustain an activity. Results by White et al. (1999) also showed that there was no significant relationship between MFA and

infant temperament at 8-9 months of age. However, poor (White et al., 1999) and slightly below average (Della Vedova, 2014) overall quality scores should be noted.

A study by Spletzer and colleagues (2009) investigated the relationship between MFA and infant sleep at age 1 week and 3 months. Non-significant relationships were found between MFA and infant sleep segments and longest sleep at both time points. Only one significant correlation was reported between MFA and infant total sleep at 1 week, with higher MFA associated with less total infant sleep.

Two further studies led by Alhusen and colleagues (Alhusen et al., 2012, 2013) looked at the relationship between MFA and neonatal outcomes and, in a later study, early childhood development at 14-26 months. Both papers utilised the same sample of vulnerable African-American women and their infants. In the 2012 paper, a significant negative relationship was found between MFA and adverse neonatal outcomes, such that lower MFA was related to preterm birth and low birth weight. Income and health practices during pregnancy were also shown to be associated with MFA and adverse neonatal outcomes. Health practices were found to mediate the relationship between MFA and adverse neonatal outcomes, however income was not controlled for and therefore the impact of sociodemographic factors on this relationship is unknown. In the later study, MFA was found to significantly predict early childhood development assessed by the ASQ-3. However, once mothers' avoidant attachment style and postnatal depressive symptoms were accounted for, MFA was no longer found to predict early development. Both studies published by Alhusen and colleagues were deemed to be of a good quality and therefore give weight to their results.

In summary, there is a paucity of evidence for the relationship between MFA and other infant outcomes with inconsistent results reported in the available empirical literature. The reliability of the results described by the five studies is mitigated due to the varying quality demonstrated.

DISCUSSION

The aim of this systematic review was to present and synthesise the characteristics and findings of research studying the relationship between maternal-foetal attachment and postnatal infant outcomes. The specific outcomes included in the reviewed studies included the mother-infant relationship and other infant outcomes such as temperament, sleep, early development and neonatal outcomes. A systematic search of three electronic databases resulted in 16 studies for review.

Overall, the research showed some reliable associations between MFA and aspects of the postnatal mother-infant relationship. This association is likely to be influenced by a number of contextual and individual factors, but further research is required to clarify this. Due to the small number of studies investigating MFA and other infant outcomes with mixed findings, there is a paucity of evidence upon which to base firm conclusions.

Maternal-Foetal Attachment and Mother-Infant Relationship

The majority of studies investigating the relationship between MFA and the mother-infant relationship reported at least one statistically significant positive association, demonstrating that the more attached women feel to their baby during pregnancy, the better the postnatal mother-infant relationship (both reported and observed). This significant association was found consistently across the majority of studies in spite of varying samples, data collection methods and length of follow-up. Consistency in results also existed across studies despite there being a variety of terms used to describe a concept related to the mother-infant relationship (i.e. attachment, bonding, interaction). The quality of studies studying MFA and the

mother-infant relationship varied with the majority of studies having average to good quality ratings. Based on study quality and results, the current evidence base regarding MFA and the mother-infant relationship suggest that this association is weak to moderate in strength. However, two key limitations should be considered. Firstly, studies do not include sufficient follow-up time points to be able to make any significant conclusions about longer-term outcomes or the consistency and stability of results over time. Secondly, a quarter (n=3) of studies assessing MFA and the mother-infant relationship utilised the same sample.

Results from studies considering contextual variables suggest that they are influential in the correlation between MFA and the mother-infant relationship. High-risk environmental factors such as single parenthood, low income, maternal depression and prenatal domestic violence are important aspects that may influence change in attachment scores from pregnancy to the postnatal period. However, firm conclusions cannot be made based on the current evidence due to paucity of results concerned with the impact of contextual factors on the association between MFA and the mother-infant relationship.

Interestingly, higher maternal education was found to be linked to lower reported postnatal attachment. As suggested by Reck and colleagues (2006), this finding may be reflective of highly educated women being more likely to respond honestly and in a less socially desirable manner. An alternative explanation may be that educated women are more realistic about the changes that come with having a baby and attribute less value to motherhood in terms of role fulfilment (Van Bussel, Spitz, & Demyttenaere, 2010a; Van Bussel et al., 2010b).

In a study by Huth-Bocks et al. (2004), pregnant women's representations of themselves as a mother and of their infant were combined. Results show a significant correlation between this combined construct and the mother-infant relationship. However, it is unknown whether this was due to the mothers' feelings about her unborn child or whether including representations of the self added strength to the results - this is worthy of further exploration.

Maternal-Foetal Attachment and Other Infant Outcomes

Only five studies were found that investigated the relationship between MFA and other outcomes including gestational age and birth weight, infant sleep, early development and temperament. Results from this limited number of studies suggest equivocal findings.

Both studies assessing MFA and infant temperament suggest that there is no link between these variables. Results regarding infant sleep suggest that there is no substantial evidence to propose a link between MFA and infant sleep at one week and 3 months of age. Interestingly, higher MFA was found to be associated with lower total infant sleep at one week, but it is unclear whether this was a spurious correlation or if it is suggesting something important about infant sleep in the early days. Two particularly high quality studies by Alhusen and colleagues (Alhusen et al., 2012, 2013) both demonstrated significant associations between MFA and infant birth weight, gestational age and development at 14-26 months. However, findings from the 2013 study suggest that mothers' own attachment style and postnatal depressive symptoms may mediate the relationship between MFA and early infant development (Alhusen et al., 2013) and thus account for these findings. Furthermore,

the 2012 study found that income was associated with MFA and neonatal outcomes suggesting a likely interaction with adverse social circumstances.

The reviewed evidence suggests that there is no consistently reported relationship between MFA and other outcomes; when such relationships have been found they appear to be mediated by mothers' own attachment style and maternal depression. However, due to the variety of outcomes investigated and the paucity of studies addressing each outcome, strong conclusions cannot be drawn.

Strengths and limitations of the reviewed literature

Strengths of the reviewed literature include clearly stated objectives and hypotheses and detailed descriptions of the study population. Some well established measures of MFA and mother-infant attachment were utilised and studies frequently assessed for reliability of measures within the study sample. Around half of the studies also benefitted from the consideration of a range of potentially confounding factors with some controlling for these in the analysis. Furthermore, quality appraisal of the reviewed studies demonstrated many overall average to good quality ratings suggesting that these studies sufficiently reported on aspects relating to internal and external validity in observational longitudinal study designs.

However, discrepancies in the terminology used regarding MFA makes it difficult to synthesise findings. Thus far, there appears to be no consistent use of definitions for the construct of MFA in recent research (Brandon, Pitts, Denton, Stringer, & Evans, 2009). As Walsh (2010) argues, precise definitions are critical in order for different studies to have a consistent understanding of the concept.

Furthermore, methodological or design limitations were common, with many studies having a small homogenous sample, a short follow-up period and only one follow-up time point. The majority of studies assessed infant outcomes between birth and 3 months, which is likely to be insufficient to detect an association particularly between MFA and infant attachment as attachment is not considered to be fully developed until 18-30 months (Brody, 1981). Therefore, this weakens the claims made regarding the relationship between MFA and the mother-infant attachment relationship.

Additionally, there was lack of consistency in the measures utilised, particularly in relation to MFA. The most commonly used measure, the Maternal-Fetal Attachment Scale, has been used in research for many years yet more recently has been criticised for lacking in validity and requires updating in order to include more modern viewpoints (Doan, Cox, & Zimerman, 2003). The use of varying MFA and infant outcome assessment measures limit the extent to which findings can be generalised. Furthermore, measures were predominantly based on maternal self-report, therefore increasing the likelihood of reporting bias, of which it's impact is difficult to report or estimate. Self-report measures are limited as they assume that women are able to accurately determine and convey their thoughts, feelings and attitudes associated with impending motherhood (Van den Bergh & Simons, 2009). In addition, many studies included both primigravidas and multigravidas despite research suggesting that MFA scores differ between first and subsequent pregnancies (Mercer, Ferketich, May, DeJoseph, & Sollid, 1988).

A limitation of the type of studies reviewed includes the difficulty of inferring causality. Results are primarily based on correlational data meaning that the

predictive value of MFA on infant outcomes cannot be determined. The potential impact of unknown mediators or influencing factors on results is also unidentified. A further limitation inherent to the study design was the high levels of attrition over the time points, with Dubber et al. (2014) having the highest attrition rate of 63% despite the follow-up period being approximately 20 weeks. Due to the common use of a convenience sample, there is also a high risk of selection bias in the reviewed studies leading to an increased likelihood of having a non-representative sample.

Strengths and Limitations of Review

The current review is the first to synthesise the evidence base regarding MFA and postnatal infant outcomes. This review further enhances understanding of this area of study by including infant outcomes, not limited to the mother-infant relationship. Strengths of the review include the systematic nature of the search to identify relevant articles, synthesis of papers using a range of associated constructs and a focus on longitudinal studies. Furthermore, a thorough quality review of included articles was completed and the reliability of quality ratings between two raters was ensured.

However, there are also some limitations that should be acknowledged. As the review only included papers published in peer-reviewed journals, it is possible that studies reporting null findings may not have been published (Hopewell, Loudon, Clarke, Oxman, & Dickersin, 2009) and therefore will have been missed in the search process.

Strengths and limitations also exist regarding the use of the Tooth et al. (2005) quality checklist. The checklist was based on, arguably, ambiguous definitions of

criteria that were not deemed to be sufficient to ensure high interrater reliability. Therefore, definitions were altered to ensure that criteria were explicitly stated and issues of ambiguity resolved.

Clinical Implications and Future Research

Results regarding the links between MFA and the mother-infant relationship provide support for universal antenatal interventions that focus on the mother-infant relationship and adequately prepare women for motherhood, such as the Solihull Approach antenatal group programme (Douglas, 2015). Antenatal interventions are considered to be a more efficient way of encouraging and supporting the development of the parent-infant relationship than intervening postnatally (Glover & Barlow, 2014; Rebello Britto, Engle, & Super, 2013).

In addition to universal interventions during pregnancy, the associations found between MFA and the mother-infant relationship highlight the importance of screening in order to assist in the early identification of mothers at risk of low MFA. As MFA is known to increase throughout pregnancy (Berryman & Windridge, 1996; Van Bussel et al., 2010b), it would be appropriate to assess during the third trimester when MFA should be well established. Routine screening for MFA as part of maternity care would help to identify women who may be at risk of experiencing subsequent relationship difficulties with their infant and may require targeted intervention. The positive correlation found between MFA and health practices such as receiving maternity care (Lowry & Beikirch, 1998) could also be used as an indicator - poor health practices may be highlighted by poor engagement with services and therefore this could serve as an identifier for follow-up. Furthermore,

women with low MFA identified in pregnancy may be more likely to require support postnatally and therefore further screenings should take place after birth by health visitors.

This review has also highlighted directions for future research. The review results underscore the need for new longitudinal studies that can better understand causal pathways in the relationship between MFA and postnatal infant outcomes. Future studies would benefit from including longer follow-up times and more than one follow-up time point in order to look at the pathways between MFA, attachment and later outcomes that have previously been shown to be associated with attachment security. Further exploration of individual and contextual variables (such as antenatal mental health, socioeconomic status, domestic violence, etc.) would also increase understanding regarding factors that play a role in the relationship between MFA and infant outcomes. Ideally future research would be based on a widely accepted definition of MFA and a reliable and valid measure to assess the construct. Consistency in the definition and measures would facilitate the synthesis of results and allow for a deeper understanding of MFA.

Conclusions

The current review found evidence to support an association between MFA and the postnatal mother-infant relationship, with higher MFA being linked to better quality of mother-infant attachment. Findings were relatively consistent and were weak to moderate in strength. Results regarding the association between MFA and other infant outcomes were less consistent and require further exploration. The reviewed papers were limited by short follow-up periods, varied use of measures and

difficulties in determining causality. Further research is required to confirm the links between MFA and the postnatal mother-infant relationship and determine other influential factors in this association. The findings of this review have implications for antenatal detection and prevention of potentially compromised postnatal attachment relationships.

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FROM BUMP TO BABY: EXPLORING FIRST-TIME PARENTS' CONCEPTS OF EMERGING PARENTHOOD AND RELATIONSHIP WITH THEIR BABY

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ABSTRACT

Background: The parent-infant relationship is known to influence child development, yet this relationship is thought to begin developing during pregnancy. Previous research has explored how expectant parents experience the transition to parenthood, but has not specifically investigated the relationship with the unborn baby. This study gives an understanding of how parents' make sense of becoming a parent and the relationship with their baby.

Method: Recruited from universal antenatal classes, 8 parents-to-be (4 couples) were interviewed during the third trimester of pregnancy and 9-11 weeks postnatally. Interviews focused on couples' experiences of becoming a parent and the relationship with their baby. Data were analysed using Interpretative Phenomenological Analysis.

Results: Three overarching themes were identified: *(1) A Journey of Uncertainty, (2) Baby as a 'real little person now'* and *(3) Mums and Dads Together, but Separate*. 'A Journey of Uncertainty' illustrates parents' experience of lacking control and fearing their future self during pregnancy, and doubting ability and fragility during the early days. 'Baby as a real little person now' demonstrates how parents' considered their baby as a person during pregnancy and postnatally; experiencing a rewarding two-way relationship and describing the baby as having their own self. 'Mums and Dads Together, but Separate' illustrates fathers' experiences of being the understudies in pregnancy whilst mothers' experienced a unique and intimate relationship with their baby.

Conclusions: The analysis of parents' experiences illustrated the differing journeys experienced by mothers and fathers during the transition to parenthood. Considering

the baby as a person was seen strongly for mothers during pregnancy, whilst fathers experienced a lack of involvement and felt disconnected to their baby. Findings have implications for ante- and post-natal care, particularly for the involvement and support of fathers.

INTRODUCTION

The caregiver-infant attachment relationship is of critical importance as it is known to impact on many aspects of a child's development (e.g. Gerhardt, 2006; Oppenheim, Koren-Karie, & Sagi-Schwartz, 2007) and on their mental health throughout life (Weich, Patterson, Shaw, & Stewart-Brown, 2009)[5]. Early attachment relationships have been associated with infant brain development, with children who have experienced neglectful or abusive environments experiencing significant and adverse effects on various areas of the brain (Perry, 2002; Teicher & Samson, 2016; Teicher et al., 2004). The first years of life are considered to be a sensitive period whereby the effect of experience on the brain is particularly strong as mechanisms of plasticity are in action (Knudsen, 2004). Caregivers are a large part of an infant's early experience and therefore their ability to interact and respond to the infant will have a significant impact on the developing brain. Furthermore, attachment has been linked to children's emotional and social development. It has been found that securely attached children are more socially active, popular and report less social anxiety than insecure children (Bohlin, Hagekull, & Rydell, 2000; Groh et al., 2014). It is thought that early attachment relationships affect not only a child's sense of empathy and sensitivity, but also their sense of self, communication skills and self-control (Balbernie, 2001; Murphy & Laible, 2013). The resulting attachment style that comes from these early child-carer relationships has an impact on all future

[5] It should be noted that the caregiver-infant relationship is not the only factor that has an impact on child development. However, there is substantial research concerning this relationship and therefore it will be the focus of this study. Furthermore, throughout this paper the terms 'attachment' and 'relationship' will be used interchangeably, as is often the case with the surrounding literature.

relationships and can be intergenerationally transmitted (Roisman, Collins, Sroufe, & Egeland, 2005; Verhage et al., 2016).

Knowing the importance of the caregiver-infant relationship has led researchers to consider what the antecedents to a secure attachment relationship are. Attachment is considered to be an interactional process (Bell, St-Cyr Tribble, Paul, & Lang, 1998) with parents significantly contributing to the relationship (Ainsworth, Blehar, Waters, & Wall, 1978). Maternal sensitivity (i.e., a mother's ability to recognise and interpret her infant's signals and respond accordingly) during the first year of life has been linked to secure attachment behaviour (Atkinson et al., 2000; van der Voort, Juffer, & Bakermans-Kranenburg, 2014). Maternal sensitivity is now seen to be an important, but not exclusive, factor in the development of secure attachment (Atkinson et al., 2000; De Wolff & van Ijzendoorn, 1997). More recently, theoretical constructs have been suggested that specifically concern maternal behaviours demonstrating sensitivity to infants' mental states, known as reflective functioning (Fonagy, Steele, Steele, Moran, & Higgitt, 1991) and mind-mindedness (Meins, 1997).

Reflective functioning is a parent's capacity to hold, regulate and experience their own and their infant's mental states without becoming overwhelmed (Slade, 2005), which has shown to be related to secure attachment in infants (Slade, Grienenberger, Bernbach, Levy, & Locker, 2005). Mind-mindedness refers to the caregivers' ability to consider the baby as a person with their own mind (rather than one with purely physical needs) and their tendency to appropriately interpret infants' internal states (Meins, 1997). Greater mind-mindedness has also been found to be predictive of secure attachment (Laranjo, Bernier, & Meins, 2008; Meins,

Fernyhough, de Rosnay, Arnott, & Turner, 2012) and other aspects of child development (e.g., theory of mind; Laranjo, Bernier, Meins, & Carlson, 2010).

However, it has been increasingly recognised that the relationship between a caregiver and their child begins prior to birth (Cranley, 1981; Darvill, Skirton, & Farrand, 2010). The existence of a relationship between a mother and her unborn baby is thought to be confirmed by the fact that women who experienced loss of a foetus or newborn experienced strong grief reactions (Hughes & Riches, 2003; Kennell, Slyter, & Klaus, 1970). The nature of the relationship between a pregnant woman and her foetus has been described as maternal-foetal attachment (or prenatal attachment). Several attempts have been made to define maternal-foetal attachment, yet no consistent definition has been used in the literature (Brandon, Pitts, Denton, Stringer, & Evans, 2009). Measures of maternal-foetal attachment indicate that the relationship between mother and baby strengthens throughout pregnancy (van Bussel, Spitz, & Demyttenaere, 2010), particularly during the third trimester as the foetus begins to move (Bloom, 1995).

Use of the term ‘attachment’ to describe the caregiver-foetus relationship has been widely debated. Attachment, as described by Bowlby, was considered to be a reciprocal behavioural process initiated by the baby in order to ensure survival (Bowlby, 1969); from this perspective, attachment could not exist prior to the baby being born. However, it has been argued that the concept of maternal-foetal attachment assists in describing the emotional experience of pregnancy and helps to understand the psychological impact of foetal loss (Condon, 1986; Laxton-Kane & Slade, 2002).

A number of studies have begun to explore the link between the maternal-foetal relationship and later parent-child relationship, with many focusing on the associations between reported pre- and postnatal attachment scores. Significant, but only modest, correlations have been found between mothers' self-reported attachment scores during pregnancy and postnatally (Damato, 2004; Müller, 1996). Few studies have assessed links between reported maternal-foetal attachment and observations of the mother-infant relationship postnatally, also finding significant positive relationships (Fuller, 1990; Thun-Hohenstein, Wienerroither, Schreuer, Seim, & Wienerroither, 2008). Mothers' prenatal representations (internal subjective experiences) of their child were also found to significantly predict later observed infant attachment classifications at 11-12 months (Benoit, Parker, & Zeanah, 1997; Huth-Bocks, Levendosky, & Bogat, 2004). Futhermore, mothers who experienced affection towards their unborn child and fantasised about what their child might be like were found to show greater involvement and make more appropriate mind-minded comments when interacting with their child postpartum (Arnott & Meins, 2008; Siddiqui & Hägglöf, 2000). Overall, the findings from studies exploring prenatal attachments suggest that mothers' internal representations of their unborn child could affect post-birth interactions and the consequent development of a child's attachment security.

Despite Condon (1985) suggesting the term 'paternal-foetal attachment' to complement maternal-foetal attachment, fathers appear to have been somewhat neglected in the literature, although recent studies have begun to explore this area (e.g Vreeswijk, Maas, Rijk, Braeken, & van Bakel, 2014; Vreeswijk, Maas, Rijk, & van Bakel, 2014). Like mothers, paternal-foetal attachment has been found to strengthen

as the pregnancy progresses (Habib & Lancaster, 2010) and there is a suggestion in the literature that a father's representations of his unborn child are associated with postnatal representations of the parent-child relationship (Vreeswijk, Maas, Rijk, Braeken, et al., 2014). However, in comparison to studies exploring maternal-foetal atatchment, there is a dearth of literature looking at fathers' experiences of the antenatal period and their relationships with their babies.

Considering the potential link between maternal-foetal attachment (and possibly paternal-foetal attachment) and the postnatal parent-child relationship, antenatal interventions that aim to promote secure attachments may be beneficial in preventing later attachment-related and mental health difficulties. Many standard antenatal interventions focus on labour and birth, but more recently interventions with a psychological component have been developed. There is limited evidence available in relation to the impact of attachment-focused antenatal interventions on the parent-foetal and parent-infant relationship, but initial findings are encouraging. Expectant parents that attended relationship-focused antenatal classes were found to have increased sensitivity to cues, increased responsiveness to infants' needs, and stronger prenatal attachments than those parents who attended standard antenatal classes (Abasi, Tafazzoli, Esmaily, & Hasanabadi, 2013; Bellieni et al., 2007; Bryan, 2000). Furthermore, women who attended workshops during pregnancy (in addition to a standard antenatal intervention) focusing on many aspects of the parent-child relationship (e.g. attunement, emotional regulation) reported an increased understanding of attachment and the babies' emotional development, as well increased confidence in establishing the start of a secure attachment (Haworth & Hickson, 2010). Fathers attending maternal-foetal attachment training were also

found to have a stronger attachment to the foetus compared to before the intervention and a control group (Akbarzade, Setodeh, Sharif, & Zare, 2014). Despite a lack of research on the impact of relationship-focused antenatal interventions, findings thus far suggest that such interventions may enhance elements of the parent-child relationship, and add some weight to the idea that attachment-based interventions might be beneficial during the antenatal period.

Despite there being recognition that the relationship between parent and child begins to develop before the child is born (Cranley, 1981), the majority of research to date has focused on studying the postnatal parent-infant relationship. The antenatal literature that does exist has placed emphasis on understanding the links between pre- and post-natal attachments and quantitatively assessed representations of the baby. Exploratory studies conducted during pregnancy exist (e.g. Birtwell, Hammond, & Puckering, 2013; Deave, Johnson, & Ingram, 2008; Ross, 2012), but are yet to focus on the developing relationship between parent and foetus. Little is known about how a mother and father experience and understand the baby and their relationship with him/her during the antenatal period. To address the lack of research in this area, this study aimed to explore prospective, first-time parents' ideas about becoming a parent and the relationship with their baby. Furthermore, the study aimed to understand how these ideas develop following the birth of their baby.

The research was guided by the following questions:

- How do parents who have attended an antenatal group programme make sense of the transition to parenthood and the relationship with their baby?
- How do parents' stories about being a parent and the relationship with their baby develop following the birth of their child?

METHOD

Design

A longitudinal qualitative design was chosen to address the research questions. Semi-structured interviews were conducted with women and their partners expecting their first baby, both during pregnancy and postnatally. The study was longitudinal as partcipants were interviewed twice. Data were collected and analysed using Interpretative Phenomenological Analysis (IPA; Smith, Flowers, & Larkin, 2009). IPA examines participants' individual lived experiences in depth, focusing on the meaning the participant makes of their experiences. Within IPA, knowledge and understanding are considered to be embedded in individuals' everyday worlds and the role of the researcher is to explore and describe as accurately as possible the social and psychological phenomena, whilst refraining from interpreting these through any existing theory or assumption (Groenewald, 2004; Smith et al., 2009).

IPA researchers are engaged in a 'double hermeneutic' as they are attempting to make sense of the participant trying to make sense of what is happening to them (Smith et al., 2009). Therefore, IPA researchers are encouraged to acknowledge and reflect on the preconceptions, experiences and assumptions that they bring to the research process and attempt to put them to one side. To assist with this process, a reflexive diary was kept throughout data collection and analysis (example extract in Appendix 2).

Ethics

Ethical approval for this study was given by the National Health Service (NHS) Health Research Authority (February 2015; Appendix 3). The Heart of England NHS

Foundation Trust Research and Development department granted approval for participant recruitment to be carried out at the Solihull Approach antenatal groups (May 2015; Appendix 4).

Sampling

This study researched couples who were pregnant with their first child. Couples in the sample had all attended at least one session of the Solihull Approach antenatal group programme. In line with IPA methodology, the participants in this study represent a homogenous, purposive sample selected as they share the experience of a particular situation or event (Smith et al., 2009; Willig, 2008). During sessions 1-3 of the Solihull Approach antenatal group programme, the researcher introduced the research to potential participants, including information such as the purpose of the research, what participation involves, confidentiality, informed consent and right to withdraw. Participants were also provided with an information sheet and opt-in form (Appendix 5 & 6). At the following session (one week later), participants were asked to return opt-in forms in order to consent to the researcher contacting them. Participants were recruited based on the inclusion criteria shown in Figure 2. No individuals were excluded from the study.

Figure 2: Inclusion Criteria

Inclusion Criteria
• Women expecting their first baby and their partners. • Partners did not have to be the biological father of the child, however couples must have intended to care for the baby together following the birth. • Couples must have attended at least one session of the Solihull Approach antenatal group programme. • Individuals who had capacity to give informed consent. • Individuals able to speak and understand English.

The researcher made contact with consenting couples in order to discuss the research and arrange the first interview. A total sample of 4 pregnant women and their partners were recruited, generating a total of 16 interviews (across both prenatal and postnatal data collection points). The sample size was based on recommendations made by Smith et al. (2009).

Sample characteristics

Participant information is shown in Table 8. Three of the four couples were married. Edinburgh Postnatal Depression Scale scores were provided by mothers' health visitors at 8 weeks. Postnatal depression scores were collected to ensure that the data could be contextualised. No mothers reported significant difficulties (all scored 5 or lower; clinical cut-off is 12). Postnatal depression scores were not gained for fathers as this information is not routinely collected by health visitors.

Table 8: Contextual details of participants

Couple number	Participant name*	Age (years)	Ethnicity	No. of antenatal sessions attended	First-time pregnancy** Y/N	Baby's name
1	Jane	33	Black British	5	N	Ayla
	Ian	32	Asian British	5		
2	Janine	29	White British	5	Y	Bradley
	Dominic	32	White British	3		
3	Helen	30	White British	5	N	Jake
	Toby	32	White British	3		
4	Lucy	28	White British	2	N	Emily
	Calvin	27	White British	1		

* Names of participants and babies have been changed to protect confidentiality.
** Failed pregnancies included miscarriage and stillbirth. Participants specific circumstances are not stated in order to maintain anonymity.

Data collection

Semi-structured interviews took place during the third trimester of pregnancy (mean 36 weeks, range 34-38 weeks gestation) and 9-11 weeks (mean 10 weeks) postnatally. The third trimester is known to be when a relationship between a parent and their unborn baby has begun to emerge (Alhusen, 2008). The postnatal interview time point was chosen as patterns of attachment are thought to start emerging from around 8 weeks (Prior & Glaser, 2006).

Interview schedules were developed based on guidelines relating to IPA research (Smith et al., 2009) and through discussion with research supervisors. The schedule for the antenatal interview covered four broad areas of experience: the experience of pregnancy, the relationship with the unborn baby, considering the baby following birth, and the experience of attending the Solihull Approach antenatal group[6]. The postnatal interview covered the labour and delivery, the early postnatal days, and revisited their experience of the antenatal group (see Appendix 7 for interview schedules). These broad topics provided a guide for the interviews, enabling an exploration of parents' experiences of pregnancy with a particular focus on the relationship with their baby. Consistent with IPA methodology, questions were open-ended to allow themes to emerge from the data. Prompts were used to gain more detail when necessary.

Participants were interviewed alone and all chose to be interviewed at their home. Prior to the antenatal interview commencing, all participants were reminded of ethical information and gave written consent to participate (Appendix 8). The

[6] The researcher was orginally requested to complete a service evaluation looking at experiences of attendance at the Solihull Approach antenatal groups. Therefore, experiences of the group were included within the interview guide.

interviews were audio recorded. Six to eight weeks following the due date, the researcher contacted participants' midwives to ensure the baby had been born without complications before contacting the participant to arrange the postnatal interview. At the postnatal interview, participants gave verbal consent to continue and were provided with a debrief sheet following the interview. Prenatal interviews were 30-50 minutes (mean 39 minutes) in duration and postnatal interviews were 30-60 minutes (mean 45 minutes).

Interview audio recordings were transcribed verbatim generating the raw data for the study. Participants were provided with the opportunity to review transcripts following each interview in order to provide them with the opportunity to withdraw any quotes that they did not wish to be used in the research; only two couples wished to review the transcripts and they did not request that any quotes be removed.

Intervention

The Solihull Approach is a group-based antenatal intervention provided by the NHS that aims to cover the practical aspects of pregnancy and birth whilst also providing parents with a framework for thinking about the relationship with their baby (Douglas, 2015). The group is aimed at mothers-to-be and their partners. Despite the group being somewhat unique as it focuses in part on the relationship with the baby, it is the universally available antenatal intervention for the area where participants were recruited. The group involves 5 sessions and covers topics including helping you and your baby through pregnancy and birth, getting to know your baby in the womb, the stages of labour and birth, and feeding your baby. Participants were

recruited from three different antenatal group cohorts that ran between July and December 2015.

Data Analysis

Interview transcripts were analysed using IPA methodology (Smith et al., 2009). Analysis involved five main stages. The initial stage included reading and re-reading the original data in an attempt for the researcher to immerse herself in the data. The second stage involved line-by-line coding by making notes on the transcripts regarding things that mattered to the participants (objects of concern), the meanings that they associated with the things that mattered (experiential claims), and the language or tone used to describe the relationship between the individual and their objects of concern (stance). During stage three, initial notations were used to generate emergent themes for each participant (Appendix 9). The fourth stage invovled reviewing themes by clustering them together in order to identify connections between themes. The final stage consisted of identifying patterns of themes across individuals, couples, mothers/fathers, and timepoints. Analysis across couples did not reveal pertinent themes. Themes across groups (both mothers/fathers and prenatal/postnatal) were then brought together to create super-ordinate themes.

Reflexive statement

Being a female at what I consider to be a pre-parenting stage of life and my own experiences of being parented are likely to have influenced my choice of research, the conduct of the inquiry, and the interpretations of the data. Through

personal experience, I have come to recognise the key influence of my early relationships on who I have become as a person. These experiences have undoubtedly motivated me to conduct this project as I wanted to develop a deeper understanding of how these relationships begin to evolve around the very early stages of our lives. I was aware that not having had children myself may have influenced the way in which I experienced hearing the participants' stories. This may have had an impact on the way in which I interpreted the data, however both academic supervisors have children, which was helpful to ensure this was balanced.

Rather than viewing the experiences and beliefs of the researcher as biases that require elimination, IPA considers these as inevitable and necessary in the process of making sense of the experience of others (Smith, Jarman, & Osborn, 1999). To ensure credibility and reflexivity, at various stages of the data analysis, any thoughts, feelings and general impressions I had were noted in the reflexive diary. Furthermore, frequent discussions regarding the data took place with academic supervisors and within an IPA peer support group with other clinical psychology trainees. Academic supervisors also coded two interview transcripts in order to make comparisons and identify any coding that may have been influenced by our own perceptions. Initial themes were sent to two couples who agreed to provide feedback, however no response was received.

RESULTS

Three main super-ordinate themes emerged from the analysis: *(1) A Journey of Uncertainty, (2) Baby as a 'real little person now',* and *(3) Mums and Dads Together, but Separate*. Within these super-ordinate themes there were seven emerging sub-ordinate themes, which are presented in Table 9. Final themes were chosen based on their prevalence, richness and prominence placed on them by participants. Part of the IPA process is to note both convergence and divergence within individual level themes. Therefore, whilst most sub-ordinate themes represented all participants' accounts, not all did (Eatough & Smith, 2008). Appendix 10 shows which participants contributed to each theme. Each individual's experiences were complex and variable, so whilst themes are presented independently of one another substantial overlap exists between themes.

Table 9: Super-ordinate and sub-ordinate themes.

Super-ordinate	Sub-ordinate	Occurrence	Description of sub-ordinate theme
1. A Journey of Uncertainty	(a) Lack of control	Across Mums & Dads Prenatal	Parents experienced feeling a lack of control during the early days of pregnancy regarding the babies survival. This reduced with time, particularly once the baby began to move.
	(b) Fear of future self	Across Mums & Dads Prenatal	Fears regarding inexperience and the responsibility of the parenting role that they were due to take on. Fathers expressed fewer concerns yet some desired to learn how to parent.
	(c) Doubting ability and fragility	Across Mums & Dads Postnatal	The early postnatal period saw parents doubting their ability to fulfil the parental role. This was also seen as a period of fragility for both parents and their babies.
2. Baby as a 'real little person now'	(a) Action, reaction and gain	Across Mums & Dads Across time points	Parents saw the relationship with their baby as two-way. Interactions were experienced as rewarding and could be initiated (actioned) by either parent or baby.
	(b) Baby as self	Across Mums & Dads Across time points	Parents considered their baby to have their own self including having their own wants, desires and character.
3. Mums and Dads Together, but Separate	(a) Understudies to pregnancy	Prenatal Dads	Fathers felt 'divorced' from the pregnancy process and experienced a lack of role during this time.
	(b) Unity of private selves	Postnatal Mums	Mothers experienced a unique, intimate and private relationship with their babies. The mothers' and the babies' separate selves were experienced to be in unity.

Theme 1: A journey of uncertainty

The theme ‘a journey of uncertainty’ explores how participants described and experienced the process of transition to first-time parenthood. Across three subthemes, parents described this process as consisting of anxiety regarding losing the baby during the early stages of pregnancy, moving through to the later stages whereby their anxiety shifted to concerns regarding their future role as a parent. During the postnatal interviews, parents shared feelings of doubt about their new role, feeling unsure of what to do.

(a) Lack of control

All pregnant women and most partners (3) described concern for the baby and mothers particularly seemed preoccupied about losing the baby during the early stages of pregnancy. This fear was often described in the context of previous loss as two couples had experienced a miscarriage and one couple had a stillborn baby. In the following extract, Lucy described her fear of losing the baby following her previous experience of loss and her need for reassurance about whether the baby was okay; while there was excitement about the pregnancy, there was a focus on fear of loss:

> *We always said we’d book a very early scan, like we had the time before, to check it had got past what had happened the first time, […] yeah so it was exciting but quite like, I don’t know, it was nerve-wracking just waiting to know if it would be okay. Cuz they said, you know, if it happens it’s unlikely it would happen again but you just don’t know do you? (Lucy, prenatal)*

Like Lucy, many mothers-to-be talked about their need for reassurance. Helen described how she, *"just wanted to be monitored and told that everything was going to be okay"* (Helen, prenatal). In the following extract, Janine describes her reaction following an incident where she was concerned about her baby's wellbeing:

> *When I was about 16 weeks pregnant I fell over at work and landed on my stomach. Cue hysterical mom-to-be. Absolutely, I mean I don't think I've ever been so frightened in my entire life and mad dash up to the hospital to check everything was okay. (Janine, prenatal)*

Mothers' fears regarding losing their baby led me to think about the lack of control that they experienced during pregnancy. Despite carrying and sustaining their baby, mothers were frightened by the fact that they do not have complete control over their baby's survival. This experience of having no control seems to be underpinned by mothers' previous experience of loss where they had no power over what happened.

To some extent, the anxiety experienced by mothers-to-be during the early stages of pregnancy was shared by their partners, who also had concerns about re-experiencing loss:

> *Obviously with everything that had happened before it was quite a worry really. Because you don't want to go through the same thing that you've been through before. But, obviously you are really excited because, we found out what had happened before, so we could sort of, take all the precautions, so I was a little less apprehensive about the whole thing. (Toby, prenatal)*

It seemed that fathers-to-be were less willing to share the strength of their concern about loss, for example Toby described it as *"quite a worry"*. The ability to take

precautions to prevent re-experiencing loss appeared to mitigate Toby's concerns and perhaps made him feel that they had some control over what happened.

I wondered whether their concern led to fathers temporarily suspending their emotional connection to the unborn baby as a protective function. An example of this is shown in the following extract, where Ian described his initial reactions to finding out about the pregnancy and his reluctance to get his hopes up for fear of losing the baby: *"I stayed positive but I don't get too erm… you could say emotionally involved because yeah, it can potentially kind of slap you in the face or something if it doesn't work out."* (Ian, prenatal). Perhaps the emotional connection was a factor that fathers-to-be felt they could be in control of.

Initial feelings of apprehension about the pregnancy were shared across couples. Many fathers-to-be described a reduction in their anxiety as pregnancy milestones were reached, but acknowledged that risk never disappears:

> *I just wanted to get to the sort of 20, 25 week sort of period. Because I think then, you are almost out of the woods then. Not totally out of the woods, but to a certain extent you are. There's a lot less chance of having complications. But with Helen, with her condition as well, that's another thing that worries me a little bit. She has to take medication and stuff […] But when she does go into labour, then it will worry me a little but. Because I just… it's just a bit of a worry. (Toby, prenatal)*

Toby seems to be recognising that despite concerns reducing, the lack of control over the pregnancy does not subside, particularly due to his partners medical condition. He talks of being *"a little bit"* worried, but I wonder if his feelings were being somewhat downplayed. Mothers-to-be appeared to experience a reduction in their

anxieties regarding loss at the stage where the baby's movement could be felt. The baby moving was experienced as reassuring for all pregnant women that baby was well, and seemed to keep the mothers psychologically well:

> *As the pregnancy progressed, the movement was what was keeping me sane, like, I do like it. Since she's got a bit bigger, the sensations a bit weird sometimes cuz it can feel quite juddery cuz there's so many bits and bobs around but it's reassuring, it's nice. I like waking up in the morning and I wait until I can feel her. And then it's alright and I go back to sleep again! (Lucy, prenatal)*

Despite not having control over their baby's movement, movement seemed to indicate to mothers that the baby was alive and well, which was experienced positively. Similarly to Lucy, Helen stated, *"It's a good feeling. I just know everything's okay. I know that the baby's kicking around and just waiting to come out."* (Helen, prenatal).

(b) Fear of future self

Most partipants (6) reported concerns regarding the impending parenting role that they were taking on. I wondered whether fears regarding becoming a parent increased as the pregnancy neared the end and the prospect of birth was imminent. Anxieties regarding the parent role appeared to differ somewhat between pregnant women and their partners. Mothers-to-be felt becoming a mother was *"scary because there's quite a lot of responsibility"* and commented on feelings of inexperience and inadequacy on how to care for a baby:

It's a blank canvas though, isn't it really? That's quite scary cuz there's quite a lot of responsibility. It's all the little things you think. I always think babies are a blank canvas and they'll be brought up how you bring them up. And how your beliefs will become their beliefs because that's what they're going to be brought up into. So you really start to think about what you think and, right okay I've got to be careful. I don't want them to think like that so what do I do to shield them from that. (Janine, prenatal)

Janine viewed her baby as having an entirely clear mind and acknowledged, what she perceived to be the significant impact that she, as it's mother, would have on it. Janine reflected on aspects of herself that she would prefer her child to be protected from. Other mothers-to-be described fears of mothering in relation to their perceived lack of knowledge or experience and an uncertainty of how they would perform in the parenting and mothering role:

I suppose it's the unknown, isnt it? Being a first-time parent. I don't know how to look after a baby. Toby asked me the other day about, 'Had I changed a baby's nappy before?' And I said, 'No, I've never needed to. Why do I?' So it's things like that that blokes just expect you to know. (Helen, prenatal)

Helen commented on gender assumptions her partner held around becoming a parent, that women may have had more experience than men, which made me wonder whether she was feeling pressured to know how to care for a baby. In the following quote, Jane described how she asked questions at the antenatal sessions due to her worries about breastfeeding her baby:

In the classes as well, I was asking about the position because they say that can also impact erm, how the baby will latch on, so I've been asking because

that's what I've been worried about. Oh my god, what if I won't be able to do it? In terms of what, if maybe I'm not doing it right and the baby's still hungry. But they told me, 'don't worry you will get support' erm and we visited [location] birthing unit and they said you can stay there for two nights. They show you until you, you know, and if you want to know anything they will show you. (Jane, prenatal)

Jane feared not being able to do it "right" and worried about the impact on her baby. She seemed to be reassured by being informed that support would be available.

Partners also referred to the uncertainty that comes with parenthood and the unease that comes with *"not knowing what to expect"* (Ian). However, differing to mothers, fathers-to-be experiences varied. Two fathers-to-be talked about attempting to lessen their concerns related to becoming a father, by learning 'how to be a father': *"I'm kind of nervous and I'm trying to plan as much as I can. Trying to, I guess, read or listen to audio books about how to erm, what to expect or strategies you've got to use."* (Ian, prenatal). I wondered whether this desire to master the practical aspects of parenting was an attempt to contain their anxieties about becoming a parent. In contrast, the other two fathers seemed to be looking forward to their new role and appeared willing to work out their role along the way:

I'm just one of those people who never reads the instructions, I'd rather just work my own way out of things. I think you learn more when you do that. But then, obviously it's a baby so… I think Helen's a bit more nervous about that kind of thing than me, really. I just think we'll be fine. We're just different personalities. (Toby, prenatal)

Toby highlighted the differing approaches that he and his partner took on their future role. Calvin was also willing to wait and see what parenting would be like and seemed confident about his future role stating, *"I'm not saying I'm prepared in any way or I know what's coming, but I've got an idea and it's not too much"*. It seemed that fathers-to-be either attempted to reduce the concerns they had about becoming a father, or were prepared to work out what being a father was as it happened.

(c) Doubting ability and fragility

From the postnatal transcripts, parents' feelings of uncertainty during the pre-natal period, persisted following the births. Parents' feelings of uncertainty were experienced in the context of loving their babies. All participants described the early days with their baby as being difficult and overwhelming, with many parents describing a sense of not knowing what to do when looking after their baby. In the following extract, Helen described the day she returned home from hospital with her baby:

> *When we first got home it was a bit like, 'What do we do now?' There wasn't a buzzer that I could just press if I needed any help and we were literally on our own. I just remember just being completely exhausted and I think, the first two weeks you just don't know whether you're coming or going. It was just... And then everyone wants to come round, so it was all a bit like... it was quite overwhelming really." (Helen, postnatal).*

For some mothers (2), the felt sense of security that seemed to come from the hospital environment, associated with a certainty of having others around who knew what to do and how to help, was juxtaposed with their sense of insecurity and felt

inadequacy in the early days at home. Helen also shared her feelings of exhaustion which made me consider how fragile she may have felt during the early days.

All parents portrayed the early days at home following birth as a time where they felt unsure about their ability to parent and needed time to *"find our feet"* (Helen, postnatal). In the following extract, Jane described how difficult and overwhelming the first night at home was:

> *My mom wasn't here because my mom came five days after. So I had to ask my cousin. […]. So she came before and she prepared everything, but it was still daunting because obviously we've got this newborn… and we didn't know what to do. The first few nights, oh my goodness, it was just… because she didn't want to sleep in the cot and she didn't want to sleep like this. So it was just a nightmare. Absolute nightmare. I would just put her on my chest. We were taking turns. And I was like, I said, 'Oh we can't keep doing this,' imagine, because we have to take turns because I have to sleep and Ian also had to sleep. (Jane, postnatal)*

With the feeling of being overwhelmed in mind, many mothers (3) emphasised the importance of having support from others, primarily their own mother. After three days in hospital, Janine wished to go home where her mother was available to help her:

> *I couldn't wait. I just wanted to get out. I was lucky though because I had my Mum waiting at home for me, and she stayed for a few days after he was born. So she was here with me, doing all the things that only your Mum can do. (Janine, postnatal)*

Mother's expressed the crucial support provided by their own mothers during the early days when they felt overwhelmed and seemed to be fragile. New mothers described a sense of being emotionally held by their own mothers and their mothers needing to make sure they were okay.

Many fathers (3) shared their apprehension of what they were doing, questioning whether they were doing it *"right"* and whether they were being good-enough fathers. In the following extract, Dominic doubted the ability to fulfil his new role which appeared to be connected with his perceived inability to "naturally" care for babies:

> *Well, yes, I think you have to have a natural level of fear because you're in a situation where you're all of a sudden pushed right outside of your comfort zone. And I suppose this is perhaps the difference between – certainly between me and Janine; I might say between men and women – is that Janine is by far and away a natural mum, you know, you can give her anybody's child and she'd be able to take it under her wing and soothe him. I'm a bloke and inherently, therefore, don't feel like I am capable of doing that naturally. And then having your own child who is then your responsibility from then on until, well, forever, for the rest of your life, it's quite an emotional hammer blow. (Dominic, postnatal)*

The comparisons Dominic made between his and his partners ability to parent seemed to lead him to doubt his ability to father 'naturally' and perhaps instead is required to learn or develop the skills to parent. Fathers seemed concerned about whether they were parenting correctly. The following quote from Calvin described his worry about getting it "wrong" during the first few days at home:

It became worrying then, because I thought, "How long does this last? Are we doing it right? Are we doing it wrong?" You know, that was a worry then. And I could see the worrying was getting to me. And I'd been saying the whole time, "This is what happens. You go through it." But even though I knew that, I was thinking, "This might never stop. I might never sleep." And it got, not upsetting, it got worrying. You do start questioning, 'can we do this?' (Calvin, postnatal)

Despite attempting to reassure himself, Calvin felt overwhelmed by his new role and questioned his ability to be a parent. Like mothers, fathers' experiences also seemed to suggest a fragility for them, which may have been associated with a heightened sense of fragility for their baby. Toby and Dominic considered their babies as vulnerable and fragile, feeling apprehensive about holding the baby and driving home from the hospital slowly as they were "worried about hurting him".

Summary of Theme 1

In summary, the journey of becoming a parent was, for these parents, dominated by a strong sense of fear and doubt. The initial period of pregnancy evoked worries about the baby's survival and their inability to control what happened, yet these worries reduced as the pregnancy continued. In contrast, the latter stages of pregnancy led parents, particularly mothers, to experience apprehension about their upcoming parental selves. Some fathers wished to prepare for parenthood whilst others were willing to learn on the job. Parents' doubt about their ability to fulfil their role was seen in early parenthood where many felt unsure about what they were doing and were concerned about doing it wrong. Parents seemed fragile during the early days which may have been linked to the perceived fragility of their baby.

Theme 2: Baby as a 'real little person now'

Throughout both the pre- and post-natal accounts parents referred to aspects of their baby that demonstrated how they were considering them as a person, being their own self, and considering the relationship with their baby to be a two-way dynamic.

(a) Action, reaction and gain

When talking about experiences of the relationship with their babies, parents described them to be a mutual, two-way process. During pregnancy, this theme was more prevalent for mothers-to-be who all described instances where reciprocity had occurred between them and their unborn baby. For example, Lucy commented: *"It is nice now that when I rub she does move."* (Lucy, prenatal). Similarly, Janine described talking to her baby throughtout pregnancy and how she has noticed her baby responding:

> *I've talked to this baby since the day I found out I was pregnant. Yeah, people just think I'm mad because I mean they did use to laugh at me at work because I'd sit there going, 'Mommy's busy at the moment. Just give mommy a minute and then we'll have some time together.' And it's never even occurred to me that it's weird. You'll see me walking down the street and I'll be chatting away to the baby and if it kicks me I'll talk back to it." (Janine, prenatal).*

These quotes provide examples of the ways mothers-to-be interacted with their babies and received responses from them. These seeming two-way interactions, as

perceievd by mothers, indicated how their babies were considered to be separate beings that could listen, feel and respond.

Most fathers-to-be (3) also considered their unborn baby as being able to listen, respond and *"draw you in"* (Dominic, prenatal). For example, Toby described situations where he had interacted with his baby and it began to move when he had spoken to it:

> *Now that I can see it moving more, I'm more inclined to turn the music up or put some headphones on her belly and things like that, and talk to it. I mean, I've spoken to the baby before when there's been no movement, and it's just gone crazy. (Toby, prenatal).*

Instances of mutual interaction were reported far less in fathers' prenatal accounts compared to mothers. At times, Dominic appeared to doubt whether his baby was actually responding to him: *"When you talk to baby and it kicks you, nine times out of ten I'm guessing it's not really kicking because you're talking."* (Dominic, prenatal). This doubt made me wonder whether this was common amongst other fathers whose accounts lacked descriptions of prenatal interaction. The contrast between the strongly held view of mothers-to-be that babies were reciprocally involved in interactions, and the less strongly held views by fathers-to-be, might be associated with how father's described and felt a seeming detachment during pregnancy (subtheme 'understudies to pregnancy').

The reciprocity of the parent-baby relationship was further illustrated in the postnatal accounts. All parents referred to aspects of the relationship with their baby that involved give and take, particularly since the baby had started to smile: *"Now that he's started smiling you're starting to get a bit more interaction and you get*

something back now." (Helen, postnatal). The parent's action followed by the baby's reaction (and vice versa) was seen to lead to a gift or reward such as a smile which was received as special. The interaction and gains are demonstrated in the following quote where Dominic described his baby's behaviour when he goes home from work during his lunch break:

> *It's lovely because I come [home] and if he's in a good place then he'll beam at me and I get to pick him up and hold him and have a little giggle and a chat and watch the television with him for a bit while I have my lunch, which is nice. Yes, so that's great, I love that. (Dominic, postnatal)*

The response Dominic received from his baby appeared to motivate him to continue this interaction by talking to and spending time with him. Similarly, Toby talked about how when he looks at his baby or touches his nose, *"he just smiles".* Parents talked warmly of this mutual relationship and it seemed that their baby's responses felt like a reward.

(b) Baby as self

Parents made reference to their baby having a self and their own mind both during pregnancy and following birth. During pregnancy, mothers-to-be described their baby having their own wants and needs. For example, Janine shared her view on why her baby kicked at times: *"First thing in the morning it tends to go a little bit mad. It's almost as if it's asking for breakfast and once it's had it's breakfast it's okay"* (Janine, prenatal). This comment represented the thoughts of other mothers-to-be who made reference to their baby having their own wants. In the following extract, Jane described her baby's reaction to the loud music when she was out one evening:

I went out with my friends on Saturday […] obviously they were playing music so it was loud, so I don't know whether it was the music but I could feel the movement. I don't know whether it was telling me, 'get out of here' or 'I'm loving it.' So I was there for like an hour then I left, but yeah it felt like it was dancing. Maybe it was dancing or it was like, 'Oh I don't like it, I want to go.' (Jane, prenatal)

Jane provided possible explanations for why her baby was moving, suggesting that she was able to consider her baby having it's own opinion or preferences for something. For fathers-to-be, the view and experience that baby has its own mind was far less evident during pregnancy, and only seemed to start to appear postnatally. This change in the perception of baby as 'person' from pre- to postnatal time periods might be related to the lack of physical and psychological connection fathers experienced prenatally.

Both mothers and fathers were able to consider their baby having their own likes, dislikes and character during the postnatal accounts. Comments such as, *"She likes that mobile you put on top of the cot. If you put it there she will be laughing, and smiling and jumping and kicking and all sorts"* (Jane, postnatal) and *"He loves his little Larry Lamb toy"* (Toby, postnatal) were made demonstrating parents' ability to attend to their baby's own preferences. In the following extract, Calvin explained how he noticed that his daughter enjoyed certain behaviours he did:

The first thing she started smiling to was when I tap her nose. And I'd make a noise. I'd go, "Ba, ba, ba, ba." And I'd get deeper, and she loved that, and I think she only did… I don't know if it was my voice, or I did the right way, she stopped smiling at that now. But there was a new thing she'll smile at that day,

and then that will last for a few days, and then, it's as if she gets bored of it. Like, "He's done that now. What's new?" (Calvin, postnatal)

This quote led me to consider how, based on his daughter's reactions, Calvin perceived that she became "bored' with his behaviours and wanted him to come up with something new. Calvin described his daughter as being, "a real little person now", suggesting that he perhaps didn't consider her to be a person previously. Parents also perceieved their baby as having their own personality styles. In the following extract, Janine describes her baby's character:

He's cheeky. Aren't you? You're cheeky. You're already starting to wind mummy and daddy up. You know exactly what to do. I think since he's started finding his voice, he knows what he wants and when he wants it, he wants it then. But he's an incredibly chilled out baby, he's not one who gets really stressed. (Janine, postnatal)

Here, Janine refers to her baby's "cheeky" and "chilled" character and his ability to impact on others. This quote made me consider how Janine seems able to recognise her baby's own wants and desires, and his urgency for having these needs met.

Summary of Theme 2

In summary, ideas about their baby being 'a person' with a sense of agency, purpose and responsiveness appeared to develop from pregnancy, certainly for mothers, but less so for father-to-be. From birth onwards, experiencing the baby as a person appears to strengthen for mothers. Fathers were more easily able to describe and experience the two-way parent-baby interaction, as well as their baby's own self following birth. What seems apparent in this theme is parents' ability to consider their

baby to be a separate human being with desires, preferences and needs, rather than a ‘thing’ that simply requires physical care. Particularly during the postnatal accounts, parents were able to identify their baby’s internal states.

Theme 3: Mums and dads together, but separate

The theme represents the differing and divergent experiences of mothers and fathers during the transition to parenthood. Despite both being part of the transition, fathers-to-be experienced a lack of connection during pregnancy whereas mothers described the distinctive connection they experienced prenatally and beyond.

(a) Understudies to pregnancy (fathers)

Within the prenatal accounts, fathers-to-be described experiences of pregnancy that resonated with a sense of feeling detached from the process. This sense of difference and relative lack of involvement was shown in Dominic’s accounts where he referred to pregnancy being a *“very female orientated process”* and described the experience from a male perspective:

> *I suppose there’s the unknown about how Janine is feeling. Obviously as a man you’re kind of almost divorced from the whole process really. The woman takes on the- almost the entire burden really. All you can do is your best to help whenever possible, but it’s difficult at times because obviously from the woman’s perspective it’s almost difficult to relay how they’re feeling. (Dominic, prenatal).*

Dominic considered his partner to be taking on the central role in pregnancy and felt *“divorced”* from the process. This made me think about how fathers might feel as if

they are on the sidelines in pregnancy. Several fathers-to-be made reference to the mothers' biological connection during pregnancy and highlighted how this may link to the bonding process. The following quote provides an example of this:

> *Obviously you can see why there's such a strong bond between mother and child because they've been carrying the baby with them, whereas the bloke's sort of, feel a bit useless at the start. Because there's not a lot you can do. Other than ask them if they need anything. All I've done is grafted on the house and got everything ready to have the baby so me and Helen can just, sort of, relax then. (Toby, prenatal).*

Here, Toby emphasised the unique role a mother plays in childbearing and used this as an explanation for the mother-child bond. Toby seemed to be highlighting that this experience is distinct from that of a mother, and perhaps that this "strong bond" may not be the same between a father and their child during pregnancy and beyond. Again, Toby seems to be positioning himself as the understudy within the pregnancy process.

All fathers-to-be referred to their experience of disconnection in relation to their role, or lack of role, throughout the pregnancy. Calvin refered to this disconnection by stating: *"It's been hard not being able to help, like you can't do anything. I know you can't do anything because it's growing in her so there's nothing you can actually do."* (Calvin, prenatal). This quote gave a sense of impotence about being a father during pregnancy. Although it was not clear whether this was directly related to developing a bond with the baby, I suspect that this may have had an impact on their feelings towards their baby in pregnancy. All fathers-to-be described their role in pregnancy as being to support their partner and some (2) perceived their

attendance at the antenatal sessions to be part of fulfilling this role. In the following extract, Dominic shared his experiences of the antenatal intervention:

> *I feel that I was going just in support of Janine and it feels sometimes that is the way you are perceived to be there for that reason, as opposed to perhaps being a new dad-to-be. […] The NCT lessons are quite mother-focussed as well. […] The man is seen almost sometimes to be more of just the, kind of, the person that's there just because they were there at the start of the job and they need to be there because it's the child's father kind of thing. (Dominic, prenatal)*

Dominic's perception, that he attended the sessions as a support role, seemed to be reinforced by his experience of the sessions. Despite taking some information away from the sessions, Toby also felt that the sessions were "more aimed at the women". In relation to experiences of pregnancy generally as well as the antenatal sessions, there was a strong sense that the fathers were the understudy.

(b) Unity of private selves (mothers)

This sub-ordinate theme represents mothers accounts that described the unique, private and intimate relationship they experienced with their baby. This theme was most pronounced during postnatal accounts, yet reference to the exclusive mother-baby relationship was also evident during pregnancy, particularly in Janine's accounts, where she seemed to want to keep the baby exclusively to herself:

> *I don't always tell people when it's kicking cuz it's like Mommy and baby time, so I don't share it. Because everyone wants to feel when it's kicking and*

sometimes I'm like, 'No, no, no. It's not kicking.' Especially at the start when it first started kicking. (Janine, prenatal).

Janine's quote made me consider how there seemed to be a mother-to-be (self) and a baby (self) which are separate, but also united together in a private, exclusive world to be kept from outsiders. The mother-baby unity continued into the postnatal accounts where mothers talked about the baby needing *them*. Helen described how her baby needed to be soothed by *her*:

My Mum came over and he was really, really crying and you know, we'd fed him, we'd changed him, we'd done everything and he just wasn't having any of it. And then my Mum just said, "Do you just want to go back to Mummy for a second?" She passed him to me and then he shut up. So it was just that sort of moment that… he needs me, almost, and sometimes he just needs a cuddle from me, which is quite a nice feeling. (Helen, postnatal)

Helen's quote illustrates the connection between her and her baby and suggests that he required her in order to be comforted. This was highlighted by mothers describing their baby as a *"Mummy's baby,"* suggesting that their baby had a preference for them. This preference was solely for the mother. Lucy described how her baby would favour her over the father: *"It's nice because she's developing knowing who I am. When Calvin comes home from work he'll have her and he's like, 'Oh it's all about Mummy.' She'll follow me round the room."* (Lucy, postnatal). Lucy's account is representative of other mothers who sensed that their babies had a preference for and connection with them. The exclusive mother-baby relationship was further highlighted in accounts from two mothers who were breastfeeding – Janine and Lucy.

The following extract provides a clear example of the baby's need for their mother for survival:

> *I think it's the fact that you are the only person who can do it. And you think that you grow them for nine months, you're the only person that's sustaining them for nine months and then all of a sudden you take that away and you think, "No!" Whereas I get to be that person still; I'm the only one keeping him alive, basically. It's quite a nice feeling really – special. (Janine, postnatal)*

Here, Janine powerfully communicates the experience of transitioning from pregnancy, where the mother solely sustains the baby, to the postnatal period, where others are able to contribute to the baby's care. Janine expressed her desire to continue being the baby's sole provider and saw breastfeeding as the method of continuing in this key role. Quotes such as Janine's led me to consider the private, unified state that mothers and their babies experience during pregnancy. Despite the mother and the baby having their own selves, they seemed to remain intimately united following the birth.

Summary of Theme 3

In summary, this theme highlights the differing experiences mothers and father have throughout the process of becoming a parent. During pregnancy, fathers experienced a distinct disconnection and divorce from their baby, which seemed to be due to the lack of physical connection, but also seemed to extend beyond this to include an emotional disconnection. In contrast, mothers described experiencing an intimate, exclusive and unified relationship with their baby both pre- and post-natally.

Experiences of the Solihull Approach antenatal group

Parents' experiences of the Solihull Approach antenatal group were explored during the pre- and post-natal interviews. Other than where this has been mentioned in the previous themes, little consistency in responses were shown and therefore no pertinent theme was concluded. The potential influence of the antenatal sessions will be considered in the discussion.

DISCUSSION

The aim of this study was to use a phenomenological approach to explore how first-time parents experience and understand the transition to parenthood and relationship with their baby. The study resulted in gaining a rich understanding of the emotional journey to parenthood and the developing parent-baby relationship for both mothers and fathers. Three main overarching themes emerged from the interviews conducted with four couples, these were: *(1) A journey of uncertainty, (2) Baby as a 'real little person now'* and *(3) Mums and dads together, but separate*. Findings correspond with and support the existing literature on experiences of pregnancy, parental-foetal attachment, and the parent-child relationship, as well as offering new insights into the transition to parenthood.

As part of the experience of becoming a parent, couples in this study experienced feelings of anxiety at various stages of the journey. Parents-to-be experienced a lack of control regarding losing their baby during early pregnancy (which diminshed over time) and growing fears regarding their future role in the latter stages. Three of the four couples that participated had experienced previous foetal loss, which has been found to lead to anxiety during subsequent pregnancies (Hill, DeBackere, & Kavanaugh, 2008). However, regardless of previous loss, experiencing fears in relation to the baby's well-being during pregnancy is known to be common among expectant parents (Melender, 2002a). In this study, parents' anxiety regarding previous loss did not appear to impact on their ability to develop a relationship with their baby pre- or post-natally. Consistent with mothers' accounts reported here, feeling the baby move was found to be one way of alleviating fears about the baby's well-being during pregnancy (Melender, 2002b).

Parents' accounts regarding the future self differed among mothers- and fathers-to-be. Mothers reported fears about their impending role due to their inexperience and concerns about doing it right. In contrast, fathers seemed more reluctant to share their concerns and either desired to learn how to parent or were willing to learn on the job. The differing experiences of expectant mothers and fathers regarding their future role is a novel finding and potentially highlights their differing needs. Postnatally, parents described feeling doubtful about their ability to fulfil their new role. Similar findings were shown in mothers who were found to experience feeling 'unready' and needing to 'work it out' (Barclay, Everitt, Rogan, Schmied, & Wyllie, 1997). Accounts in the current study show that doubting ability was common among both mothers and fathers who conveyed a sense of fragility during the early postnatal period which may have been related to their sense of the fragility of the baby. Theme 1 demonstrated that, despite not being a clinical sample, anxiety exists during the transition to parenthood and highlights the need for support and containment during this period, particularly for mothers during pregnancy and all parents postnatally.

Within the theme of the 'Baby as a real little person now', parents in this study were able to consider their baby as having an active role in the two-way relationship and consider the baby to have its own self. Evidence for this theme was shown in the prenatal accounts and support the literature suggesting that the parent-baby relationship begins prior to birth (Condon, 1993). Despite fathers contributing to some extent, this theme was stronger for mothers during pregnancy, which fits with previous findings suggesting that mothers' attachment to the foetus is significantly stronger than fathers' (Mercer, Ferketich, May, DeJoseph, & Sollid, 1988; Ustunsoz,

Guvenc, Akyuz, & Oflaz, 2010). Parents' capacity to consider their baby as a psychological agent has predominantly been researched in the postnatal period (e.g. Sharp & Fonagy, 2008), yet this study suggests that parents' ability to consider their baby as having their own internal states (known as mind-mindedness) starts developing during pregnancy. Findings show that mothers were more able to see their baby as interactive and having their own self during pregnancy, suggesting that sensitivity and mind-mindedness may be slower to develop for fathers. Based on emerging evidence that mind-mindedness in pregnancy is linked to the postnatal parent-child relationship (Arnott & Meins, 2007), fathers may require more time to develop a strong and secure relationship with their child following birth. Despite this, both parents' abilities to consider their baby as a person and the relationship as two-way developed significantly following the birth. Reciprocal interaction between parent and baby is not only enjoyable for both parties, but is also known to be key in developing a secure attachment and linked to positive long-term outcomes (Feldman, Bamberger, & Kanat-Maymon, 2013; Grossman, Grossman, & Waters, 2005).

This study provides insights into the differing experiences of becoming a mother and father. The theme 'Mums and dads together, but separate' illustrated fathers strongly conveyed experiences of being the understudies to pregnancy and the contrasting unique and intimate togetherness mothers described with their baby. Fathers' prenatal feelings of being detached is consistent with previous literature that has reported fathers' feelings of separation and emotional distance from the pregnancy (e.g. Finnbogadottir, Crang Svalenius, & Persson, 2003; Kowlessar, Fox, & Wittkowski, 2014). Fathers' experiences of lacking a role and involvement, as well as feeling alienated from their baby, may impact on the paternal-foetal relationship,

and consequently link to the postnatal father-infant relationship (Vreeswijk, Maas, Rijk, Braeken, et al., 2014). Furthermore, if fathers continue to experience role identity difficulties following birth this may indicate risk of postnatal depression. Paternal mental health during the transition to parenthood and links to later child outcomes has been increasingly recognised (Hanington, Ramchandani, & Stein, 2010; Kvalevaag et al., 2014). New mothers' experiences of emotional closeness to their baby has also been referred to previously (Olsson, Jansson, & Norberg, 1998), yet this study highlights an intensely unique and special unity between mother and baby. Mothers seemed to relish this relationship, which may further distance fathers from the experience of becoming a parent.

In summary, first-time parents were found to experience feelings of uncertainty across the course of pregnancy and beyond. However, findings suggest that mothers and fathers experience differing and separate journeys during the transition to parenthood. Mothers expressed many anxieties throughout the journey, yet were able to consider their baby as having their own self and experienced a close and unique relationship with them throughout. Fathers accounts showed that their ability to consider their baby as a person was much stronger following birth and is perhaps delayed compared to mothers; this may be associated with their experience of being understudies to pregnancy and feeling divorced from the process. During pregnancy, father-to-be did not express strong anxieties regarding their future self, yet following birth they experienced similar doubts about their ability as mothers.

Although not a primary focus, a provisional aim of this study was to see how parents descriptions may relate to the Solihull Approach antenatal intervention. It could be suggested that themes regarding the baby having a self and the relationship

between parent and baby being two-way may relate to aspects of the intervention, however parents did not explicitly link their experiences with the content of the antenatal sessions. Given the lack of data on explicit links to the Solihull Approach, no specific themes emerged, but this does not mean that parents' attendance at the intervention has not influenced their accounts.

Implications for clinical practice

Findings of IPA studies cannot be generalised without caution, however the findings of this study are consistent with and build upon those from previous research and therefore give weight to the following suggested clinical implications.

This study has demonstrated the importance of supporting both expectant mothers and fathers in order to encourage the early development of the relationship with their baby. Parents' feelings of anxiety experienced in pregnancy suggest that there may be value in educating parents regarding common emotional processes involved in becoming a parent, such as feelings of uncertainty and doubt experienced during pregnancy and beyond. This study illustrated parents' ability to consider their baby as having a mind of their own, which began antenatally. The ability to consider the baby as having a mind appears to be a normative process in the journey to parenthood, yet this developing relationship may require scaffolding from services. Early and effective antenatal interventions should have a physical (e.g. what happens during labour and birth, pain relief) and relational focus including aspects such as containment and reciprocity. The Solihull Approach antenatal intervention aims to do this, although couples in this study did not explicitly link their experiences to this intervention.

Many couples in this study had experienced foetal loss, which is likely to have influenced their anxiety and highlights the importance of gaining information regarding expectant parents' obstetric history. Furthermore, due to the known impact of significnt and prolonged anxiety on the unborn baby (Alder, Fink, Bitzer, Hosli, & Holzgreve, 2007; Mulder et al., 2002), there is a need for parents to be routinely screened for levels of psychological distress at various stages throughout pregnancy. Early screening and identification of concerns would allow for early intervention to protect the health of the baby, as well as supporting the bonding process between parent and unborn baby.

Midwives and health visitors are well placed to explore parents' experiences of, and ability to reflect on, their unborn and newborn baby. Parents' capacity to consider their baby as a psychological agent may serve a potential protective role for secure attachment (Meins, Fernyhough, Russell, & Clark-Carter, 1998; Slade et al., 2005) and, therefore, if further support is found that this begins in pregnancy, maternity services have a role to encourage the development of this relationship. In addition to screening for mental health (NICE, 2014), midwives and health visitors should be looking out for evidence that the baby is talked about as a person and support parents to develop these ideas. Clinical Psychologists have a role to play in training and supporting front line staff to feel confident in screening and intervening during the perinatal period (British Psychological Society, 2016).

Fathers' experiences of being detached during pregnancy give weight to the argument that fathers should be included in antenatal care and interventions (Deave & Johnson, 2008; Kowlessar et al., 2014). However, simply being invited to maternity care may not be sufficient for fathers who may need further involvement and require

additonal father-focused support and information. Whilst acknowledging fathers' physical separation, fathers should be educated about the ways they can connect and interact with their baby during pregnancy and beyond. Findings regarding fathers' slower development of the relationship with their baby compared to mothers suggests that health visitors should enquire about and ideally observe the father-baby relationship (in addition to the mother-baby relationship). Fathers may also require follow up later in the postnatal period when they may be more likely to have developed a relationship with their baby.

Methodological considerations

The use of an IPA approach was a strength of this study as it allowed in-depth exploration of participants' experiences over time. Each account was analysed thoroughly with the aim of improving the rigour of the study and ensuring participants' experiences were captured. A further strength was the small sample size which allowed sufficient time to analyse each account in depth and ensure all participants narratives were considered. However, the sample is unlikely to be representative of all first-time parents and therefore themes may not directly apply to others in the same situation. Three of the four couples participating in this study had experienced previous loss which does not correlate with previous studies reporting incidents of foetal loss to be 12-15% (Regan & Rai, 2000). In addition, couples had attended a specific relationship-focused antenatal intervention which many first-time parents won't have experienced. The study may also be criticised for having self-selecting participants of a particular demographic profile (predominantly white-British, married, well educated). However, gaining a representative sample is not the aim of IPA, and

instead provides the opportunity to engage with a research question at an idiographic level. Therefore, any conclusions made are specific to the context shared by the participants.

A further limitation of this study is the unknown impact of the Solihull Approach antenatal sessions. Despite the intervention being relationship-focused, parents did not explicitly report that it had influenced their thoughts regarding their baby. However, the method relied on self-report which is limited to conscious narratives and therefore the extent to which couples experiences are related to the intervention cannot be fully determined.

Future research

The accounts of parents in this study provide interesting information regarding the experiences of becoming a first-time parent and the early developing relationship between parent and child. Future research may consider following parents across a longer time period starting from pre-conception to explore whether ideas about attachment begin to emerge prior to discovering the pregnancy. Following parents at various time points throughout pregnancy would also provide insight into the developing relationship with the unborn baby, such as their ability to consider the baby as a person and experience a two-way relationship. Future research may also consider following up parents when their child is aged 18-30 months when attachment is considered to be fully developed (Brody, 1981). A follow-up would allow exploration of the further developed parent-child relationship and could be considered in light of parents' prenatal accounts.

Future studies may also benefit from considering the impact of traumatic birth on the developing attachment relationship. It would also be interesting to compare findings from this study to a clinical sample, such as mothers who present with prenatal depression or anxiety, or PTSD following birth.

Findings from this study suggest that parents begin to consider their baby as having a mind of their own antenatally. This appears to overlap with concepts such as mind-mindedness and reflective functioning which have been shown to contribute to secure attachment (Meins, Fernyhough, Russell, & Clark-Carter, 1998; Slade et al., 2005). Research needs to further explore whether these concepts begin to develop during pregnancy and what factors may impact on their development.

Conclusions

This research has highlighted the differing journeys that mothers and fathers experience during the transition to parenthood. The ability to consider the baby as a person was seen to occur during pregnancy for mothers in particular who also experienced a strong and unique relationship with their baby following birth. Fathers experienced pregnancy as a time where they lacked involvement and felt disconnected to their baby. Findings have implications for ante- and post-natal care, particularly for the involvement and support of fathers.

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PUBLIC DISSEMINATION DOCUMENT

EXPLORING PARENTS' RELATIONSHIP WITH THEIR BABY FROM PREGNANCY TO INFANCY

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PUBLIC DISSEMINATION DOCUMENT

This thesis was submitted as partial fulfilment of the requirements of a Doctorate in Clinical Psychology. This document summarises both sections of Volume I, which includes a literature review and an empirical paper.

Is maternal-foetal attachment associated with postnatal infant outcomes? A systematic review.

The links between the relationship between a parent and child and later child outcomes have been widely researched. Findings show that a healthy parent-child relationship is linked to better child outcomes such as brain development and mental health throughout life (Schore, 2001; Weich, Patterson, Shaw, & Stewart-Brown, 2009). It is now recognised that the relationship between a parent and child begins to develop prior to birth, whilst the child is a foetus (Cranley, 1981). Research has begun to investigate whether the relationship between a mother and her baby during pregnancy is influential on the infant following birth. The aim of this review was to methodically review and combine the findings of research studying the links between the mother-foetal relationship and infant outcomes following birth.

A systematic search was undertaken and identified seventeen papers that met the criteria for inclusion in the review. Twelve studies explored the association between the mother-foetal and mother-infant relationship. Five studies investigated links between the mother-foetal relationship and other infant outcomes, such as temperament and sleep.

Main findings showed relatively consistent links between the mother-foetal relationship and the relationship between a mother and infant following birth. Mothers

who reported a higher attachment to their baby during pregnancy were found to be more likely to have a better relationship with their child postnatally. Lack of consistent results were found when reviewing the studies looking at the mother-foetal relationship and other infant outcomes (e.g. temperament, sleep) and therefore no conclusions could be drawn from these studies.

Findings suggest that the mother-foetal relationship is associated with the mother-infant relationship. Therefore, a role exists for maternity services to detect any difficulties and support the development of postnatal mother-infant relationships during pregnancy. Further research is required to demonstrate whether the relationship between a mother and her foetus has implications for other outcomes, such as child development and temperament.

From bump to baby: Exploring first-time parents' concepts of emerging parenthood and relationship with their unborn baby.

It has been acknowledged that the relationship between a parent and their child begins to develop during pregnancy (Cranley, 1981). Much of the existing literature on this topic has sought to discover whether the parent-foetal relationship is related to the later parent-child relationship. Findings suggest that parents' strong feelings of attachment towards their foetus is associated with a strong relationship between parent and child following birth (Huth-bocks, Levendosky, & Bogat, 2004; Müller, 1996). However, little is known about how expectant parents experience and understand the baby and their relationship during pregnancy. This study aimed to gain a better understanding of how parents' make sense of becoming a parent and the relationship with their baby during the transition to parenthood.

Semi-structured interviews were conducted with four expectant mothers and their partners on two occasions: during the third trimester of pregnancy and an average of 10 weeks postnatally. The interviews explored parents' experiences of becoming a parent and the relationship with their baby.

The interviews were analysed using Interpretative Phenomenological Analysis (IPA) which yielded three overarching themes: (1) *A journey of uncertainty*, (2) *Baby as a 'real little person now'*, and (3) *Mums and dads together, but separate*. Parents were found to experience feelings of uncertainty across the course of pregnancy and during the early postnatal period. However, findings suggest that mothers and fathers experience differing and largely separate journeys during the transition to parenthood. Mothers expressed many anxieties throughout the journey, yet were able to consider their baby as having their own self (i.e., having their own wants, needs and preferences) and experienced a close and unique relationship with them throughout. Fathers' ability to consider their baby as a person was much stronger following birth and was perhaps delayed compared to mothers. This later-to-develop ability for fathers may be associated with their experience of feeling divorced from the pregnancy process.

A number of clinical implications result from the findings of this study. Findings emphasise the importance of supporting both mothers and fathers during pregnancy and the early postnatal period in order to encourage the early development of the relationship with their baby. Furthermore, there is a need for father-focussed antenatal interventions in order to promote their inclusion and the relationship with their baby.

In conclusion, this research has highlighted the differing journeys that mothers and fathers experience during the transition to parenthood. The ability to consider the baby as a person was seen to occur during pregnancy for mothers in particular who also experienced a strong and unique relationship with their baby following birth. Fathers experienced pregnancy as a time when they lack involvement and felt disconnected to their baby. These findings have implications for ante- and post-natal care, particularly for the involvement and support of fathers.

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APPENDICES

Appendix 1: Table showing quality framework items with definitions and/or rationale for exclusion

	Criterion	Tooth et al. (2005) definition	Additional information
1	Are the objectives or hypotheses of the study stated?	Self-explanatory	
2	Is the target population stated?	The group of persons towards whom interferences are directed. Sometimes the population from which a study group is drawn.	The individuals who were targeted for recruitment. E.g. people attending [location] antenatal groups; two hospitals etc.
3	Is the sampling frame stated?	The list of units from which the study population will be drawn. Ideally, the sampling frame would be identical to the target population, but it is not always possible.	The sampling method (e.g. convenience sample).
4	Is the study population defined?	The group selected for investigation.	Studies describing demographic information of the sample were rated as yes. If insufficient detail was reported (e.g. only reporting age) then it was rated as no.
5	Are the study setting (venues) and/or geographic location stated?	Comment required about location of research. Could include name of center, town or district.	If general description of where participants recruited (e.g. recruited from antenatal classes) then rate as yes.
6	Are the dates between which the study was conducted stated or implicit?	Self-explanatory.	

	Criterion	Tooth et al. (2005) definition	Additional information
7	Are eligibility criteria stated?	The words 'eligibility criteria' or equivalent are needed, unless the entire population is the study population.	Studies stating inclusion and/or exclusion criteria were rated as green.
8	Are issues of 'selection in' to the study mentioned?	Any aspect of recruitment or setting that results in the selective choice of participants (e.g., gender or health status influenced recruitment).	The authors mention likely sources of bias operating at the recruitment stage, e.g. participants self-selected; education level of sample above average (compared to population)
9	Is the number of participants justified?	Justification of number of subjects needed to detect anticipated effects. Evidence that power calculations were considered and/or conducted.	
10	Are numbers meeting and not meeting the eligibility criteria stated?	Quantitative statement of numbers.	If everyone met eligibility criteria then rate as yes.
11	For those not eligible, are the reasons why stated?	Broad mention of the major reasons.	
12	Are the numbers of people who did/did not consent stated?	Quantitative statement of numbers.	Rated as yes if paper states that every person consented.
13	Are the reasons that people refused to consent stated?	Broad mention of the major reasons.	Rated as not applicable if every person consented.
14	Were consenters compared compared with nonconsenters?	Quantitative comparison of the different groups.	Rated as not applicable if every person consented.
15	Was the number of participants at the beginning of the study stated?	Total number of participants (after screening for eligibility and consent) included in the first stage of data collection.	Studies reporting sample size at time point one were rated as yes.

	Criterion	Tooth et al. (2005) definition	Additional information
16	Were methods of data collection stated?	Description of tools (e.g. surveys, physical examinations) and processes (e.g., face to face, telephone etc.)	Rated as no if description of tools *and* processes not sufficiently described.
17	Was the reliability (repeatability) of measurement methods mentioned?	Evidence of the reproducibility of the tools used.	Reference to previous published studies.
18	Was the reliability of measurement methods measured in the study sample?	Item added	Reliability examined in the current study sample, such as using Cronbach's alpha or Cohen's Kappa.
19	Was the validity (against a gold standard) of measurement methods mentioned?	Evidence that the validity was examined against, or discussed in relation to, a gold standard.	If validity was commented on for one measure (despite there being two), then this was rated as yes.
20	Was the validity of measures established in the current sample?	Item added	Rated yes if some consideration of assessing for validity in the study sample was reported, e.g. content validity assessed by expert panel
21	Were any confounders mentioned?	Confounders being defined as a variable that can cause or prevent the outcome of interest, is not an intermediate variable, and is associated with the factors under investigation.	Demographic variables were considered as confounders.
22	Was the number of participants at each stage/wave specified?	Quantitative statement of numbers at each follow-up point.	Studies reporting sample size at all time points (two or more) were rated as yes.
23	Were reasons for loss to follow-up quantified?	Broad mention and quantification of the major reasons.	Rated as not applicable if no loss to follow up occurred.

	Criterion	Tooth et al. (2005) definition	Additional information
24	Was the missingness of data items at each wave mentioned?	Differences in numbers of data points (indicating missing data items) explained.	Rated as yes if no missing data was reported.
25	Was the type of analyses conducted stated?	Specific statistical methods mentioned by name.	Rated as no if planned analyses were not outlined in the method.
	Were 'longitudinal' analysis methods stated?	Longitudinal analyses were defined as those assessing change in outcome over two or more time points and that take into account the fact that the observations are likely to be correlated.	ITEM OMITTED Item requires that the postnatal infant measure of interest should have been measured at two different time points. This item is not relevant to the studies under review as they are not concerned with change in outcome over time.
	Were absolute effect sizes reported?	Absolute effect was defined as the outcome of an exposure expressed, for example, as the difference between rates, proportions, or means, as opposed to the ratios of the measures.	ITEM OMITTED Original paper states that this item is not relevant for all observational longitudinal studies. This item is not relevant to reviewed studied as they are not concerned with change in outcome over time.
	Were relative effect sizes reported?	Relative effects were defined as ratio of rates, proportions, or other measures of an effect.	ITEM OMITTED Reviewed studies are not interested in change in outcome over time and therefore this item is not relevant.

	Criterion	Tooth et al. (2005) definition	Additional information
26	Was loss to follow-up taken into account in the analysis?	Specific mention of adjusting for, or stratifying by, loss to follow-up.	Rated as not applicable if no loss to follow up. Rated as yes if participants not taking part at follow up were excluded.
27	Were confounders accounted for in analyses?	Specific mention of adjusting for, or stratifying by, confounders.	Studies accounting for covariates were rated as yes.
28	Were missing data accounted for the in the analyses?	Specific mention of adjusting for, or stratifying by, or imputation of missing data items.	Rated as not applicable if no data were missing. Rated as yes if missing data were reported to have been excluded in the analysis.
29	Was the impact of biases assessed qualitatively?	Specific mention of bias affecting the results, but magnitude not quantified.	Specific mention of bias posing a threat to internal and/or external validity rated as yes.
	Was the impact of biases estimated quantitatively?	Specific mention of numerical magnitude of bias.	ITEM OMITTED Item appears to be duplicating earlier items. For example, items on selection bias, missing data, loss to follow-up and confounding variables. Therefore, omitted due to duplication.
	Did authors relate results back to a target population?	A study is generalizable if it can produce unbiased inferences regarding a target population (beyond the subjects in the study). Discussion could include that generalizability is not possible.	Ambiguity regarding the difference between this item and the following item, therefore one item concerning generalizability was developed.
	Was there any other discussion of generalizability?	Discussion of generalizability beyond the target population.	As above.

	Criterion	Tooth et al. (2005) definition	Additional information
30	Was there any discussion regarding generalizability of results?	Item added.	Any mention of generalizability specifically rated as yes. If a sample is described as unrepresentative (despite no mention of generalizability) then it was rated as yes.

Appendix 2: Reflexive journal extract

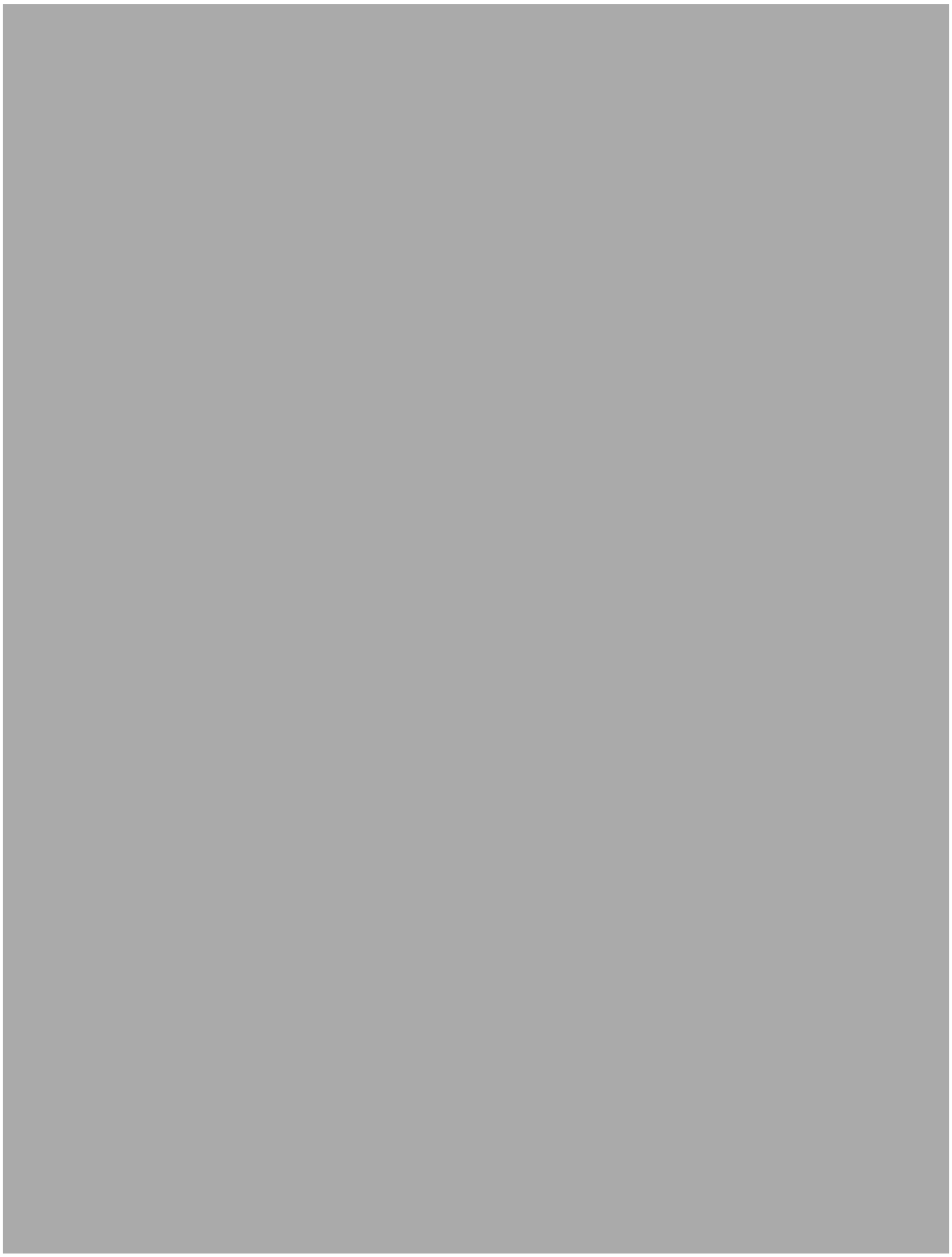
Prior to the antenatal interviews I felt very nervous about going to the couples homes and wondered what they would think about the questions I was going to ask them. Despite my anxiety, I was also curious to hear their stories and felt excited to hear about their pregnancy so far.

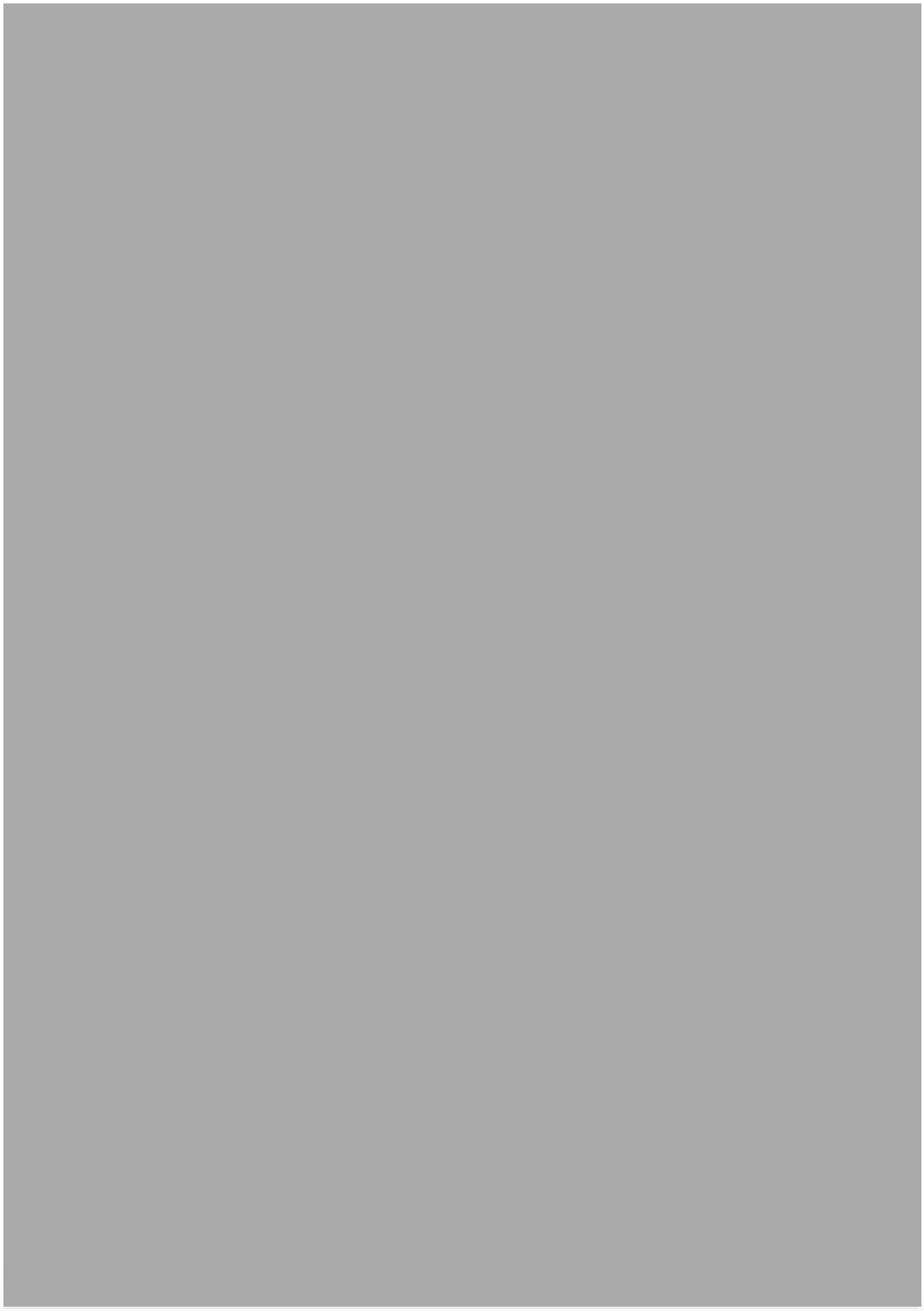
During some of the prenatal interviews, I found myself taking on some of the parents' feelings of anxiety. I attempted to note my feelings and place them to one side in order to stay focused on the interview. At times this felt difficult, but with reflection and discussion in supervision I was able to think about why these feelings were coming up and how best to manage my own feelings in the future interviews.

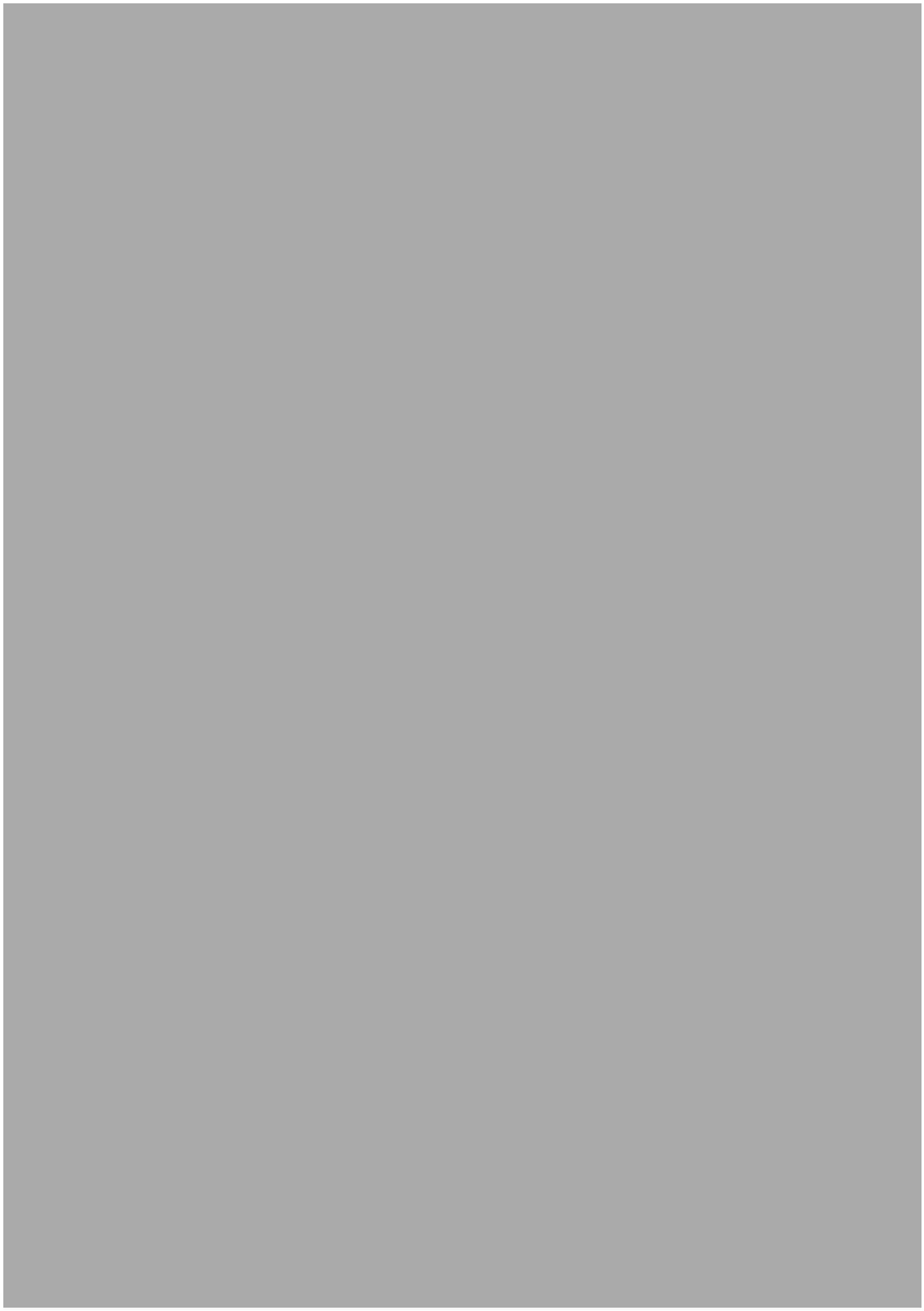
The postnatal interviews felt like an entirely different experience for me. Meeting the couples for the second time meant that my anxiety wasn't as noticable and I was so eager to find out how couples were getting on with their first baby. Generally the postnatal interviews felt more relaxed and I wondered whether this was due to my anxiety being lower, whether the couples were feeling more relaxed now their baby was born safety, or perhaps a combination of the two.

Throughout both interviews, I was struck by the couples willingness to share their experiences of becoming a parent and their openness to share their thoughts and feelings about their baby. I felt that I could strongly relate to the experiences of mothers, despite not being a mother myself, and attempted to stay aware of this in order to ensure that it did not impact on my interpretation of the interviews.

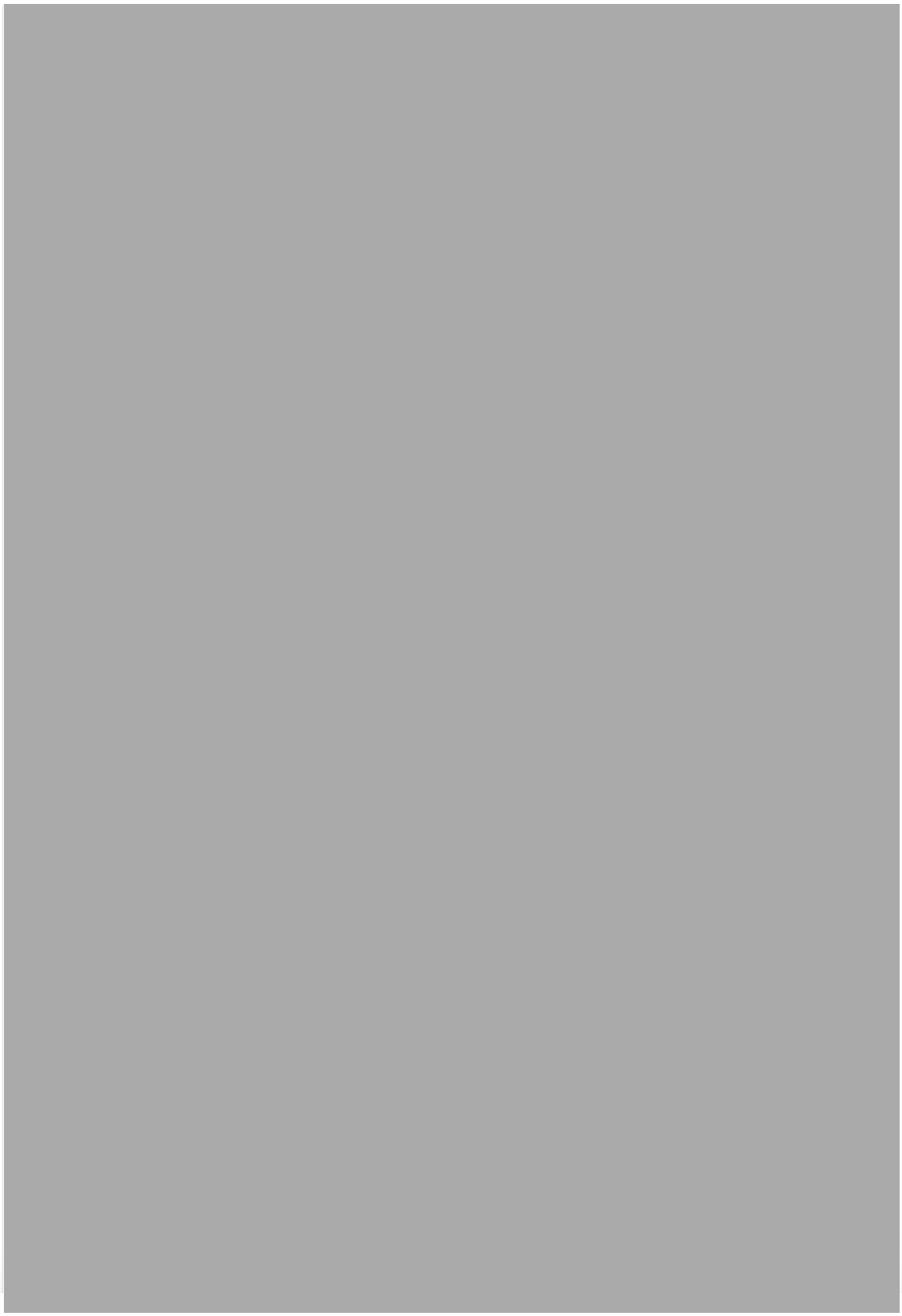
Appendix 3: NHS HRA ethics approval letter

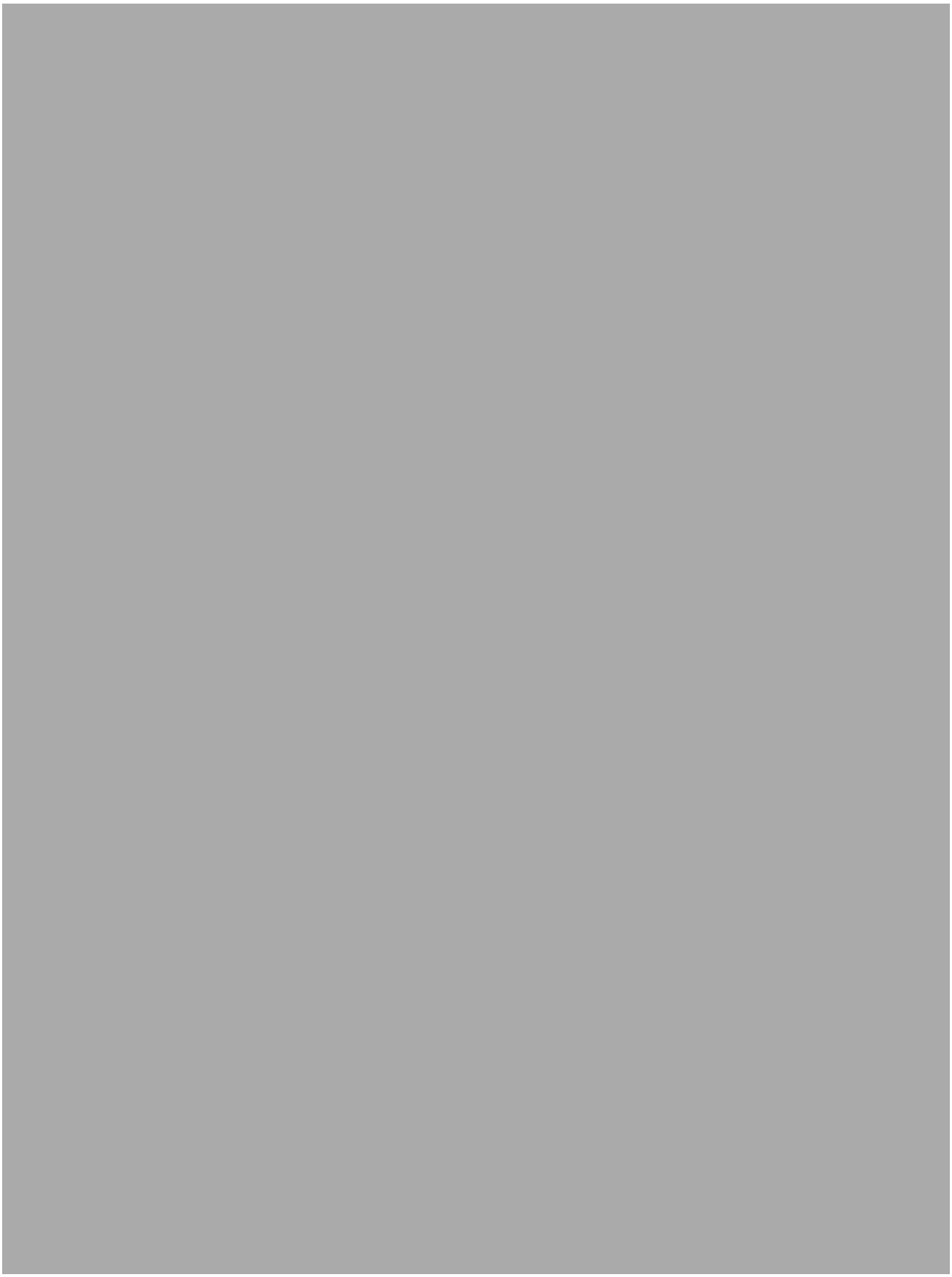






Appendix 4: Heart of England NHS research and development approval letter





Appendix 5: Participant information sheet

Exploring parents' experiences of the transition to parenthood.

Participant Information Sheet for Couples

You are being invited to take part in a research study. Please read the following information carefully and consider whether or not you wish to take part. If you would like to discuss any aspect of the research, please do not hesitate to contact us using the contact details at the end of this sheet.

What is the purpose of this research?

The study aims to explore first-time parents' ideas about becoming a parent and relationships with their baby. This is an important area of research as the relationship between parents and their child has been found to be important for several areas of child development.

Couples who are expecting their first child and have attended the Solihull Approach antenatal parenting group are invited to take part.

Who is doing the research and why?

The research will be carried out by Adele Phillips, Trainee Clinical Psychologist, as part of a doctoral research project supported by the University of Birmingham.

Do I have to take part?

It's up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and you and your partner will be asked to sign a consent form. You are both free to withdraw without giving a reason. This will not affect the standard of care you receive.

What will I have to do if I agree to take part?

You and your partner will both be asked complete an opt-in form. The opt-in form means that you are giving consent to be contacted by the researcher. Alternatively, you may contact the researcher directly to express your interest.

The researcher will contact you to arrange the first of two interviews. Interviews with you and your partner will be done separately. The first interview will take place during the 3rd trimester (27-40 weeks) of pregnancy. Prior to this interview starting, you will both be asked to sign a consent form. During both interviews you will be asked to talk about your pregnancy and your relationships with your baby.

The second interview will take place 8-14 weeks following the birth. Prior to this, the researcher will contact your Health Visitor to check it is okay to contact you again. Interviews with you and your partner will be done separately. Reported extracts will have identifying information removed; however we cannot guarantee that someone who knows you well will not be able to identify your comments. Each interview should

last approximately up to one hour and will be audio recorded. Interviews will take place in a venue which feels comfortable to you, which will usually be at your home.

At the second interview you will be asked whether you give the researcher permission to access your EPDS (Edinburgh Postnatal Depression Scale) score from your Health Visitor. This is a measure which is routinely administered to mothers following the birth of your baby. We ask to access this information as interview responses and the recall of your experiences of the Solihull Approach group programme may be influenced by mood.

What are the possible disadvantages and risks of taking part?

It is possible that the interviews may raise sensitive topics that you might wish to discuss further. In the unlikely event of this happening please contact your Health Visitor. If you become distressed whilst the interview is taking place, the interview will be stopped and we will be able to consider whether you would like to continue or not. Ultimately, you may choose to stop and withdraw your data.

Will my taking part in this study be kept confidential?

All data collected will be kept confidential and secure. All names will be changed and identifying details will be removed. Audio recording devices will be kept in a locked cabinet and will be deleted following transcription. Transcribed interviews will be kept on a password protected computer and will be kept for 10 years according to the Data Protection Act 1998.

The data will be looked at by the researcher and research supervisors at the University of Birmingham to ensure that the analysis is a fair and reasonable representation of the data. The researcher may need to contact agencies to support you if they have significant concerns about your own or others' safety, but we will let you know if this is the case. Otherwise, the information you provide in your interview will be kept confidential to the research team.

The research has received ethical approval from the NHS Health Research Authority.

What will happen if I do not want to carry on with the study?

You may withdraw from the study at any point prior to the interview or whilst the interview is taking place. If you decide to withdraw from the study, your data will be withdrawn although your partners' interview may still be included in the study results (unless they also wish to withdraw). Following each interview, a copy of your interview transcript will be sent to you and you will then have a two week reflection period to consider whether there are any quotes that you do not wish to be used in the research. Any quotes included in the results will be reported anonymously. Providing you are happy for the data to be used at this point, you will no longer be able to withdraw the data following this.

What will happen to the results of the research study?

The results of the study will be analysed and collated into a report written by the main researcher. The report will only include extracts of the interviews with names and identifying details removed. Data will also be submitted to a journal for research publication. You may request a copy of the final report if you wish. A summary of the research findings, all anonymised, will be available from June 2016.

What happens if I have any further concerns?

If you have any further concerns, please contact the researcher or the research supervisors on the contact details below. You may also contact the clinical research supervisor, Dr Karen Bateson [redacted]
Alternatively, you may express your concerns via the Heart of England NHS Foundation Trust Patient Services Department on 0121 424 0808.

Contact details

Researcher: Adele Phillips **Email:** [redacted]

Research Supervisors: Dr Ruth Butterworth & Dr Gary Law

[redacted]

Thank you for your time and help with this study.

Appendix 6: Opt-in form

Exploring parents' experiences of the transition to parenthood.

Opt-in Form for Couples

If you and your partner are willing to take part in the research, please complete the information below and give this form to your group facilitator. The researcher will use the details you provide in order to contact you about the research.

Alternatively, you or your partner may contact the researcher directly using the details provided on the information sheet in order to express your interest.

Name: ……

Partners name: ……

Group location: ……

Home telephone: ……...

Your mobile telephone: ……

Your partners mobile telephone: ……

I agree for the researcher to contact me using the details stated above to discuss my participation in the research.

Signed by you: ……

Signed by your partner: ……..

Appendix 7: Interview schedules

Interview Guide

Antenatal interview:

The pregnancy

- Tell me about what happened when you found out you were pregnant
- When did you discover that you were pregnant?
- How did you feel when you found out?
    - Physically and emotionally
    - Was the baby planned?
- What went through your mind?
- Can you remember who you spoke to/told first?
- Is there anything that you have found difficult during pregnancy?

Relationship with foetus

- Tell me about how you and your baby communicate
- Are there ways that you talk to or interact with your baby?
    - Do you talk to your baby?
    - Do you ever feel it kicking or moving?
    - How do you feel when you're interacting with your baby?

Considering the baby following birth

- What do you sense your baby will be like once it is born?
- Do you know the gender of your baby?
- Do you have a name in mind?
- What do you think he/she will look like?
- What kind of temperament or personality do you think it will have?
- What do you imagine your relationship will be like after the birth?
- How are you intending to feed your baby?

Postnatal interview:

Labour and delivery

- Tell me about your labour and the delivery
    - Where did you give birth?
    - How did you feel at the time?
- What do you remember about the first few minutes of being with your baby?
- How did your birth partner react?

Early days

- How soon were you able to go home?
- How are you feeding your baby?
    - Is that how you had intended?/Is that what you were expecting to do?
    - What was the experience of feeding like for you?

- How would you describe the first few weeks at home?
    - Feeding, sleeping, crying, bonding
    - The baby and your relationship
- Is there anything that you have struggled with/found difficult?
- Describe your baby to me / What is [name] like?
- How would you describe his/her appearance?
- Describe your impressions of his/her temperament/personality?
- What is your relationship like?
    - How have you bonded since the birth?
    - How has your relationship developed or changed since he/she was born?
- How does this compare to what you thought it may be like?
- Have you and [name] been apart since the birth?
    - If yes – how did you react to being away from him/her?
    - How did it feel?
    - How did he/she react to being separated from you?

Both interviews:

Experience of Solihull Approach antenatal group

- Can you tell me about your experiences of the Solihull Approach antenatal group.
- What things did you take away from the group?
- What did you learn?
- What has the group made you think about?
    - Clarification: Do you think that would have been different if you hadn't been to the group?
- Was there anything about the group that you didn't like or feel could have been done differently?

Appendix 8: Consent form

CONSENT FORM

Research site: .....
Study Number & Title:.....
Participant Identification Number:.....

Title of Project: Exploring parents' experiences of the transition to parenthood.
Researcher: Adele Phillips

Please initial box

1. I confirm that I have understood the information sheet dated 06/02/2015 (version 4) for the above 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 prior to or during the research interview, without giving any reason. This will not affect the standard of care I receive. ☐
3. I understand that the research interview will be audio-recorded ☐
4. I understand that following the research interview I will have two weeks to reflect on the interview and consider whether there are any quotes that I do not wish to be used in the research. I am aware that I may withdraw my interview entirely or in part, without giving any reason. ☐
5. I understand that the data collected during this study will be looked at by the researcher and relevant others at the University of Birmingham to ensure that the analysis is a fair and reasonable representation of the data. I understand that parts of the data may also be made available to relevant agencies if the researcher has concerns about my own or others' safety. ☐
6. I understand that direct quotes from my interview may be published in any write-up of the data, and used for training purposes, but that my name will not be attributed to any such quotes and that I will not be identifiable by my comments. ☐
7. I give consent for the researcher to contact my Health Visitor and record my Health Visitors details. ☐
8. I agree to take part in the above study. ☐

.....	.....	.....
Name of participant	Date	Signature
.....	.....	.....
Name of researcher	Date	Signature

Appendix 9: Example of individual theme development table

Object of concern	Line number & quote
Unborn baby is a person	
Nickname for unborn baby	238 – 'I was going 'right then bubs' – it's nicknamed bubs cuz it was a shrimp'
Unborn baby having it's own mind	286 – 'it's almost as if it's asking for breakfast and once it's had breakfast it's okay'
	84 – 'my little one has been very very kind to me'
	336 – 'I think it likes attention so I think it's going to be quite a loving child'
Baby as blank canvas	339 – 'it's a blank canvas though isn't it really?'
	344 – 'I always think babies are a blank canvas and they'll be brought up how you bring them up and your beliefs will become their beliefs because that's what they're going to be brought up into'
Fear of role as mother	172 – 'I said "I'm just going to be a terrible mum and I can't do this"'
Responsibility of parenthood	339 – 'it's a blank canvas though isn't it really? That's quite scary- cuz there's quite a lot of responsibility'
	522 – '…other than it being solely mine-my responsibility and having that fear…'
Parenting as daunting	355 – 'there's not really a lot you can do until you're-you're doing it- but it is- it is quite a daunting thought'
	417 – 'big shoes to fill in my mum'
Role in supporting baby's development	450 – 'how do I then influence that and how can I develop that and support it'
	531 – 'I know that he's talked to me a few times and said I ain't got a clue how to change a baby – how do you do it?'
Expectation that you should know how to parent	532 – 'there is almost an expectation that people will know how to do it'
Relationship with unborn baby	
Baby is "mommy's"	230 – 'oh it's a mommy's baby'
Interacting with/responding to the unborn baby	230 – 'I've talked to this baby since the day I have found out I was pregnant'
	234 – 'you'll see me walking down the street and I'll be chatting away to the baby and if it kicks me I'll talk back to it'
	305 – 'if I rub it's bum it'll go calm and if I stop it will kick me'
	311 – 'if I sit and rub- you have to rub quite hard but if I do it for a while […] as soon as I stop I get kicked'
Special relationship between Mum and baby	255 – 'I don't always tell people when it's kicking cuz it's like mommy and baby time so I don't share it'
	281 – 'it's nice especially at 2 o'clock in the morning when it's waking you up and you're lying there and

	you're like oo just sit here and have some quiet time- it's nice'
Experience of the baby moving	
Private/special Mum-baby time	255 – 'I don't always tell people when it's kicking cuz it's like mommy and baby time so I don't share it' 279 – 'I love it – that's one thing I'm really going to miss'
New and unfamiliar experience	259 – 'I started feeling movements at about 16 weeks- I was really early- I started thinking 'oo what's that?'' 268 – 'somebody said it feels like wind and it does- it's like, it's a really strange sensation' 272 – 'it was lovely – you suddenly feel 'oo''
Baby like an alien	277 – 'your tummy does these weird shapes and oh god sometimes I'm like what's going…'- it looks like an alien'

Appendix 10: Table to show the participants that contributed to each theme

Theme	Jane	Ian	Janine	Dominic	Helen	Toby	Lucy	Calvin
Theme 1: A journey of uncertainty								
Lack of control	✓	✓	✓		✓	✓	✓	✓
Fear of future self		✓	✓	✓	✓		✓	
Doubting ability and fragility	✓		✓	✓	✓	✓	✓	✓
Theme 2: Baby as a 'real little person now'								
Action, reaction and gain	✓	✓	✓	✓	✓	✓	✓	✓
Baby as self	✓	✓	✓	✓	✓	✓	✓	✓
Theme 3: Mums and dads together, but separate								
Understudies to pregnancy (fathers)				✓		✓		✓
Unity of private selves (mothers)			✓		✓		✓	