VOLUME I

RESEARCH COMPONENT

PERINATAL MENTAL HEALTH DIFFICULTIES IN MOTHERS AND FATHERS

BY

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A thesis submitted to
The University of Birmingham
for the degree of
DOCTORATE IN CLINICAL PSYCHOLOGY

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May 2015

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Overview

This thesis is submitted in partial fulfilment of the requirements for the degree of Doctorate of Clinical Psychology (Clin.Psy.D.) at the University of Birmingham. The thesis consists of two volumes.

Volume 1

This volume comprises three chapters. The first chapter is a systematic review exploring the relationship between paternal mental health in the perinatal period and preadolescent child outcomes, including externalising and internalising difficulties, socioemotional and cognitive development and child temperament. The second chapter is an empirical study regarding the role of antenatal maternal orientation in exploring the relationship between perfectionism and postnatal distress in first time mothers. The third chapter is a public domain briefing document, providing an accessible summary of both the systematic review and empirical paper.

Volume 2

Five Clinical Practice Reports (CPRs) are presented in this volume. The first report details the case of a 30-year-old man with depression, formulated from a cognitive and psychodynamic perspective. The second report presents a service evaluation of the psychological treatment pathways for those with psychosis who are discharged from Home Treatment Teams to Community Mental Health Teams. The third presents a single case experimental design evaluating the effectiveness of a cognitive-behavioural intervention for a 14-year-old girl experiencing social anxiety. The fourth report focuses upon the development of consultation skills whilst on a placement in a psychiatric liaison team focusing upon work with older adults in an acute hospital. The fifth is an abstract of an oral presentation given regarding a behavioural intervention for 'challenging behaviour' in a 20-month-old boy with Cornelia de Lange Syndrome.

All names and identifying features have been changed to maintain confidentiality.

Acknowledgements

Thank you to the women who so graciously gave up their time to participate in my research.

Thank you also to my supervisors Dr Ruth Butterworth, Dr Chris Jones and Dr Mary McGuinness for their endless support, advice and patience during the research process.

To Charlie Bamford for her support during the initial stages of data collection, your enthusiasm and determination were greatly appreciated.

To my wonderful friends (far too many to mention!) and family for their years of patience, support and enthusiasm for my journey.

Of course to Alex, for your unwavering belief in me. I couldn't have done this without your love and support.

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Chapter One

Paternal Mental Health During the Perinatal Period and its Impact upon Preadolescent Outcomes: A Systematic Review

Abstract

Background. It is increasingly recognised that fathers as well as mothers may experience mental health difficulties during the perinatal period. Societal and cultural changes mean that fathers are now playing a more central parenting role, which may be contributing to higher levels of depression and anxiety in men trying to manage this role. Although a wealth of information is available regarding the impact of maternal mental health on child outcomes, far less is known regarding paternal mental health, although some evidence of an association is emerging.

Aim. To explore whether there is a relationship between perinatal paternal mental health and outcomes in preadolescent children.

Method. A systematic search of five databases was conducted, focusing on paternal mental health in the perinatal period and child outcomes measured before the age of thirteen. Three hundred and ninety-one papers were screened against inclusion and exclusion criteria and 18 included in the review.

Results and Conclusion. The review found fairly consistent evidence for internalising and externalising problems and mixed evidence for socio-emotional and cognitive difficulties and child temperament. More research is required regarding mental health in fathers during this period more generally as well as *how* preadolescent child outcomes may be affected

Introduction

The prevalence and impact of maternal perinatal mental health difficulties has been extensively researched. This research suggests relatively high prevalence rates for mood disorders, particularly in the antenatal and postnatal period, with literature suggesting approximately 7-20% of mothers will experience depression during this time (e.g. Gavin et al, 2005; Wisner et al, 2013); with a similar figure being found for anxiety (Heron, O'Connor, Evans, Golding & Glover, 2004; Yelland, Sutherland & Brown, 2010); and women in the perinatal period being 1.5 to twice as likely to experience obsessive compulsive disorder (OCD) than non-pregnant or postnatal women (Russell, Fawcett & Mazmanian, 2013).

However, it is now recognised that mental health difficulties in the perinatal period are not exclusive to mothers, and fathers may also experience difficulties. A review by Bradley & Slade (2011) found that fathers can experience a range of disorders in the first year after the birth of their child including depression, anxiety, OCD, post-traumatic stress disorder (PTSD) and psychosis. However, the review does not stipulate whether the included studies controlled for mental health difficulties prior to becoming a father and thus whether mental health problems are specifically associated with partner pregnancy and becoming a parent; or reflect some level of pre-existing difficulty.

Depression has been most extensively researched in fathers and prevalence rates are in the region of 4.8% (e.g. Paulson & Bazemore, 2010). Research suggests that risk factors in the postnatal period observed for mothers are similar for fathers, such as low socioeconomic status, low education level and marital/ relationship dissatisfaction (Bergstrom, 2013). A relationship between maternal and paternal mental health has also been found, with research suggesting that up to half of mothers and fathers may experience depression concurrently (e.g.

Goodman, 2004) which can further impact upon relationship satisfaction and discord (Cummings, Keller & Davies, 2005).

Understanding these risk factors has become more important, due in part to a change in the societal and cultural context in which parenting is now taking place, with fathers playing a much more central role in the upbringing of their children (Fletcher, Matthey & Marley, 2006). It has been argued that this shift in role may be contributing to higher rates of anxiety and depression in fathers, already heightened due to the transition of becoming a parent (Buist, Morse & Durkin, 2003). Fatherhood brings up many questions for expectant men, including what kind of father they want to be, as well as a perceived need to protect their spouse and manage the shift associated with the addition of a new baby (Boyce, Condon, Barton & Corkindale, 2007).

A relationship between parental mental health and long-term child outcomes has been suggested, including the development of later mental health difficulties (National Scientific Committee on the Developing Child, 2009). Outcomes including those relating to cognitive, socio-emotional, internalising and externalising difficulties have been found to be associated with maternal mental health difficulties (see Sanger, Iles, Andrew & Ramchandani, 2015 and Stein et al, 2014 for reviews). This is particularly when maternal mental health difficulties emerge during the perinatal period (Shonkoff, 2007), increasing the risks of prematurity and low birth weight (e.g. Talge et al, 2007) and the risk of poor cognitive outcomes (e.g. Hay et al, 2001). The attachment relationship can also be interrupted by maternal mental health, with a reduction in some mothers' ability to provide responsive and sensitive caregiving (Milgrom, Westley & Gemmill, 2004). These outcomes have prompted a range of initiatives aimed at supporting women with perinatal mental health difficulties, including the development of guidance by the National Institute of Clinical Excellence (NICE, 2014) and the publication of

briefing papers suggesting how perinatal mental health service provision may be improved (Mental Health Network NHS Confederation, 2014).

Despite the breadth of knowledge regarding maternal mental health and its impact on child outcomes, significantly less is known about the relationship with paternal mental health, although some evidence of risks are emerging.

Previous Reviews

A small number of previous reviews have considered the associations between paternal psychiatric disorders and child outcomes. Ramchandani & Psychogiou (2009) summarised the literature in this area and found paternal depression and substance misuse left children at a higher risk of emotional and behavioural difficulties. They found that much of the research had focused upon paternal depression, with less focusing upon severe and enduring mental health problems such as bipolar disorder and schizophrenia. Both genetic and environmental factors (e.g. non-responsive parenting and marital conflict) were suggested to be important mediating factors.

A meta-analytic review (Kane & Garber, 2004) found small but significant effects of parenting difficulties (decreased positive and increased negative parenting behaviours) with fathers experiencing depression. A more recent meta-analysis by Wilson & Durbin (2010) highlighted associations between paternal depression and child externalising and internalising problems through to adolescence. Although these reviews provide interesting conclusions regarding the relationship between paternal mental health and child outcomes, they predominantly focus upon depression, not necessarily measured in the important perinatal period.

The Current Review

The current review aims to examine the literature regarding paternal mental health during the perinatal period (pregnancy through to the child's first year) and outcomes in preadolescent children (0-12 years). It builds on that of earlier reviews (such as Ramchandani & Psychogiou, 2009) by focusing upon specific outcomes in the pre-adolescent period to include cognitive, socio-emotional and internalising and externalising difficulties and a range of paternal mental health difficulties, specifically measured during the perinatal period.

The importance of a child's early years for their long-term outcomes has been consistently highlighted in the literature (e.g. Cuthbert, Rayns & Stanley, 2011). The preadolescent period has been specified in this instance to allow for the interpretation of child outcomes (to include the early years) outside of other influences, with research suggesting that children and their behaviours become more influenced by the peers and less by their parents during the adolescent period (Moretti & Peled, 2004). Understanding of perinatal mental health has also begun to include fathers in recent years with some large longitudinal studies focusing on mothers *and* fathers (e.g. ALSPAC, Golding, 2001). It therefore seems timely to conduct a review to explore if the impact of paternal mental health difficulties in the perinatal period may be associated with difficulties in their children during the preadolescent period.

Methodology

Scoping Exercise: Prior to conducting the literature search, a scoping exercise was completed to ensure that a current review focusing upon paternal mental health and preadolescent child outcomes had not recently been published. This included searching The Cochrane Library and the Centre for Reviews and Dissemination (DARE). No reviews were identified.

Search Strategy: Relevant articles were identified through (1) systematically searching electronic databases and (2) hand searching reference lists of the relevant articles obtained through the database search.

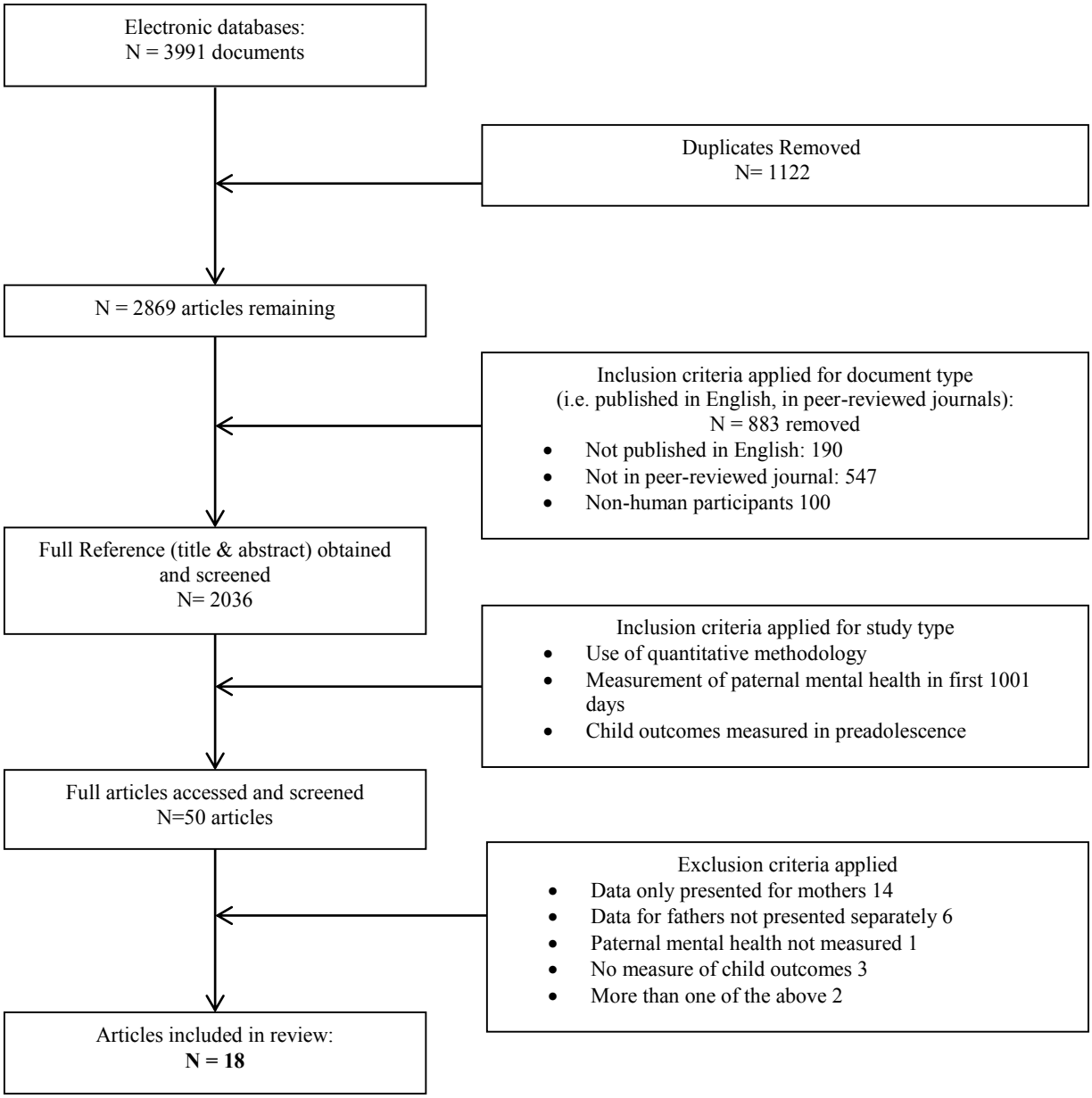
Electronic Database search

An electronic database search of *PsychINFO* (1967 to Feb week 1 2015), *Embase* (1974 to Feb 05 2015), *Medline* (1946 to Feb week 1 2015), *CINAHL* (1982 to Feb week 1 2015) and *Web of Science* (1946 to Feb week 1 2015) was undertaken on 6th February 2015 using the following search strategy:

A. A keyword search was conducted for paternal* **or** father* **or** parent*
B. A keyword search was conducted for pregnan* **or** postnatal **or** antenatal **or** perinatal
C. A keyword search was conducted for depression **or** mental health **or** mood
D. A keyword search was conducted for child* **or** toddler* **or** infant*
E. A keyword search was conducted for development* **or** behav* **or** psychopathology **or** cognition **or** outcome*

Search strategies A **and** B **and** C **and** D **and** E were combined and resulted in **3991** papers. See Figure 1 for a flow chart of the search strategy and the number of articles included and excluded at each stage.

Figure 1. *Schematic diagram of search strategy and articles obtained*



Duplicates were removed and relevant initial inclusion criteria relating to language, participant and journal type were applied (see table 1). Title and abstract information for the remaining 2036 articles were then screened against remaining inclusion criteria specific to the research question, leaving 50 articles which were screened in full-text form.

Hand searching reference lists

The reference lists of articles obtained in full text were searched for any further relevant articles not found in the database search. This resulted in 1 further paper (Lieb et al, 2002). However upon full-text inspection, it was found that this focused upon outcomes measured in adolescence and thus was excluded.

Criteria for inclusion into review: The full text articles generated by the above search strategy were reviewed against the following criteria:

Table 1: *Inclusion and exclusion criteria for the review*

Inclusion criteria	**Exclusion criteria**
Include if meets all of the following:	*Exclude if any one of the following satisfied*:
• Peer-reviewed journal article, published in English • Empirical study focusing upon the relationship between paternal mental health and child preadolescent outcomes • Use of quantitative questionnaire based methodology • Paternal mental health measured between conception and 2 years old (1001 Critical days, Leadsom, Field, Burstow & Lucas, 2013) • Child outcomes measured during preadolescence (age 0-12 years)	• If study includes both maternal and paternal mental health measurement, exclude if: • Data only presented for mothers. • Fathers' mental health data not presented separately from mothers'. • If paternal mental health not measured • If child outcomes have not been measured • More than one of the above

A total of **18** articles were included in the final review.

Data Extraction

Key details and characteristics of the 18 included studies were extracted based on the PRISMA guidelines (Moher et al, 2009). This data is presented below in Table 2. Although some data for mothers is given, only results relating to paternal mental health and preadolescent child outcomes are included, unless maternal mental health has been found to play an important role in this in a particular study.

Table 2: Data extraction for the 18 studies included in the review (in chronological order)

Study **Authors** **Country of Origin**	**Study Aims**	**Design**	**Sample** **Exclusion Criteria** **Attrition**	**Paternal Mental Health Assessment Measures** **Time Points**	**Child Assessment Measures** **Time Points**	**Key Findings**	**Limitations**
1. **Carro, M.G., Grant., K.E., Gotlib, I.H. & Compas, B.E (1993)** US	Maternal and paternal depression as predictors of later child behaviour difficulties (internalising and externalising problems)	Prospective Longitudinal	Mothers and Fathers (n=70) Attrition: NR	BDI (cut off >9) 1 month postpartum	CBCL Completed by mothers when children were between 2-3 years old (M=2.67 years, SD=0.47)	Paternal PND at one month postpartum predicted children's internalising and externalising problems at 2-3 years old.	Child outcomes rated by mothers only Small sample
2. **Dave, S., Nazareth, I., Sherr, L. & Senior, R (2005)** UK	Explore the association of infant fussiness with paternal mood and other contextual factors	Prospective Longitudinal	N=98 Fathers N=48 completed initial questionnaire N=19 followed up Attrition 39%	HADS (cut off >8) and EPDS (cut off >12) 4-6 weeks after birth	ICQ Other measures: Father-child interaction and father attitude	(N=4, 8% of men scored >8 on HADS and N=4, 8% scored >12 on EPDS) At 6 months: Paternal depression positively associated with infant fussiness 68% of the variance in infant fussiness was explained by paternal depression, lower affection in the couple relationship, traditional attitudes towards fathering and increased experience of major life events.	Small sample including a very small depressed sample (N=4) Infant Characteristic Questionnaire predominantly completed by mothers High attrition

3. **Ramchandani, P., Stein, A., Evans, J., O'Connor, T.G. and the ALSPAC Study Team (2005)** UK *ALSPAC Study*	Assess paternal postnatal depression and whether this has a relationship to child behavioural and emotional problems at 3.5 years.	Prospective Longitudinal	Fathers N=8431 Mothers N=11, 833 Children N= 10,024 Exclusion: None Attrition: NR	EPDS (>12) 8 weeks and 21 months after birth.	Rutter revised preschool scales Completed by mother at 3.5 years	Paternal depression at 8 weeks postnatal associated with child behavioural problems at 3.5 years and emotional, conduct and hyperactivity subscales (after controlling for social class, degree of education and maternal depression). After controlling for paternal depression at 21 months the total problems score was no longer significant. Association stronger in boys than girls.	Small number of fathers (N=303) identified as depressed Child outcomes rated by mothers
4. **Mantymaa, M., Puura, K., Luoma, I., Kaukonen, P., Salmelin, R.K. & Tamminen, T. (2008)** Finland	Examine the association between infant social withdrawal and parental mental health during infancy and preceding year.	Cross-sectional cohort study	Infants N=260 4 months old (N=74, 29%) 8 months old (N= 99, 38%) 18 months old (N=86, 33%)	At 4, 8 or 18 months EPDS (cut off >9/10 for fathers) Parents also asked about mental health in preceding year (either good, moderate or poor)	At 4, 8 or 18 months: ADBB (cut off >5 indicative of withdrawn behaviour) By GP	N=10 (4%) infants scored >5 on ADBB were defined as withdrawn. The proportion of withdrawn infants did not differ between age group or gender Only 5% (N=9) of fathers reported current depressive symptoms. N=206 (87%) defined their mental health as 'good' Fathers' perceived mental health defined as moderate or poor was related to infant social withdrawal. EPDS scores were not associated with infant social withdrawal.	Lower EPDS cut off (>9/10) used for fathers. N=59 paternal depression data (EPDS) missing. Small number of infants defined as withdrawn Interview bias regarding confounding variables

5. **Ramchandani, P., Stein, A., O'Connor, T., Heron, J., Murray, L. & Evans, J. (2008a)** UK *ALSPAC Study*	Association between postnatal paternal depression and children's psychiatric and psychological outcomes at age 7.	Prospective Longitudinal Population Cohort	Fathers N=10,975 Children= NR Data available for paternal mental health over all 4 time points N=4,792 (37.1%) Attrition (Fathers): 63% over the 4 time points	EPDS (>12) and CCEI (top 15%) at 18 weeks partner gestation, 8 weeks and 8 and 21 months postnatal	SDQ at 6 years (81 months) N=8401 And DAWBA at 7 years (91 months) Completed by mothers in 97% of cases	Depression in fathers at 8 weeks strongly associated with: Child psychiatric diagnosis at age 7. (Significant association with oppositional/conduct disorder, mediated by child behaviour problems at age 3). Association remained after controlling for postnatal maternal depression and father's education level Increased scores for less prosocial behaviours, hyperactivity, conduct problems, peer problems and total problem scores at age 6. Controlling for paternal depression at 21 months led to a small amount of reduction in the above associations.	Paternal depression not assessed at 7 years as confounding variable Child outcomes rated by mothers High attrition over the time points.
6. **Ramchandani, P.G., O'Connor, T.G., Evans, J., Heron, J., Murray, L. & Stein, A (2008b)** UK *ALSPAC Study*	To examine the potential effects of prenatal and postnatal depression in fathers on children's behavioral and psychological problems	Prospective Longitudinal	Fathers N=7601 completed questionnaires for both time points Attrition: NR	EPDS (>12) 18 weeks prenatal and 8 weeks postnatal	Rutter revised preschool scales (top 10% cut-off) Completed by mother at 3.5 years DAWBA at 7 years (91 months) Completed by mothers and teachers	Sample divided into 4 groups: no depression at any time point, prenatal depression only, postnatal depression only and depression at both time points Children with fathers in the three depression groups had high total problem scores on the Rutter scale (3.5 years) than those children whose fathers were not depressed Children of fathers depressed both prenatally and postnatally more likely to have higher scores (emotional, conduct and hyperactivity) than the non-depressed group. Children whose fathers were depressed at prenatal stage were more likely to score higher on Rutter emotional subscale than the non-depressed group.	Unclear the number of DAWBA completed by teachers Current level of paternal depression not assessed at 3.5 years or 7 years (as a confounding variable) Small number of fathers

						Children in the postnatal only group scored higher for conduct problems than the non-depression group. When controlling for confounding variables (pre and postnatal maternal depression, paternal education, marital status and other children in the family) only the differences found between prenatal depression and child total problem score and those scores for those whose father was depressed both pre and postnatally remained significant. For Boys: Increased total problem scores in all three depressed groups compared to the non-depressed group. Postnatal only group and depressed at both time points group had higher levels of conduct problems. Those only depressed at the prenatal point had higher scores on the emotional subscale. When analyses controlled for confounding factors the prenatal depression was no longer associated with high total scores, this was also the case for conduct problems. For Girls: Those exposed to prenatal depression and depression at both time points had higher total problem scores. A significant interaction was found for postnatal depression and child gender for conduct problems (p=.30) When analyses included psychiatric diagnosis at age 7 and confounding variables were controlled for the associations between paternal postnatal depression and conduct disorder was no longer significant.	(N=303) identified as depressed.

7. **Hanington, L., Ramchandani, P & Stein, A (2010)** UK *ALSPAC Study*	Whether parental depression predicts difficult child temperament and vice versa.	Prospective Longitudinal	Fathers N=7168 (time point 1) N=6170 (time point 2) Attrition: 13.9% Children (N given for the 4 variables) Minimum N= 10, 317 maximum N=10, 494 Attrition: 1.6%	EPDS (>12) 6-8 months postnatal and 21-24 months postnatal	CTSs at 6 months and 24 months of age Intensity and Mood subscales chosen for analysis	Paternal depression and child temperament results: Children whose fathers depressed at time point 1 had higher intensity and mood scores at time point 2. (Paternal mood was predictive of child temperament (p=0.003). These effects found to only be significant for male children and remained significant after controlling for child temperament at time 1 and paternal depression at time 2. Child temperament at time 1 did not predict paternal mood at time 2	Small number of fathers (N=212 at time point 1 and N=216 at time point 2) identified as depressed. Mothers completed CTSs Unclear the cut-off for CTSs (defined as 'higher scores')
8. **Pemberton, C.K., Neiderhiser, J.M., Leve, L.D., Natsuaki, M.N., Shaw, D.S., Reiss, D. & Ge, X. (2010)** US *EGDS*	Examine the genetic and environmental influences on toddler behavioural problems at 27 months.	Prospective Longitudinal	N= 351 linked sets of Adopted Children, Adoptive Mothers, Adoptive Fathers, Birth Mothers and Birth Fathers Attrition: NR	At 3-6 months (mean 4 months) and again at 18 months- **Biological Parents:** 20 item BDI, mental health and stress during the pregnancy. At 9 and 18 months birth	At 27 months (2.25 years) CBCL completed by adopted mothers and fathers (correlated at .40 (p<. 001) At 9 months adoptive parents	Adoptive father depressive symptoms when child was 9 months old were associated with child externalising behaviours and maternal depressive symptoms (Confounding variables paternal antisocial behaviour, child fussiness at 9 months, openness to the adoption process, birth mother age, adopted mother age, adopted father age, child sex, pregnancy risk, prenatal exposure to toxins and prenatal exposure to drugs) were controlled for during analysis. AF depressive symptoms at 18 months were predicted by antisocial behaviour.	BDI scores- means given rather than percentage that reached different thresholds. All means under 9 indicating minimal depression. Low participation for BF N=95

				parents completed Personality Diagnostic Questionnaire At 9, 18 and 27 months postpartum- **Adoptive Parents:** 20 item BDI Videotaped interactions and standardized tasks.	completed the ICQ. Child fussiness scores given by mothers and fathers were correlated at.6 months ($p<001$).		Adoptive families high socioeconomic status and education compared to wider society norms- differences in these factors between AF and BF.
9. **Hanington, L., Heron, J., Stein & Ramchandani (2011)** UK *ALSPAC Study*	To test the hypothesis that marital conflict mediates the relationship between postnatal parental depression and negative child outcomes	Prospective Longitudinal	**Fathers:** Antenatal conflict N=8,338 Postnatal Conflict N=6, 914 Attrition: 17% Antenatal depression Attrition: 36%	EPDS (>12) Marital conflict scale developed for ALSPAC study (one measure- top 10% identified most troubled relationships) at 18 weeks gestation and 8 months postnatally	Rutter revised preschool scales (top 10% cut-off) at 3. 5 years completed by mothers	Paternal postnatal depression predicted total child problems at 3.5 years. When postnatal marital conflict scores were included this reduced the significant by 25%. Marital conflict partially mediated this relationship (indirect effect) and was also found to independently predict negative child outcomes. Marital conflict scores increased postnatally.	Response lower for fathers than mothers Rutter measure completed by mothers High levels of attrition for paternal depression measure

10. **Ramchandani, P.G., Psychogiou, L., Vlachos, H., Iles, J., Sethna, V., Netsi, E. & Lodder, A. (2011)** UK	To examine the association between paternal depression and child and family functioning	Prospective Longitudinal	N=153 Fathers N=54 (depressed group) N=99 (non depressed group) Children N=NR Attrition: NR	Both parents: SCID at 3 months postnatal EPDS (>10) at 7 weeks postnatal	IBQ assessed at 3 months postnatal Assessed by both paternal and maternal report	12.7% of fathers scored >10 EPDS at 7 weeks postnatal. Fathers in depressed group: higher levels of relationship disharmony compared to non-depressed fathers and reported high levels of criticism (both towards and from partner) Few differences were found regarding infant temperament between the depressed and non-depressed group. Fathers defined as depressed reported more distress in their infants (significant for both boys and girls).	Difference in group numbers Only N=19 currently depressed at 3 months postpartum as defined by SCID and EPDS
11. **Fletcher, R.J., Feeman, E., Garfield, C. & Vimpani, G. (2011)** Australia *LSAC*	Examine the effects of early paternal depression on child wellbeing at 4-5 years of age.	Prospective Longitudinal	N=2620 Two-parent families where family still intact at 4 year follow-up Attrition: NR	Both parents: Kessler Psychological Distress Scale (>12 indicates clinically depressive symptoms)	At 4-5 years of age: SDQ completed by mothers in 98% cases Derived Outcome Indices developed for LSAC study	1.3% of fathers were defined as depressed. Maternal and paternal depression significantly correlated. Early paternal depression was associated with increased risk of high SDQ total difficulties score, after controlling for socioeconomic status, education and maternal depression. Early paternal depression was also found to be associated with lower DOI. After controlling for socioeconomic status, education and maternal depression, only the social/emotional subscale and overall score remained significant Associations for paternal depression were stronger for girls than boys.	Unclear when paternal depression assessed (states early paternal) Child outcome data assessed by mothers

12. **Mantymaa, M., Puura, K., Luoma, I., Latva, R., Salmelin, R & Tamminen, T. (2012)** Finland *EEPP*	To assess whether emotional and behavioural difficulties at age 2 persist until age 5. To examine child and parental factors that may influence these difficulties.	Prospective Longitudinal	N= 96 children who had data for 3 time points Mothers: N=165 at 4-11 weeks postpartum N for fathers= NR Attrition=NR	At 4-11 weeks postpartum and 2 years postpartum. SCID (paternal mental health- maternal report)	At 4-11 weeks postpartum ICQ (Maternal report) At 2 years old and 5 years old: CBCL (Maternal report) (T scores >60 reflecting internalising and externalising problems)	At 5 years old 12% had high internalising problems and 14% high externalising problems. 6% had both high internalising and externalising problems Father mental health problems at 2 years postpartum were associated with child internalising problems at the same time point. Fathers mental health was not associated with internalising factors at 5 years Father's mental health before and during pregnancy was associated with child externalising problems at 5 years. Internalising problems were also predicted by parenting stress at 2 years and family violence during 4-11 weeks postpartum.	Maternal report of paternal mental health Maternal report only of child temperament and behaviour Difference in socioeconomic status (over half requiring extra support) to other samples (difficulty with comparison) Mediation models not utilised
13. **Van Batenburg-Eddes, T., Brion, M.J., Henrichs, J., Jaddoe, V.W.V., Hofman, A., Verhulst, F.C.,**	Whether the relationship between maternal depression and anxiety and child attention problems can be explained by intrauterine factors	Prospective Longitudinal Cross Cohort	**ALSPAC** Children N=8,715 (data available for antenatal parental depression and anxiety) N=6, 555 had	**ALSPAC** EPDS (>12) and CCEI (top 15%) at 18 weeks pregnancy and 33 months postnatal	**ALSPAC** SDQ (abnormal category) at 4 years old (completed by mothers)	Only data for paternal depression and anxiety will be presented here: Analysis conducted on N=3, 442 children who complete parental data and relevant confounding data were available for when their child was 3 years old. Association between antenatal paternal anxiety and depression symptoms and child attention problems (but weaker than the association found for	Different measures used in each sample. (Reduces ability to compare findings). Attrition- not reported

Lawlor, D.A., Davey Smith, G. & Tiemeier, H. (2013) UK & Netherlands *ALSPAC Study & Generation R*			data on behavioural problems Data for postnatal parental depression and anxiety in N=4,019 children	**Generation R** BSI (depression and anxiety scale) at 20 weeks of pregnancy and when child 3 years old	**Generation R** Attention problems subscale of CBCL at 3 years old (Borderline cut off score 93rd percentile)	mothers). In ALSPAC sample paternal associations were largely accounted for by maternal depression and anxiety (other variables controlled for included age, gender, ethnicity of the child, education and age of the mother, family income, maternal smoking and alcohol use during pregnancy	
14. **Smith, H.R., Eryigit-Madzwamuse, S. & Barnes, J. (2013)** UK *Families, Children and Child Care Study*	Examine the relationship between paternal mental health and children's socio-emotional difficulties at the start of school (4.25 years old)	Prospective Longitudinal	N=705 fathers Attrition: 23%	At 3 months postpartum: Mothers and Fathers completed the EPDS (>12/13) Dyadic Adjustment Scale (to measure marital discord) At 36 months postpartum: GHQ	At 51 months postpartum: SDQ Completed by parents and teachers. Conduct problems, hyperactivity emotional symptoms and peer problems used to give a total difficulties score (0-40)	7.9% (N=43) of men scored above the EPDS cut-off at 3 months postpartum. Marital discord at 3 months was associated with child behavioural problems at 51 months. Marital discord at 3 months postpartum and paternal mental health problems at 36 months mediated the relationship between paternal postnatal mental health symptoms and child emotional and behaviour problems. No moderation effects were found for child gender.	Over representation of families from high SES High attrition rate at 51 months (23%)

15. **Kvalevaag, A.L., Ramchandani, P.G., Hove, O., Assmus, J., Eberhard-Gran, M. & Biringer, E. (2013)** Norway *MoBa*	Examine the association between psychological distress in expectant fathers and socio-emotional and behavioural outcomes in their children at 36 months of age.	Prospective Longitudinal Population Cohort	Fathers N=31, 663 Pregnancies N=31, 172 Which resulted in N=31 663 children at 36 months Attrition: NR	At 17 or 18 weeks of gestation: SCL-5 (Cut off >2.00) N=31, 458 fathers with valid SCL-5 scores.	At 36 months of age: SDQ ITSEA CBCL 3 summary scales to represent behavioural difficulties, emotional difficulties and social functioning.	3% of fathers had high levels of psychological distress as measured by >2.00 of SCL-5. A positive association was found between fathers' psychological distress and behavioural and emotional difficulties at 36 months of age. Results remained unchanged after adjusting for father's age, education, marital status, somatic conditions, use of alcohol, cigarette smoking, physical activity and maternal mental health. No gender effects were found.	Operalization of children's socio-emotional and behavioural outcome measures. Possible difficulties comparing to other results. (Although reasonable Cronbach Alpha .65, .62 and .72)
16. **Luoma, I., Puura, K., Mantymaa, M., Latva, R., Salmelin, R. & Tamminen, T. (2013)** Finland *EEPP*	Explore the paternal, maternal, infant and family factors associated with paternal depression and anxiety during their child's first two years.	Cross sectional	N=194 Father-mother and infant dyads. Attrition: NR	EPDS (Cut-off >5/6 for fathers and 7/8 mothers) (Completed by both mother and father)	At 4, 8 or 18 months: ADBB (cut off >5 indicative of withdrawn behaviour)	N=41 (21%) of fathers scored at the 4/5 cut off for EPDS Paternal mental health was predicted by father's perceiving their mental health being moderate or poor, difficulties in the marital relationship, smoking and mother's moderate or high levels of anxiety and depression. No statistically significant associations found between paternal mental health and infant outcomes (withdrawn behaviour).	Low EPDS cut-off (Reduced ability to compare to other research results) Only two fathers (1%) cored above the conventional EPDS cut off scores (>10)

17. **Kvalevaag, A.L., Ramchandani, P.G., Hove, O., Assmus, J., Eberhard-Gran, M. Assmus, J., Haavik, O.E., Sivertsen B & Biringer, E. (2014)** Norway *MoBa*	To examine the association between paternal mental health and physically aggressive behaviour in children.	Prospective Longitudinal Population Cohort	N=19, 580 father-child dyads Attrition: NR	Both mothers and fathers: At 17 or 18 weeks of gestation: SCL-5 (Cut off >2.00) N=20,002 fathers N=20, 155 Mothers	At 18 months, 3 years and 5 years of age: CBCL Completed by mothers Two items from the ASQ to describe expressive and impressive skills	At 5 years of age 16% of the children were hitting. The rate of hitting in boys was significantly higher at 18 months and 3 years but not at 5 years of age. Higher levels of paternal psychological distress were predictive of higher risk of child hitting behaviour at 5 years of age. After controlling for confounding variables a significant risk for hitting was only found for 5 year old girls. Adjustment for father's marital satisfaction led to an attenuation of the risk that high levels of psychological distress had upon children hitting others at 5 years. Adjustment for children's language skills led to an increase risk for hitting others.	CBCL completed by mothers Low participation rate (39%)
18. **Parfitt, Y., Pike, A. & Ayers, S. (2014)** UK Sussex Journey to Parenthood Study	Examine the associations between parental mental health, the couple's relationship, parent-infant relationship and infant characteristics on infant cognitive, language or motor development.	Prospective Longitudinal	N=42 families Attrition: NR	Birmingham Interview for Maternal Mental Health at 5 months postpartum	Parent-infant interaction at 3 months postpartum. Assessed via CARE-Index procedure At 16-20 months old Child development assessment – cognitive, language and motor development	No significant associations were found between child developmental outcomes (cognitive, language or motor development) and maternal or paternal postnatal depression. Parental perception of infant temperament and sleep disturbance predicted child outcomes.	Results based on parental perception of parent-infant relationship (which may be affected by mental health) Small sample-limited statistical power and increase risk of Type II errors.

					(Bayley Scale of Infant Development III)		

Cohort name: *ALSPAC* Avon Longitudinal Study of Parents and Children, *EEPP* European Early Promotion Project, *EGDS* Early Growth and Development Study, *LSAC* Longitudinal Study of Australian Children, *MoBa* The Norwegian Mother and Child Cohort Study.

Outcome measures: ADBB= Baby Alarm Distress Scale, ASQ= Ages and Stages Questionnaire, BDI= Beck Depression Inventory, BSI= Brief Symptom Inventory, CBCL= Child Behaviour Check-list, CCEI= Crown Crisp Experiential Index, CTSs=Carey Temperament Scales, DAWBA= Development and Well-Being Assessment, EPDS= Edinburgh Postnatal Depression Scale, HADS= Hospital Anxiety and Depression Scale, IBQ= Infant Behavior Questionnaire-Revised, ICQ= The Infant Characteristic Questionnaire, ITSEA= The Infant and Toddler Social and Emotional Assessment, SCID= Structured Clinical Interview for DSM Disorders, SCL-5= The Hopkins Symptom Checklist, SDQ= Strengths and Difficulties Questionnaire.

Quality Assessment

The quality of each study was assessed using a reduced version of an item checklist (Tooth, Ware, Bain, Purdie & Dobson, 2005) designed to assess the quality of reporting of observational longitudinal research (Table 3 provides details of the variables rated). Each category and paper were then assigned a rating of weak, moderate or strong, regarding to which extent the recommendations were met (Table 4). The ratings given to each paper and their relative strengths and weaknesses are described in the results section. Other quality frameworks (such as those developed by Kmet, Lee & Cook, 2004) do not take into account specific issues associated with longitudinal research design such as details regarding sample numbers at each follow-up stage and whether missing data is accounted for within analysis. Although there is currently limited data available regarding the reliability of the Tooth et al (2005) guidelines, they were considered to offer the best available assessment of quality given the longitudinal nature of the majority of the included studies.

Furthermore, in order to reduce the subjectivity of the quality assessment and increase inter-rater reliability, two (11%) papers were assessed for quality by a second rater. Inter-rater agreement was high and any discrepancies discussed.

Table 3: *Variables rated for methodological quality using a sub-group of the Tooth et al (2005) criteria for reporting observational longitudinal research*

Category	Criteria	Definition
Sampling	Is the target population defined?	The group of persons toward whom inferences are directed- sometimes a population from which the sample is drawn.
	Is the study population defined?	The group selected for investigation
	Are eligibility criteria stated?	The words 'eligibility criteria' or equivalent are needed, unless the entire population is the study population.
	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.
	Was the number of participants at each stage/wave stated?	Quantitative statement of numbers at each follow-up point.
Measurement	Were methods of data collection stated?	Description of tools (e.g. surveys, physical examinations) and processes (e.g. face to face etc.)
	Was the reliability (repeatability) of the questionnaires utilised mentioned?	Evidence of the reproducibility of the tools used.
	Was the validity (against a gold standard) of the questionnaires utilised mentioned?	Evidence that the validity was examined against, or discussed, in relation to a gold standard.
Confounding Variables	Were any confounding variables 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.
Analysis	Were confounders accounted for in the analysis?	Specific mention of adjusting for or stratifying by confounders.
	Were missing data accounted for in the analysis	Specific mention of adjusting for or stratifying by, or imputation of missing data items.
External/Internal Validity	Was the impact of bias assessed and estimated?	Specific mention of bias affecting the results, including numerical magnitude of bias.

Table 4: *Ratings of methodological quality assessed using Tooth et al (2005) criteria for reporting observational longitudinal research*

Study	Sampling	Measurement	Confounding Variables	Analysis	External/Internal Validity	Overall Rating
Carro et al (1993)	Moderate	Strong	Strong	Moderate	Moderate	Strong
Dave et al (2005)	Strong	Moderate	Strong	Moderate	Weak	Moderate
Ramchandani et al (2005)	Moderate	Moderate	Strong	Moderate	Moderate	Moderate
Mantymaa et al (2008)	Weak	Strong	Strong	Moderate	Weak	Weak
Ramchandani et al (2008a)	Moderate	Moderate	Strong	Strong	Moderate	Strong
Ramchandani et al (2008b)	Strong	Moderate	Strong	Moderate	Strong	Strong
Hanington et al (2010)	Strong	Moderate	Weak	Weak	Moderate	Weak
Pemberton et al (2010)	Strong	Strong	Strong	Moderate	Strong	Strong
Hanington et al (2011)	Strong	Moderate	Moderate	Moderate	Moderate	Moderate
Ramchandani et al (2011)	Strong	Strong	Strong	Moderate	Strong	Strong

Fletcher et al (2011)	Moderate	Strong	Strong	Strong	Moderate	Strong
Mantymaa et al (2012)	Moderate	Strong	Weak	Weak	Moderate	Weak
Van Batenburg-Eddes (2013)	Strong	Strong	Moderate	Moderate	Moderate	Strong
Smith et al (2013)	Moderate	Moderate	Moderate	Strong	Moderate	Strong
Kvalevaag et al (2013)	Strong	Strong	Strong	Moderate	Moderate	Strong
Luoma et al (2013)	Moderate	Strong	Strong	Moderate	Moderate	Strong
Kvalevaag et al (2014)	Strong	Strong	Moderate	Moderate	Moderate	Strong
Parfitt et al (2014)	Strong	Strong	Strong	Strong	Moderate	Strong

Category ratings: Strong= Criteria fully met.
Moderate= Criteria partly met
Weak= Criteria deemed to not be met.

Overall ratings: Strong= All criteria in that category met or partially met (no weak ratings)
Moderate= At least one criteria partly met (some criteria defined as moderate or one weak)
Weak= Two or more criteria not deemed to be met (two or more defined as weak)

Results

Overview of studies

Eighteen studies were included in the review with a sample consisting of thirteen cohorts across six countries (Australia, Finland, Netherlands, Norway, US and UK). Six papers were presented from the Avon Longitudinal Study of Parents and Children (ALSPAC) study, two from the Norwegian Mother and Baby (MoBa) study and two from the European Early Promotion Project (EEPP), with the remaining 8 papers presenting singular studies. Several studies explored more than one child outcome, with some presenting additional data to answer different research questions at different time points (e.g. ALSPAC study) thus warranting their inclusion into the review.

Description of Studies

Sample Size

The sample at baseline comprised of 49,923 fathers and 45,596 children. The 18 studies varied in the sample information given, with ten only reporting the sample size for fathers, three providing no information regarding the number of fathers within their sample and others stating the number of families (e.g. Parfitt et al, 2014; Fletcher et al, 2011) or father-child dyads (e.g. Kvalevaag et al, 2014) Therefore, the total sample size is an estimation based on this limited data. The sample of fathers participating in the six ALSPAC papers ranged from 11,198 to 7,601, with the number of children ranging from 10,494 to 8,715. In these cases the highest number was used to calculate the above sample sizes. The individual sample sizes for the 18 studies ranged from 48 to 11,198 fathers (mean=5,623) and 96 to 10,494 children (mean=5,295). Where the relevant information was given, attrition

rates were calculated. Where there were several follow-up points, it was calculated between these points and for different measures where possible. Broad attrition across time points were reported in 5 of the 18 studies and ranged from 1.6% (Hanington et al, 2010) to 63% (Ramchandani et al, 2008a). The differences in attrition rates appear to reflect the length of time children were followed-up, with Hanington et al (2010) following children until 24 months of age and Ramchandani et al (2008a) over a 7-year period.

Participants

Fathers

Age and demographic information

Fourteen of the eighteen studies provided some demographic information (such as paternal age, ethnicity and education level). However, much of this was not sufficiently detailed and only seven studies provided the mean for paternal age in their samples, the mean of this being 33.5 years old. The ALSPAC cohort (consisting of six reviewed papers) is described as being of mostly white ethnicity and in skilled professions, indicating a relatively high socioeconomic status group. This was similar for the sample described by Smith et al (2013), with around 80% of fathers being white and at least one parent holding a professional/ managerial role in 60.6% of the sample. Other studies also gave paternal education level (e.g. Carro et al, 1993; Luoma et al, 2013 and Kvalevaag et al, 2014) but not with sufficient detail to help clearly define the demographics of the sample.

Children

Age and Gender

Only one of the eighteen reviewed studies specifically stipulated the mean age of the children within the sample at the time of recruitment (Parfit et al, 2014), which was reported as 17.17 months (SD 0.73). However, child age was somewhat indicated by the follow up points within each study, ranging from four to eleven weeks postpartum (Mantymaa et al, 2012) to seven years of age (e.g. Ramchandani et al, 2008a; Ramchandani et al, 2008b) In terms of gender, five studies (Mantymaa et al, 2012 Ramchandani et al, 2011; Pemberton et al, 2010; Mantymaa et al, 2008) described this and cited near equal gender splits. Although specific details regarding the gender and age of children were not reported in each of the six ALSPAC studies, the wider child sample at one year postpartum was reported to constitute 51.7% males and 48.3% females (Golding et al, 2001).

Assessment Tools

Parental

All 18 studies included at least one measure to assess paternal mental health. Postnatal depression was most commonly assessed but prenatal depression, pre and postnatal anxiety and 'psychological distress' were also measured in a small number of studies.

Paternal mental health was assessed using self-report measures in the majority of studies. The most frequently used measure, The Edinburgh Postnatal Depression Scale (EPDS, Cox, Holden & Sagovsky, 1987) was utilised in 10 studies. Most (N= 6) used a cut off score of 12 to define depression (the generally accepted cut-off for a good level of

sensitivity and specificity, Murray & Carothers, 1990). Others used scores ranging from 5/6 (Luoma et al 2013) to 12/13 (Smith et al, 2013). Further studies utilised more general or combined measures of mental health (e.g. Brief Symptom Inventory, van Batenburg et al, 2013; General Health Questionnaire, Smith et al, 2013) and psychological distress (e.g. The Hopkins Symptom Checklist, Kvalevaag et al, 2014).

Paternal mental health was assessed by mental health professionals in three of the studies reviewed. The Structured Clinical Interview for DSM Disorders (SCID) being used by Ramchandani et al (2011) and Mantymaa et al (2012) and the Birmingham Interview for Maternal Mental Health used by Parfitt et al (2014). Paternal mental health was assessed via mothers using the SCID in Mantymaa et al (2012).

As well as assessing paternal mental health, some studies also assessed for other potentially confounding variables. These included past history of depression (Ramchandani et al, 2008), maternal mental health (Carro et al, 1993, Van Batenburg-Eddes et al, 2013, Ramchandani et al, 2011, Mantymaa et al, 2012, 2008, Luoma et al, 2013), marital status (Luoma et al, 2013) marital/ relationship satisfaction or dynamics (Carro et al, 1993; Dave et al, 2005; Mantymaa et al, 2008; Luoma et al, 2013), family violence (Mantymaa et al, 2012, 2008; Luoma et al, 2013) paternal age (Ramchandani et al 2008), whether father was living with their child (Kvalevaag et al, 2014), paternal alcohol/ substance use (Dave et al, 2005; Mantymaa et al, 2008; Ramchandani et al, 2011; Luoma et al, 2013), perceived stress and social support (Carro et al, 1993), stressful life events (Dave et al, 2005), parenting stress (Mantymaa et al, 2012) socioeconomic status (Mantymaa et al, 2012) and perceived criticism of partner and partner on self (Ramchandani et al, 2011). A measure of crowding in the family home and the number of other children at the time of the child's birth was also collected by

Ramchandani et al (2008a). See table 5 for full details of the assessments used to measure paternal mental health across the 18 studies.

Table 5: Description of the assessments used to measure paternal mental health in the 18 studies

Study	BDI	Birmingham International Maternal Mental Health Assessment	BSI	CCEI	EPDS					GHQ	HADS	Kessler Psychological Distress Scale	SCID	SL-5
					Cut-off >5/6	Cut-off >9/10	Cut-off >10	Cut-off >12	Cut-off >12/13					
Carro et al (1993)	✓													
Dave et al (2005)											✓			
Ramchandani et al (2005)								✓						
Mantymaa et al (2008)						✓								
Ramchandani et al (2008a)				✓				✓						
Ramchandani et al (2008b)								✓						
Hanington et al (2010)								✓						
Pemberton et al (2010)	✓													
Hanington et al (2011)								✓						

Ramchandani et al (2011)							✓						✓	
Fletcher et al (2011)												✓		
Mantymaa et al (2012)														
Van Batenburg-Eddes et al (2013)			✓	✓				✓						
Smith et al (2013)									✓	✓				
Kvalevaag et al (2013)														✓
Luoma et al (2013)					✓									
Kvalevaag et al (2014)														✓
Parfitt et al (2014)		✓												

Paternal Mental Health Measures BDI= Beck Depression Inventory, BSI= Brief Symptom Inventory, CCEI= Crown Crisp Experiential Index, EPDS= Edinburgh Postnatal Depression Scale, GHQ= General Health Questionnaire, HADS= Hospital Anxiety and Depression Scale, SCID= Structured Clinical Interview for DSM Disorders, SL-5=The Hopkins Symptom Checklist.

Child Assessment Measures

All reviewed studies included an assessment of child outcome, with thirteen measures employed across the eighteen studies. The Child Behaviour Checklist (CBCL) and the Strengths and Difficulties Questionnaire (SDQ) were the most utilised measures, being employed in six and four studies respectively. The CBCL measured externalising and internalising difficulties and the SDQ assessed child difficulties across four areas: emotional, conduct, hyperactivity and peer problems. It also includes a measure of prosocial behaviour. Scores on the initial four scales can be calculated to give a 'total problems' score. One study (Kvalevaag, 2013) created three summary scales (behavioural difficulties, emotional difficulties and social functioning) using five items from the SDQ, 26 items from the Infant-Toddler Social and Emotional Assessment (ITSEA) and 44 items from the CBCL, with scores above the 90th percentile indicating emotional and behavioural difficulties. Other tools measured parent-infant interaction, child temperament, socio-emotional and behavioural difficulties. See table 6 for full details of the child assessment measures used across the 18 studies.

Child assessments were predominantly completed by mothers across the included studies, with the exception of seven studies, including Ramchandani et al (2008b) where assessment was also conducted by the child's teacher and Ramchandani et al (2011) where fathers also completed the Infant Behavior Questionnaire (IBQ). Further studies include, Mantymaa et al (2008) and Luoma et al (2013), where the measure of child social withdrawal was completed by the GP, Pemberton et al (2010) where mothers and fathers *both* completed the outcome measures and Smith et al (2013) where both parents and the child's teacher also completed the SDQ. Both mothers and fathers were also assessed for their parent-infant interaction in Parfitt et al (2014).

Apart from specific measures to assess for child outcomes, little additional data were collected regarding child participants. However, details regarding the children's physical health were collected by Mantymaa et al (2012).

Timing of parental mental health assessment

The timing of parental mental health assessment varied across the eighteen studies, depending upon the research question under exploration. Paternal mental health was assessed during their partner's pregnancy in five papers (Ramchandani et al, 2008a, 2008b; Hanington et al, 2011; van Batenburg- Eddes, 2013 and Kvalevaag et al, 2013, 2014), with four relating to the ALSPAC cohort and one MoBa cohort. Paternal mental health assessment in the postnatal period was particularly varied, ranging from 4 weeks (e.g. Mantymaa et al, 2012; Carro et al, 1993) to 36 months postpartum (Smith et al, 2013) with some conducting multiple assessments across these times. For example Hanington et al (2010) measured paternal mental health at 6-8 months and 21-24 months postpartum. However, most paternal mental health assessments were conducted within 6 months of the postnatal period. Two papers utilising a cross-sectional design (Mantymaa et al, 2008; Luoma et al, 2013) assessed paternal mental health at either 4, 8 or 18 months postpartum, depending upon timing of recruitment.

Table 6: Description of the child outcomes assessments used in each of the 18 included studies.

Study	ADBB	ASQ-I	Bayley Scale	Care Index	CBCL	CTSS	DAWBA	IBQ-R	ICQ	ITSEA	Rutter preschool scales	SDQ	SDQ/ITSEA/CBL (Amalgamated)
Carro et al (1993)					✓								
Dave et al (2005)									✓				
Ramchandani et al (2005)											✓		
Mantymaa et al (2008)	✓												
Ramchandani et al (2008a)							✓					✓	
Ramchandani et al (2008b)							✓				✓		
Hanington et al (2010)						✓							
Pemberton et al (2010)					✓				✓				
Hanington et al (2011)											✓		
Ramchandani et al (2011)								✓					

Study	ADBB	ASQ-I	Bayley Scale	Care Index	CBCL	CTSS	DAWBA	IBQ-R	ICQ	ITSEA	Rutter preschool scales	SDQ	SDQ/ITSEA/CBL (Amalgamated)
Fletcher et al (2011)												✓	
Mantymaa et al (2012)					✓				✓				
Van Batenburg-Eddes (2013)					✓							✓	
Smith et al (2013)												✓	
Kvalevaag et al (2013)													✓
Luoma et al (2013)	✓												
Kvalevaag et al (2014)		✓			✓								
Parfitt et al (2014)			✓	✓									

Child Outcome measures: ADBB= Baby Alarm Distress Scale, ASQ= Ages and Stages Questionnaire, CBCL= Child Behaviour Check-list, CTSs=Carey Temperament Scales, DAWBA= Development and Well-Being Assessment, IBQ= Infant Behavior Questionnaire-Revised, ICQ= The Infant Characteristic Questionnaire, ITSEA= The Infant and Toddler Social and Emotional Assessment, SDQ= Strengths and Difficulties Questionnaire.

Length of follow-up

The length of follow up regarding child outcomes varied considerably. Some larger longitudinal cohort studies, such as the ALSPAC study, assessed children up to five times between 6 months and 7 years. Similarly the children within the MoBa cohort were followed up at 18 months, 3 years and 5 years respectively. As with other variables, the length of follow-up related to the research aims, with studies focusing upon child temperament (e.g. Parfitt et al, 2014; Hanington et al, 2010 and Dave et al, 2005) generally completing the follow up within 6 months postpartum. Included studies with longer follow-up periods were more often measuring outcomes relating to internalising and externalising difficulties and the trajectory of these difficulties over time (e.g. Smith et al, 2013 and Ramchandani et al, 2008a).

Study Design and Quality

Sixteen of the eighteen included papers utilised a prospective longitudinal design, (Parfitt et al, 2014; Kvalevaag et al, 2014, 2013; Smith et al, 2013, Kvalevaag et al, 2013; van Batenburg-Eddes, 2013; Mantymaa et al, 2012; Pemberton et al, 2010; Fletcher et al, 2011; Ramchandani et al, 2011; Hanington et al, 2011; Ramchandani et al, 2008a, 2008b; Ramchandani et al, 2005; Dave et al, 2005 and Carro et al, 1993). These cohorts were followed over a period of time, with specific variables of interest being measured at intermittent time points, attempting to understanding how these may relate to certain outcomes. In the current review, the potential relationship between paternal mental health during the perinatal period and preadolescent child outcomes were under investigation and assessed across time. The final two papers (Mantymaa et al, 2008; Luoma et al, 2013) utilised

a cross-sectional design, where both paternal mental health and child outcomes were measured at a single time point.

Using the Tooth et al (2005) criteria, the majority of the studies were defined as strong (N=12), with three studies being found to be of moderate quality and three being defined as weak. The proportion of studies being defined as strong increases the reliability of the results found within this review. Weaker aspects of study design related to a lack of commentary on the numerical impact of bias and missing data not always being accounted for within the analysis. However, these studies were included due to the limited number of publications in the area under review.

Study Outcomes

Paternal mental health prevalence

The percentage of fathers meeting the criteria for specific mental health difficulties was detailed in thirteen of the eighteen reviewed studies. Prenatal depression (as rated by the EPDS >12) prevalence rates all came from the ALSPAC cohort, ranging from 2.3% (Ramchandani et al, 2008) to 4% (Hanington et al, 2011). Postnatal depression prevalence rates (as rated by EPDS) illustrated greater variation across the 13 studies. The ALSPAC cohort samples had prevalence rates consistent to their prenatal scores, between 2.2% (Ramchandani et al, 2008) and 4% (Ramchandani et al, 2005). Studies with smaller sample sizes had higher prevalence rates of postnatal depression, with Carro et al (1993) citing a prevalence rate of 10% (N=7) and Dave et al (2005) citing 8% (N=4). Furthermore, as expected, those studies that employed a lower cut-off score to classify depression (e.g. Luoma

et al, 2013), found higher rates of depression in fathers with 21% (N=41) defined as depressed using a cut off score of 4/5 on the EPDS.

Preadolescent Child Outcomes

Child outcomes were split into groups (internalising, externalising and cognitive difficulties), defined in a recent review focusing upon maternal postnatal depression and adolescent offspring outcomes (Sanger, Iles, Andrew & Ramchandani, 2015). Other groupings were added that were considered pertinent to the developmental stage in question (e.g. child temperament and socio-emotional difficulties).

Child Temperament

Five studies explored the relationship between paternal mental health and child temperament. Measures of child temperament include ratings of infant withdrawal and 'fussiness'. A small prospective longitudinal study (Dave et al, 2005) found that paternal depression was positively associated with infant 'fussiness' at 6 months of age. More traditional attitudes towards fathering, increased experience of major life events and low couple affection scores were important factors in understanding the relationship. However, this was based on a very small sample of depressed fathers (N=4) and thus should be considered with extreme caution. A larger population-based cohort (Hanington et al, 2010) comprising part of the ALSPAC study, assessed child temperament in infants at 6 months and 24 months, using the intensity and mood subscales of the Carey Temperament Scales (CTS, Carey, 1978) and assessed paternal mood at the same time points using the EPDS. Hanington et al (2010) found that fathers who were depressed (>12 on the EPDS) at 6-8 months had infants with higher intensity and mood scores at 24 months of age. This relationship was only

significant for male infants but remained significant after controlling for infant temperament at 6 months and paternal depression scores at 24 months. Child temperament did not predict paternal depression scores at two years postpartum, concluding that infant temperament did not influence the development of paternal depression in this sample. These findings were based on a comparatively small number of depressed fathers (N=212/ 7168, equating to 2.9%) and was deemed a 'weak study' by the author, due to its lack of inclusion of confounding variables (e.g. paternal demographics) and the lack of accounting for missing data within their analysis. Another UK study, Ramchandani et al (2011) found few differences regarding infant temperament (as measured at 3 months by the Infant Behavior Questionnaire (IBQ, Garstein & Rothbart, 2003) and paternal depression in the postnatal period (EPDS at 7 weeks and SCID at 3 months). Fathers defined as depressed reported more perceived distress in their infants. A limitation of the study includes the difference in number between the non-depressed group (n=99) and the depressed group (n=54). However, both mothers and fathers completed the IBQ to assess for child temperament, where most other studies of this type rely on maternal report only. Two cross-sectional studies (Mantymaa et al, 2008 & Luoma et al, 2013) attempted to examine the association between infant social withdrawal at 4, 8 or 18 months and parental mental health during infancy. Social withdrawal was measured using the Baby Alarm Distress Scale (Guedeney & Fermanian, 2001) at well-baby clinics. Like Ramchandani et al (2011), depressed mood was not associated with infant social withdrawal. However, both Mantymaa et al (2008) and Luoma et al (2013) utilised a lower EPDS cut off of >9/10 and >5/6 respectively, reducing the ability to compare their results with other studies. Previous research has suggested that a cut-off of greater than 10 to be used when screening depression in fathers using the EPDS (Edmonson, Psychogiou, Vlachos, Netsi & Ramchandani, 2010), significantly higher than the score used by Luoma et a (2013), thus

leading them to suggest that 21% of the fathers in their sample may be depressed. The paternal mental health data reported by Luoma et al (2013) was also unclear, with the number of fathers at baseline not being reported, but it cited that paternal EPDS data was missing in 59 cases. Furthermore, 87% of fathers defined their mental health in the proceeding year as 'good', with infant social withdrawal (N=10, 4% defined as 'withdrawn') found to be associated with fathers perceiving their own mental health to be moderate or poor (Mantymaa et al, 2008).

In summary, there is inconsistent evidence for a relationship between paternal mental health during the perinatal period and child temperament. The reliability of the conclusions described by the five studies are mitigated due to different cut-off scores to describe possible depression, and missing data not being accounted for within the analysis.

Internalising Problems

Six studies included data regarding the relationship between paternal mental health and child internalising problems, referring to all assessment ratings or diagnoses related to depression and/or anxiety disorders, somatic complaints, and experiences of fear or loneliness. An early US study (Carro et al, 1993) of 70 fathers, found that paternal depression at 1 month postpartum predicted internalising behaviours as measured by the CBCL in children of 2-3 years of age. Later studies (such as ALSPAC) utilised the Rutter preschool scales (Elander & Rutter, 1996) in some papers, specifically the emotional subscale to measure child internalising difficulties at 3.5 years. Ramchandani et al (2005) found that paternal depression at 8 weeks postpartum, was related to emotional difficulties in children 3.5 years of age (after controlling for social class, degree of education and maternal

depression) with children with fathers depressed in both pregnancy and the postnatal period, having higher levels of emotional problems than children whose fathers who were defined as not depressed in either period (Ramchandani et al, 2008b). A study of 31, 663 Norwegian children and their fathers (Kvalevaag et al, 2013) had similar findings, suggesting a positive association between paternal psychological distress (as measured by The Hopkins Symptom Checklist, SCL-5, Tambs & Mourn, 1993) and child emotional and behavioural difficulties at 3 years (after controlling for father age, education, marital status, somatic conditions, use of alcohol/cigarettes, physical and mental health and maternal mental health). Although moderate to good (α= .65, .62 and .72) reliability coefficients were found for the three summary scales from SDQ, ITSEA and CBCL used to measure child emotional and behavioural difficulties by Kvalevaag et al (2013), the specific nature of the scale makes it difficult to compare these results to that of other studies. It is noteworthy that three of the four aforementioned studies were defined as being 'strong' and the remaining one (Ramchandani et al, 2005) as being of moderate quality, suggesting a high level of methodology and clear reporting, increasing the reliability of conclusions.

Positive associations were found between early paternal depression and social and emotional difficulties at 4-5 years (as measured by the SDQ and DOI) in a sample of 2620 families (Fletcher et al, 2011). These findings remained significant after controlling for socioeconomic status, education and maternal depression. A Finnish study (Mantymaa et al, 2012) found that although paternal mental health and child internalising problems were associated at 2 years of age, this association became non-significant by the time the child turned 5. Parental stress (at 2 years postpartum) and violence within the family in the early postnatal period were also found to be important factors in predicting internalising problems in young infants. However, this study was defined as 'weak' by the author due to confounding

variables (such as family violence and parenting stress) not being controlled for during the analysis, but instead analysed separately to explore if they predicted internalising difficulties individually, somewhat limiting the strength of their conclusions.

In summary, a fairly consistent relationship was found between paternal mental health difficulties and child internalising difficulties up to the age of four to five years.

Externalising Problems

Eight studies described data regarding the relationship between paternal mental health and child externalising difficulties. These difficulties are defined as being related to all measures of aggression, conduct disorder (CD) and oppositional defiant disorder (ODD) (Sanger et al, 2015). Many reviewed studies did not specify behaviours, instead utilising the generic term 'externalising', with this being the case in an early US study by Carro et al (1993). This study found that paternal postnatal depression at 1-month postpartum predicted child externalising behaviours at 2-3 years old as measured by the CBCL. Another US study explored relationships between adoptive paternal mental health at 9 months postpartum and adoptive child externalising behaviours at 2 years, also finding positive associations between these variables (Pemberton et al, 2010). The potential relationship between paternal mental health and child externalising behaviours were also measured within the ALSPAC cohort (Ramchandani et al, 2005; 2008a, 2008b; Hanington, 2011) using the Rutter revised preschool scales at 3.5 years, the SDQ at 6 years and Developmental and Well-Being Assessment (DAWBA) at 7 years. Associations were found between paternal mental health (N=4,792 as measured by the EPDS) at 8 weeks and child behavioural problems at 3.5 years (which remained significant after controlling for social class, education and maternal depression), with a stronger association for boys. Significant associations were also found for ODD and

CD at age 7, predicted by hyperactivity, difficulties with peers and less prosocial behaviours at age 6 (after controlling for maternal depression) (Ramchandani et al, 2008a). Strengths of these studies include large sample sizes, the inclusion of a range of confounding variables which were controlled for during analysis (apart from Hanington et al, 2011 as already described) and the use of well-validated and reliable measures. Furthermore, studies (e.g. Ramchandani et al, 2008b) where fathers were compared if they met the EPDS cut-off screen for depression (>12) or not, found that externalising problems such as conduct and hyperactivity in children, were higher if fathers were depressed both prenatally and postnatally, than fathers of children defined as not depressed.

Differences between groups for conduct problems differed depending upon the scores used. Using the top 10% of scores to define clinically problematic behaviours yielded no differences between the groups. When continuous scores were utilised, differences *were* found, with children of fathers with postnatal depression scoring higher than those with non-depressed fathers. However, when controlling for confounding variables, (maternal depression, paternal education, marital status, psychiatric diagnosis at age 7 and presence of siblings), these findings were no longer significant, suggesting that other factors may provide explanations for this relationship. Despite this, a small significant interaction (p= .30) was found between postnatal depression, child gender and conduct problems. It is important to note however, as with other reviewed studies (e.g. Ramchandani et al, 2005) the relative proportion of fathers defined as depressed was low (303/8431, equating to 3.5%) and measures of child outcome were rated only by mothers in the majority of cases.

The Norwegian Mother and Child Cohort Study (MoBa) explored the relationship specifically between paternal psychological distress during pregnancy (as measured by SCL-5) and child hitting behaviours in the early years in 19,580 father-child dyads. Their results

indicated that at 5 years, 16% of the children were exhibiting hitting behaviours, with boys hitting significantly more at 18 months and 3 years but not at 5 years of age. Higher levels of paternal psychological distress predicted child-hitting behaviours at 5 years. However after controlling for a range of relevant confounding variables (paternal age, education, health, marital status, whether living with the child, any siblings and lifestyle type variables including alcohol and cigarette use, maternal mental health, paternal marital satisfaction and children's language competency at 5 years), the relationship for hitting in girls at 5 years was the only significant result (Kvalevaag et al, 2014). Externalising difficulties at 5 years old were also explored in a Finnish cohort of 96 children using the CBCL. The authors (Mantymaa et al, 2012) found 14% were exhibiting high levels of externalising behaviours at 5 years old, with paternal mental health both prior to pregnancy and during pregnancy being associated with these behaviours.

In summary, as with internalising behaviours, a fairly consistent relationship was found between paternal mental health in the perinatal period and child externalising behaviours (such as hitting) up to the age of six. When exploring this relationship at age five and seven, a range of other variables were implicated, including maternal mental health and paternal education level, whether the father lives with the child and lifestyle factors, suggesting that other factors may be influential in this relationship.

Socio-emotional Problems

Six studies utilised the 'total problem' scores on the Rutter revised preschool scale (Ramchandani et al, 2005; Ramchandani et al 2008b; Hanington et al, 2011) and SDQ (Ramchandani et al, 2008a, Fletcher et al, 2011; Smith et al, 2013). This scale combines scores on emotional and conduct difficulties to give a total problem score. In Ramchandani et

al (2005), (2008b) & Hanington et al (2011) this was calculated using the top 10% to define those with particular difficulties. Although the paternal postnatal depression and total problem score was found to be significant at 3.5 years, this was no longer significant after controlling for paternal depression at 21 months (Ramchandani et al, 2005). However in a later ALSPAC study (Ramchandani et al, 2008b), prenatal depression and total problem scores were significant after controlling for maternal depression, paternal education level, marital status and the presence of other children) at 3.5 years. Hanington et al (2011) replicated the initial finding of Ramchandani et al (2005) but found that marital conflict partially mediating the relationship as well as independently predicting child difficulties. Marital discord at 3 months postpartum also played an important role in explaining the relationship between paternal mental health (as measured by General Health Questionnaire) and child total SDQ scores at 4.25 years (Smith et al, 2013).

Using the 'total problem' score from the SDQ, Ramchandani et al (2008a) found that paternal depression at 8 weeks postpartum was associated with higher scores. The top 10% of high SDQ total problem scores were used in research by Fletcher et al (2011), concluding that early paternal depression was also associated with increased risk of higher scores on 2,620 Australian two-parent families. However the timing of paternal mental health assessment was not specifically stated, limiting the author's ability to compare the results to other studies.

The results using 'total scores' on the Rutter revised preschool scores and the Strengths and Difficulties Questionnaire (SDQ), illustrate more complex findings, with some relationships remaining significant after controlling for other variables ,with others becoming non-significant. It appears that marital discord and conflict may be a factor in mediating this relationship. The majority of the results come from methodologically strong studies and research (Goodman, 1997) suggests that the two measures are highly correlated, thus

indicating that there is little difference in the results using the two different measures when considering child socio-emotional development.

Cognitive Development

Three of the included studies also explored the relationship between paternal mental health and cognitive development including language, motor development and attention. A UK study (Parfitt et al, 2014) of 42 families found no association between paternal depression and child cognitive development, language and motor development at 16-20 months of age, as assessed by the Bayley Scale of Infant Development (Bayley, 2006). However a large cross cohort study, including samples from both the ALSPAC and Generation R cohorts, found a weak association between paternal anxiety and depression and child attention problems at 3 years, as assessed by the CBCL (Van Batenburg-Eddes et al, 2013). Kvalevaag et al (2014) used child language competency as a confounding variable to explore the relationship between antenatal paternal psychological distress and child hitting behaviours, finding that adjusting for this led to increased risk for hitting others. All three studies in this area were deemed to be methodologically strong according to the Tooth et al (2005) criteria. Child cognitive development was assessed via self-report measured in Van Batenburg-Eddes et al (2013) and Kvalevaag et al (2014) but by a specially trained researcher in Parfitt et al, (2014). Thus the differences found may be accounted by the differences in assessments utilised and raters, with mothers reporting subjectively higher levels of difficulties.

In summary, two of three studies found some relationship between paternal mental health and child cognitive development, with the remaining one finding no relationship. Differences appear to relate to the use of assessment and the reporting source, as well as

differences in the age that children are assessed, with the no relationship to paternal mental health being found in the younger sample of children (Parfit et al, 2014).

Discussion

Overview

This systematic review aimed to explore the relationship between paternal mental health in the perinatal period and preadolescent child outcomes. The specific outcomes included in the reviewed studies included child temperament, externalising and internalising difficulties, socio-emotional problems and cognitive development. A systematic search of five electronic databases resulted in 18 reviewed studies.

Overall, the research provided mixed evidence for an association between paternal perinatal mental health difficulties and outcomes in preadolescent children. Some of the most consistent findings were found for outcomes relating to internalising and externalising difficulties (also found in a previous review by Wilson & Durbin, 2010), with more inconsistent findings regarding outcomes relating to child temperament, socio-emotional and cognitive difficulties.

Internalising and externalising difficulties

The majority of the findings found significant associations between externalising difficulties and paternal mental health (predominately depression) both during pregnancy and the postnatal period. One study (Pemberton et al, 2010) also found evidence for an association between adoptive fathers mental health and child externalising behaviours, suggesting that the transmission of risk can occur purely in the postnatal period. When considering results across the age-span, whilst controlling for other potential risk factors (e.g. maternal mental health), many significant results were evident when children were 2-3 years of age (e.g. Carro et al,

1993; Pemberton et al, 2010; Ramchandani et al, 2008b). Some findings became non-significant once the child had reached the age of 5 in a small number of studies (e.g. Kvalevaag et al, 2014), thus suggesting that other factors may play a protective role in this relationship in the medium-term. Despite the range of results that indicate an association between paternal mental health and child externalising difficulties, it is important to note that half of these results come from the same cohort (ALSPAC) and despite its size, this somewhat limits the generalisability of these findings (Ramchandani & Psychogiou, 2009).

This lack of generalisability is less of a concern when considering the results for internalising difficulties. Mantymaa et al (2012) reported that nearly half of their sample required additional support due to social disadvantage, mental health and marital difficulties. All six studies found significant associations between paternal mental health (again predominantly depression) and child internalising difficulties, however in some studies (e.g. Mantymaa et al, 2012) these results did not remain over time, with significant results at 2 years becoming non-significant by 5 years of age. This may suggest that parental mental health difficulties and social disadvantage, may not impact on children long-term. As with externalising difficulties, a range of other risk factors were controlled for during the analyses (e.g. father age, education, marital status, etc.) and many significant results still remained, suggesting a direct relationship between paternal mental health and child internalising difficulties in these samples. Furthermore, some studies highlighted particular experiences that may be important in understanding this relationship, such as parental stress and violence within the home during the child's early years, suggesting a complex multi-factorial relationship.

Child temperament, socio-emotional and cognitive difficulties

The picture regarding child temperament, socio-emotional and cognitive difficulties is more complex. There is evidence for a lack of association between paternal mental health and child temperament, which may be accounted for in a number of ways, for example the very low number of depressed fathers in some studies, (e.g. Dave et al, 2005), and the range of sample sizes more generally. The use of different assessments by different sources also reduces the ability to compare the results.

Data regarding cognitive difficulties was considered in a very small number of the studies, with one out of the three finding no association between paternal mental health and cognitive difficulties (e.g., attention, language, and motor development); and one study finding a very weak association between paternal anxiety depression and child attention problems at 3 years. Kvalevaag et al, 2014, controlled for child language competency and suggested that lack of competency and skills in this area led to increased risk of hitting behaviours in the early years. Given the inconsistencies, little can be extrapolated from these findings.

As described in the results section, six of the 18 studies utilised 'total scores' on the Rutter preschool revised scale and SDQ to assess for socio-emotional difficulties more generally. These scores can be particularly difficult to interpret, as negative child outcomes are defined as those scoring in the top ten percent of the measure, without specifically identifying examples of what these difficulties may be. However, as with the other child outcomes reviewed, a range of risk factors were controlled for and significant associations still remained in some samples (e.g. Ramchandani et al, 2008b). In addition, some of the stronger evidence was found in studies that specifically utilised mediation analysis in order to

assess whether other factors could explain the direct relationship (e.g. Ramchandani et al, 2005 and Smith et al, 2013). These studies found systemic difficulties such as marital discord and conflict played an important role in explaining the relationship between paternal mental health and socio-emotional difficulties in their children.

Indeed the role of mediation has been found to be an important consideration in understanding the relationship between paternal postnatal depression and child development. Recent research published utilising data from the ALSPAC cohort (N=13,822) by Gutierrez-Galve, Stein, Hanington, Heron & Ramchandani (2015) adds further support for the importance of mediating effects, as highlighted by some of the reviewed studies (e.g. Smith et al, 2013). They suggest that the relationship between paternal postnatal depression and child outcomes is mediated by its impact upon family functioning (e.g. increases in marital discord and conflict and maternal depression), with this accounting for two thirds of the relationship found in this sample.

Strengths and limitations of the review

The author believes this to be the first systematic review specifically focusing upon paternal mental health in the perinatal period and preadolescent child outcomes. This review further enhances understanding of this area by focusing upon a wide range of child outcomes, such as cognitive and socio-emotional development not considered in other reviews (e.g. Ramchandani & Psychogiou, 2009) and aims to understand the impact that paternal mental health difficulties in the child's first year of life can have upon both short and medium terms outcomes. Particular strengths of the current review include a large overall sample and cohorts from six countries, assessing several outcomes over a number of years.

However, there are also some limitations that require discussion. As already noted, a relatively high number of the papers reviewed came from the ALSPAC cohort. Despite the evidence that fathers also experience mental health difficulties during pregnancy and the postnatal period (e.g. Mathey, Barnett, Ungerer & Waters, 2000; Bradley & Slade, 2009), there are relatively limited research groups that collect and publish data on both maternal and paternal mental health. Thus, despite the author's effort to ensure that the inclusion criteria captured a wide range of studies, the specific nature of the ALSPAC publications warranted their inclusion in order to highlight the trajectory of child outcomes across the preadolescent period, although it is noted that this presents a bias within the current review. Furthermore, only papers published in peer-reviewed journals were included in the review. Given that significant findings are more likely to be published (Hopewell, Loundon, Clarke, Oxman & Dickersin, 2009), studies that found no relationship between the factors under review may be in existence but were not captured in the search process. Other excluded papers included those studies where both maternal and paternal mental health data were collected but were presented collectively to focus upon the parental impact on child outcomes, thus meaning that some data could not be separated from maternal data and presented in this review.

Strengths and limitations of the reviewed literature

Overall strengths of the literature include large samples at baseline (49,923 fathers and 45,596 children), prospective longitudinal designs (some utilising a cohort design and thus reducing sampling bias), with many incorporating long follow-up periods (up to 7 years in some cases). A high proportion of the research reviewed also collected data regarding a range of potentially confounding variables and controlled for these in their analyses, with some specifically conducting mediation analysis to explore variables that were hypothesised to

account for the direct relationship. Several studies also accounted for missing data and presented odds ratios (Fletcher et al, 2011; van Batenburg-Eddes et al, 2013; Kvalevaag et al, 2014) to describe the relative odds that an outcome will occur, given exposure to (in this case) perinatal paternal mental health (Szumilas, 2010). A limitation of the type of studies reviewed includes the difficulty in determining causation. Given the complexity of such relationships, only association can be determined and thus other unknown mediators or influencing factors may be impacting upon the results found. Other limitations are also inherent to the study design, with high levels of attrition over the time points in some studies, up to 63% in Ramchandani et al (2008a) over a 7-year period and low numbers of fathers experiencing mental health difficulties in some samples. The use of different assessments and cut-off scores to measure paternal mental health and child outcomes may also limit the generalisability of the findings, with some differences being apparent between outcomes according to the use of continuous or cut-off scores (such as in Ramchandani et al, 2005). Furthermore, child outcomes were assessed via mothers in the majority of the studies reviewed and paternal mental health was also assessed via maternal report in Mantymaa et al (2012) suggesting rater bias in some cohorts. The use of terminology also caused some difficulty in interpreting the results, with generic terms such as internalising and externalising used in most studies. Although this complements the questionnaires utilised (e.g. CBCL and SDQ) and is useful for the interpretation of general difficulties, papers such as that by Kvalevaag et al (2014) provided more specific and clinically useful information to draw conclusions from.

Clinical Implications

The results of the review highlight the importance of assessing paternal mental health in the perinatal period. Although research has suggested that paternal mental health is measured less due to mothers predominantly being the parent having contact with maternity services (Fisher, Kopelman & O'Hara, 2012), ways to overcome this barrier and facilitate paternal assessment should be considered. Furthermore, given the range of other variables that my be influencing the relationship between paternal mental health and child outcomes, it is important for services to develop systemic interventions for families, with a focus upon parental mental health and management of marital conflict.

Implications for Future Research

This review has highlighted a number of areas for future research. Firstly, given the high number of studies that measured paternal depression, further exploration of paternal mental health to include other disorders, such as anxiety and severe and enduring mental health difficulties, would increase understanding regarding fathers' experiences of mental health in the perinatal period. Future research would also benefit from the inclusion of child outcome measures as reported by a range of sources and to specifically include fathers. The use of mediation analysis to consider specific mechanisms of risk and a focus on assessing specific child outcomes may improve our understanding of *how* preadolescent child outcomes may be influenced by the mental health of their fathers in the perinatal period.

Conclusion

The current review found mixed evidence for a relationship between paternal mental health in the perinatal period and poor outcomes in their preadolescent children. The most consistent evidence was found for difficulties defined as externalising and internalising, with less consistent evidence for relationships with child temperament, socio-emotional and cognitive difficulties. Limitations of the reviewed studies included often high attrition rates, difficulties in determining causality and variation in the use of assessment measures and associated cut-off scores. Exploration of the impact of paternal mental health difficulties, to include understanding of the systemic complexities that may influence the development of poor child outcomes is warranted.

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Chapter Two:

The Role of Antenatal Maternal Orientation in Exploring the Relationship between Perfectionism and Postnatal Distress

Abstract

Background. It is estimated that one in ten women will experience mental health difficulties in the perinatal period, including depression, anxiety and obsessive-compulsive disorder (OCD). These can have a negative impact upon women, their children and the wider family. A range of factors are known to predict maternal mental health difficulties including perfectionism, maternal orientation (referring to particular intentions and beliefs about being a mother), age and lack of social support.

Aims. To explore whether perfectionism was related to experiences of postnatal distress (depression, anxiety and OCD) in first time mothers and whether this relationship could be explained by antenatal maternal orientation. Furthermore, whether the strength of any aforementioned relationships were affected by participants' experience of becoming a mother.

Method. Eighty-four women completed questionnaires in pregnancy and fifty-nine, six to twelve weeks after birth.

Results and Conclusion. A relationship between socially prescribed perfectionism and postnatal depression and anxiety was observed. Antenatal maternal orientation did not mediate this relationship. Mental health in pregnancy, the impact of sleep deprivation, feelings of control and powerlessness, perceived relationship with baby and levels of social support were found to be important in understanding what might predict depression, anxiety and OCD in the postnatal period.

Introduction

Pregnancy and the transition to motherhood is often a happy and fulfilling time for women. However, for some it can be a stressful and unhappy period where mental health problems develop or are exacerbated by the enormity of the life event. Such difficulties in this period are referred to as perinatal mental health disorders, defining difficulties occurring during the specific period from conception to the child's first birthday.

Prevalence and symptoms of depression, anxiety and OCD in perinatal period

Estimates of mental health difficulties in the perinatal period are well researched and relatively high, with a prevalence of between 7 and 13.5% for antenatal depression (Gavin et al, 2005; Evans et al, 2001) and 10-20% for postnatal depression (Gavin et al, 2005; Wisner et al, 2013). Although historically less examined, the prevalence for anxiety is also relatively raised, with estimates of 14.6% of women experiencing anxiety during the antenatal period (Heron, O'Connor, Evans, Golding & Glover, 2004) and 12.7% postnatally (Yelland, Sutherland & Brown, 2010). A recent systematic review and meta-analysis (Russell, Fawcett & Mazmanian, 2013) suggested that women in the perinatal period are 1.5 to 2 times more likely than the general population to experience OCD, with 2.07% experiencing this during pregnancy and 2.43% experiencing postnatal OCD.

Symptomatology of perinatal mental health disorders are vast. Depression can include tearfulness, feelings of hopelessness, inadequacy, guilt, and inability to cope and feel joy over the new baby. Other symptoms include feelings of agitation, anxiety, loss of appetite, poor memory, sleep disturbance, fatigue, social isolation and suicidal ideation (Hogg, 2012). Symptoms of anxiety disorders include persistent worry about future events, poor

concentration, fatigue, muscle tension and restlessness (Ross & McLean, 2006). Although, also an anxiety disorder, women experiencing perinatal OCD tend to report obsessive thoughts that concern contamination or aggression towards their baby (such as accidental or intentional harm) (McGuinness, Blissett & Jones, 2011; Uguz & Ayhan, 2011 & Misri & Kendrick, 2007). This can lead to compulsions to clean, excessively checking their child's well-being or avoidance of their child.

Efforts to establish vulnerability towards perinatal mental health disorders have been considerable and predictors include; being older, low maternal education, lack of social support, low socio-economic status and experience of trauma. Mental health difficulties prior to and during pregnancy have been associated with postnatal depression (e.g. Martini, Petzoldt, Einsle, Beesdo-Baum, Hofley & Wittchen, 2015; Schmied et al, 2013; Scrandis et al, 2007; Heron et al, 2004; O'Hara & Gorman, 2004; Robertson et al, 2004). Martini et al (2015) explored risk factors for perinatal anxiety and depression and found that anxiety and depression prior to pregnancy were the strongest predictors for women experiencing these during the perinatal period. Predictors for postnatal anxiety contrast with those for postnatal depression, including being younger and experiencing trauma prior to pregnancy, however, low education level was an important predictor for both. As with postnatal depression, predictors for antenatal depression and anxiety included lack of social support as well as lower relationship satisfaction and lower self-esteem and self-efficacy (Martini et al, 2015).

Unlike anxiety and depression, predictors of perinatal OCD are less well understood, However a combination of biological (e.g. reproductive events such as pregnancy and miscarriage) and psychological factors are suggested as being likely predictors (Frias, Palma, Bardon, Varela, Alvarez & Salvador, 2015; Russell et al, 2013; Fairbrother & Abramowitz, 2007). From a psychological perspective, heightened sense of responsibility as a new parent

and the attribution of significant meaning to 'benign' thoughts are suggested to be important factors in the development of OCD in the postnatal period (Fairbrother & Abramowitz, 2007). Social expectations of motherhood may mean that mothers who experience mental health difficulties such as depression, anxiety or OCD may be reluctant to disclose these or seek help for such difficulties (Dolman et al, 2013; Hogg, 2012).

Importance of identifying perinatal mental health difficulties

Research has suggested that perinatal mental health difficulties can have a profound effect on mother, baby and partners, with these being associated with marital conflict and relationship dissatisfaction and paternal mental health (e.g. Lee & Chung, 2007; Goodman, 2004; Grace, Evindar & Stewart, 2003; Murray & Cooper, 1997; Sharp, Hay, Pawlby, Schmucker, Allen & Kumar, 1995). The quality and security of the mother-baby attachment relationship has been found to play a marked role in the infant's social and emotional development (e.g. Cuthbert, Rayns & Stanley, 2013). While poor maternal mental health does not inevitably cause an insecure attachment relationship, evidence suggests that maternal mental health difficulties in a child's early years can impact on their long-term outcomes Recent reviews by Sanger, Iles, Andrews & Ramchandani (2015) and Stein et al (2014) summarise difficulties 'in utero' development and into childhood and adolescence and can include cognitive, internalising and externalising difficulties.

Given the impact upon the family system, national guidance highlights the importance of assessment and intervention of antenatal and postnatal mental health difficulties in women (The National Institute of Clinical Excellence-NICE, 2014). The guidance suggests that women with perinatal mental health disorders should have access to specialist and equitable services and timely evidence-based therapies. This is supported by charities such as the

National Society for the Prevention of Cruelty to Children (NSPCC) whose work has raised concerns regarding the impact of both mother and child if perinatal mental health difficulties go untreated and unsupported (e.g. Hogg, 2012). In order to provide effective interventions, it is important to understand what factors may act as specific vulnerabilities in the perinatal period.

Expectations, pregnancy and the transition to motherhood

Maternal expectations and attitudes towards pregnancy and motherhood may influence adjustment and development of perinatal mental health difficulties. A recent US study (Sockol, Epperson & Barber, 2014) found that maternal attitudes in pregnancy (e.g. '*If I fail at motherhood, then I am a failure as a person*') were associated with anxiety and depressive symptoms in the antenatal and postnatal period. Experiences not matching optimistic expectations have also been associated with depression and poorer relationship adjustment in parents (Harwood, Mclean & Durkin, 2007). It is possible that such expectations and attitudes coupled with some of the risk factors associated with perinatal mental health (e.g. antenatal mental health and low educational level) may exacerbate this relationship.

Maternal Orientation

Intentions and attitudes towards motherhood during pregnancy are key aspects of a women's antenatal maternal orientation. Conceptualised by Joan Raphael-Leff, maternal orientation is defined as a woman's expectations and beliefs about childbirth, impending motherhood and her child (Sharp & Bramwell, 2004). Research by Raphael-Leff (e.g. 1983, 1984, 1985a, 1986, 1991, 1993, 2009) and others (Sharp & Bramwell, 2004; van Bussel, Spitz & Demyttenaere, 2009a; van Bussel, Spitz & Demyttenaere, 2009b; Roncolato & McMahon,

2012) found that such expectations are found to cluster, with each orientation encompassing a distinct mothering philosophy. The concept has evolved since its conception in the 1980s; the initial theory encompassed a linear model with women being placed upon a continuum between the Facilitator and Regulator orientations. Over time, Raphael-Leff proposed that the theory also incorporated those who were in negotiation between the two orientations as women having their own distinct mothering philosophy (defined Reciprocators).

Raphael-Leff (2009) defines Facilitators as women who believe their pregnancy and impending motherhood to be self-actualising and a realisation of long held wishes to become a mother. Facilitators are described as women who cherish pregnancy and it's side-effects, feel they intuitively communicate with their baby, believe only they are truly able to understand their baby's needs and thus prefer to be baby-led. The Regulator holds a very different philosophy and feels that pregnancy and the baby is a threat to her existing persona and would prefer to remain as her pre-pregnancy self for as long as possible during the pregnancy (Raphael-Leff, 2009). Unlike the Facilitator, the Regulator strives to implement schedules and for her baby to adapt to the usual household routines (Sharp & Bramwell, 2004). She believes that she, not her baby knows what is best for them, with the baby being unable to differentiate her from others, which allows for shared parenting activities (Raphael-Leff, 2009). Raphael-Leff (1993, 2009) suggests that although the mothering orientations and associated philosophies may invoke ideas of stereotypes and judgement, they were not created for this purpose, but as a way to cluster common ways of responding in motherhood.

There are clear links between maternal orientation and perinatal mental health conditions. Research suggests (Sharp & Bramwell, 2004) that both Facilitators and Regulators may be susceptible to postnatal depression in the first six weeks due to difficulties in adhering to their particular philosophy. Van Bussell et al (2009) suggests that those who hold a

Regulator orientation are more likely to experience anxiety and depression in both the antenatal and postnatal period as this new way of life is a threat to their existing life and persona (Sharp & Bramwell, 2004). Facilitators are suggested to be at risk of depression later in the perinatal period, when their child is around a year old, due to the infant's desire to explore and forge independence from its mother, with this being a threat to the Facilitator orientation (Sharp & Bramwell, 2004).

Perfectionism as a transdiagnostic variable of distress

Perfectionism is seen as being transdiagnostic in nature and has been identified as both a vulnerability and maintaining factor for a range of mental health difficulties including depression, anxiety and OCD (Egan et al, 2011), including those in the perinatal period (Maia et al, 2012; Macedo et al, 2009). It is proposed that perfectionism is multidimensional, incorporating other-oriented perfectionism (needing to meet standards imposed by others), self-oriented perfectionism (expectations of perfectionism from self) and socially prescribed perfectionism (characterised by a belief that to be accepted and approved by others, one has to meet unrealistic expectations from others). All three constructs feature unrealistic standard setting, which leads to feelings of failure when such standards are not achieved (Hewitt & Flett, 1991a). Self-oriented perfectionism in particular is associated with both depression and OCD (Sassaroli et al, 2008; Egan et al, 2008) and with depression and anxiety during pregnancy (Macedo et al, 2009). Socially prescribed perfectionism has been found to be associated with depression in clinical and non-clinical samples (e.g. Hewitt & Flett, 1991a) and during pregnancy (Macedo et al, 2009) and also anxiety and depression in the postnatal period (Maia et al, 2012). Other-oriented perfectionism has been identified as having limited associations with psychopathology in both the general population and in the perinatal period,

being more associated with interpersonal difficulties (Dimitrovsky et al, 2002; Hewitt & Flett, 1991b, 1993).

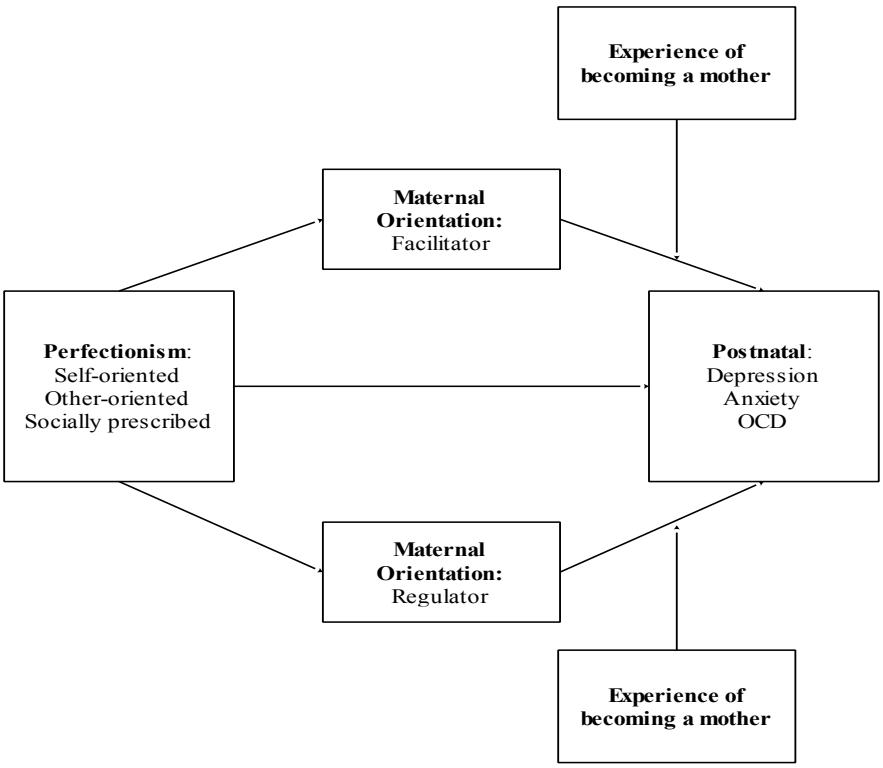
The Current Study

Although there is research to suggest that women of 'Regulator orientation' are more likely to experience antenatal and postnatal depression and anxiety (e.g. Sharp & Bramwell, 2004), there is a lack of published research that evaluates the role that maternal orientation plays in the development of postnatal distress more widely to include OCD. Intuitively, it seems that the rigidity and thoughts associated with OCD may also be associated with antenatal maternal orientation. Therefore the aim of the study is to explore whether maternal orientation and experience of early motherhood play a role in the understanding of postnatal distress (depression, anxiety and OCD in the postnatal period).

Overall Aims

The aim of the study is to gain an understanding of the relationships between three constructs of perfectionism (self-oriented, other-oriented and socially prescribed) and experiences of postnatal distress (depression, anxiety and OCD) in first time mothers and to explore whether these relationships could be mediated by the participants' maternal orientation (either high scores on the Facilitator or Regulator subscale). Given other circumstantial factors that are associated with postnatal distress, the author also investigated whether the strength of any aforementioned relationships were affected by participants' experiences of early motherhood (e.g. relationship with baby, social support and relationship with partner). Figure 1 below illustrates a diagrammatical interpretation of this model.

Figure 1: Diagrammatical representation of the model under investigation



Hypotheses

1. To explore whether antenatal maternal orientation mediates the relationship between perfectionism and postnatal distress (postnatal depression, anxiety or postnatal OCD).
2. To explore whether experience of being a mother influences any relationship between antenatal maternal orientation and postnatal depression, anxiety and OCD.

Methodology

Ethical Approval

Prior to the study commencing, approval was given by the local NHS Research Ethics Committee (Appendix A) and by the Research and Development department of the NHS trust from which participants would be recruited (Appendix B).

Sampling

Women in their third trimester of pregnancy were recruited from June 2014 until September 2014 via three recruitment routes. The majority of participants were recruited via antenatal midwifery appointments held at GP surgeries provided by a local NHS trust. Others were recruited at NHS parent education classes and via a research advert placed on parent/pregnancy focused social media sites (e.g. National Childbirth Trust (NCT) Facebook page). To ensure time to consider their participation in the research, potential participants who were met face-to-face were given an information sheet to read (Appendix C). It was then agreed that they could contact the author or discuss it further at their next antenatal appointment or class. A list of inclusion and exclusion criteria (Table 1) was created to identify women suitable for participation in the study. This was based on potential confounding variables. For example, women who were aware that their baby had a medical condition may be more anxious due to specific worries about the health of their baby. Recruitment and antenatal data collection were completed by the author and another researcher. Independent samples t-tests were conducted upon all antenatal outcomes and no significant differences were found (depression $t(82) = .331$, $p = .742$; anxiety $t(82) = -1.04$, $p = .298$ and OCD $t(82) = -.424$, $p = .672$), concluding no researcher impact upon results.

Table 1: Study Inclusion and Exclusion Criteria

Inclusion criteria	**Exclusion criteria**
Include if meets the following:	*Exclude if any one of the following satisfied*:
• Participant is pregnant with her first child • Participant is in the third trimester of pregnancy (the AMOM-R[1] measure necessitates that women are in a position to contemplate their baby being born and their beliefs about this and early motherhood) • Participant demonstrates an ability to understand and read in English as required for the method of data collection (ability to complete questionnaires)	• Women who are pregnant with a child that is not their first • Women in their first or second trimester of pregnancy • Women who are aware that their baby has a medical condition • Women who are aware that there is a high risk of not completing their pregnancy • Women with an identified learning disability • Women with an identified significant mental health difficulty • Inability to read and understand English. This would cause difficulty in completing the questionnaires

Procedure

Pregnant women who indicated interest in participating in the study after providing written informed consent (Appendix D) were met in a convenient location (e.g. home, clinic or class). Questionnaires were completed in the author's presence to ensure that any questions that arose could be answered and to manage any potential risk observed (see appendix E for self-harm protocol). With their consent, a letter was sent to their General Practitioner (GP) to inform them of their involvement in the study (Appendix F).

At 6-12 weeks after their due date, where possible, midwifery teams were contacted to ensure the baby had been safely delivered. This was not practicable in all cases as some

[1] Antenatal Maternal Orientation Measure Revised (AMOM-R).

women had delivered out of area and their midwifery team had not been informed. Participants were contacted directly and were again met in a convenient location (usually at home) where the postnatal questionnaires were completed. They were then debriefed (Appendix N) regarding the purpose of the study and any questions answered. Participants were seen to complete postnatal questionnaires between July 2014 and February 2015.

Design and Questionnaires

The study employed a cross-sectional prospective design, with participants completing the first set of questionnaires during their third trimester of pregnancy (27-42 weeks) and the second set of questionnaires (6-12 weeks) in the postnatal period. The questionnaires[2] were presented to each participant in the same order indicated below.

Antenatal questionnaires

The Multidimensional Perfectionism Scale (MPS, Hewitt & Flett, 1991a) is a 45-item self-report questionnaire that measures three aspects of perfectionism: self-oriented perfectionism, other-oriented perfectionism and socially prescribed perfectionism using a 7-item response scale (1= disagree to 7=agree). Total scores for each subscale are then converted to T-scores. A T-score of between 55-59 indicates moderate levels of perfectionism and vulnerability and T-scores of over 60 demonstrating an elevated level of perfectionism and vulnerability for a variety of pathology. The MPS has been found to be both a reliable and valid measure of perfectionism in community and clinical samples (e.g. Hewitt & Flett, 1991a). Cronbach's alpha were calculated for each of the three perfectionism subscales for the

[2] All questionnaires utilised are subject to copyright restrictions and thus are not included within the appendices. All are accessible from the questionnaire authors.

current sample and were found to have good internal consistency (self-oriented subscale α= .84, other-oriented α= .68 and socially prescribed α = .83).

The Edinburgh Postnatal Depression Scale (EPDS, Cox et al, 1987) is a 10-item self-report measure that screens for the presence of depression using a 4-point scale. The EPDS is a widely used and valid measure. Although not a diagnostic tool, scores of 12 and above identify a likely diagnosis of postnatal depression in women, with high specificity (95.7%) and sensitivity (81.1%) (Murray & Carothers, 1990). Cronbach's alpha for the current sample was α= .81 indicating good internal consistency. The EPDS has also been found to usefully identify depression in the antenatal period and to identify anxiety in both the antenatal and postnatal periods in scores of 6 or above (range 0-9), using the statements 'I have blamed myself unnecessarily when things go wrong', 'I have been anxious or worried for no good reason' and 'I have felt scared or panicky for no good reason'. (Mathey, Fisher & Rowe, 2013; Phillips, Charles, Sharpe & Mathey, 2009; Mathey, 2008). The Cronbach's alpha for anxiety subscale for the current sample was α= .73.

The Florida Obsessive-Compulsive Inventory (FOCI, Storch, Bagner, Merio, Shapira, Geffken, Murphy & Goodman, 2007). The FOCI is a 25 item self-report questionnaire that assesses the presence (range 0-20) and severity (range 0-25) of obsessive-compulsive disorder (OCD). Higher scores indicate greater symptomology and severity and scores over 8 on the severity scale are deemed potentially clinically significant. (E. Storch, personal communication, 16th May 2015). Participants answer the 25 items on a 7-point Likert scale (0=strongly disagree to 7=strongly agree) Storch et al (2007) found both the symptom checklist (Kuder-Richardson 20 Formula= .83) and severity scale (Cronbach's Alpha= .89) to have good internal consistency, with the FOCI symptom checklist being modestly related to

the symptom severity scale (r =. 38; P<0.001). Cronbach's alpha for the current sample was α= .82 for both the symptom checklist and severity scale.

The Antenatal Maternal Orientation Measure-Revised (AMOM-R, Roncolato & McMahon, 2012) is an 18 item self-report questionnaire (measured using a 5-point Likert scale ranging from strongly disagree to strongly agree) that assesses maternal orientation, with high scores on each subscale reflecting either the Facilitator or Regulator orientation. In an Australian community sample, Cronbach's alpha for the regulator subscale was α= .71 and facilitator subscale α= .72 indicating adequate internal consistency (Roncolato & McMahon, 2012). Cronbach's alpha for the current sample was lower than the Australian sample, being α= .52 for the regulator subscale. The Cronbach's alpha for the facilitator subscale in the current sample was improved from α= .57 to α= .70 with the removal of three questions related to infant feeding ('I intend to mostly breastfeed', 'To begin with I intend to feed my baby on demand' and 'After several months I intend to feed my baby on demand').

Postnatal questionnaires

Both the EPDS and FOCI were administered again in the postnatal period as was The Mother's Postnatal Health Instrument (M-PHI, Jones et al, 2011) which is a 29-item self-report questionnaire that assesses the mother's postnatal health in 6 main scales (relationship with baby, control and powerlessness, sleep, emotional well-being, mood and social support) and 5 conditional scales (physical health, relationship with extended family, sexual intercourse, infant feeding and relationship with partner). Each dimension (e.g. 'relationship with baby) is scored on a 4-point likert scale (0 indicating 'never' and 4 indicating 'always') with positive scales being reversed scored. Total scores range from 0 to 100, with 0 indicating

the best possible health status as measured by the questionnaire and a score of 100 indicating the worst possible health status as measured by the M-PHI. Jones et al (2011) cite the Cronbach's alpha of the scales to range from α= .66 to α= .87. Cronbach's alpha ranged for the current sample from α= .64 (experience of breastfeeding) to α= .89 (mood and social support subscales).

Other information obtained

Demographic and other personal information (e.g. whether the pregnancy was planned and any history of mental health difficulties) were collected from participants in the antenatal period (Appendix G). Information regarding experience of labour, sleep and health of their baby was collected in the postnatal period at the same time as questionnaire administration (Appendix H).

Results

Statistical Analysis

Sample Size

A paper by Fritz & MacKinnon (2007) described the percentage of published literature which has employed mediation analysis, with various sample sizes. If moderate path coefficients are expected, then a sample size of 71 participants would achieve a power of 0.8

Analysis Strategy

Data was analysed using SPSS (version 21; Armonk, NY: IBM Corp) in the following stages: Descriptive statistics were produced for all demographic variables including the number and percentage of participants meeting caseness for depression and anxiety in both the antenatal and postnatal period. Mediation analysis was conducted using the Preacher & Hayes (2008) method. The analysis was carried out using an SPSS macro downloaded from http://www.processmacro.org/download.html. The relationship between the three perfectionism constructs (self-oriented, other oriented and socially prescribed) and postnatal depression, postnatal OCD and postnatal anxiety were explored using the regulator and facilitator constructs as mediators. The constructs related to the experience of being a mother in the early postnatal period (relationship with baby, control and powerlessness, social support, experience of breastfeeding and relationship with partner) were then analysed with the antenatal distress variables and perfectionism constructs to understand which variables contributed to participants' experiences of postnatal depression, anxiety and OCD using regression tree models.

Sample Characteristics

Eighty-four women participated in the study during the antenatal period (27-42 weeks) with fifty-nine of these participating again in the postnatal period (6-12 weeks after the birth of their baby) reflecting a 29% attrition rate. Reasons for attrition are not known.

Participant demographics

The mean age of the 84 participants was 30.5 years (SD 4.82, range 19-42), which is comparable to UK wide statistics that suggest the average age of mothers having live births in 2013 to be 30 years. The mean age for first time mothers was slightly lower at 28.3 years (Office of National Statistics, 2014), suggesting a slightly older cohort of first time mothers within the current sample. In terms of ethnicity, the majority of participants described themselves as White British (70.2%, N=59) and were married or in a civil partnership (63.1%, N=53) or cohabiting (26.2%, N=22). This also being comparable with national statistics, suggesting that in 2013, 84% of babies were registered by parents who were married, in a civil partnership or cohabiting (Office of National Statistics, 2014). The current sample was a highly educated one with 34.5% (N=29) having a professional qualification and only 2.4% (N=2) citing no qualifications. The majority were in full time employment (75%, N=63) and had partners (77.4%, N=65). Ninety-five percent of participants conceived naturally and 68 (81%) described their pregnancy as planned. Prior experience of mental health problems was also cited in 15.5% (N=13) of the sample of women. Full demographic information for variables that have more than two categories is presented in Table 2.

Prevalence of mental health difficulties

Of the 84 women in the sample, 9 (10.7%) had scores above the cut-off suggested when using the EPDS to screen for depression (>12). Fifteen participants (17.9%) scored >6 on the EPDS items for the presence of anxiety during the antenatal period. Four (4.8%) met the cut-off suggested when using the FOCI to screen for OCD symptom severity. This prevalence reduced in the postnatal period (N=59), with 5 (6%) participants scoring >12 for depression, 6 (7.1%) for anxiety and 3 (5.1%) for OCD symptom severity.

Maternal Orientation

The authors of the AMOM-R do not suggest a specified cut-off score to indicate a facilitator or regulator orientation (Roncolato & McMahon, 2012). Therefore for the purpose of this study, scores reaching 1 standard deviation above the mean were used to indicate a facilitator or regulator orientation. This cut-off found that 17.9% (N=15) women were of facilitator orientation and 11.9% (N=10) were of regulator orientation. A high percentage (65%, N=55) did not reach the cut off for either orientation indicating beliefs somewhere between the two orientations. A final small sub-set of participants (4.8%, N=4) reached the cut off for both facilitator and regulator orientations.

Antenatal characteristics of participants and non-participants in the postnatal period

Prior to the difference between the antenatal characteristics of participants and non-participants at 6-12 weeks postnatal being examined, tests of normality were conducted. Perfectionism constructs (self-oriented, other oriented and socially prescribed) were normally distributed, as was participant age. Chi-Square and Mann-Whitney U-Tests were used as

appropriate to explore the antenatal differences of those participating or not, in the postnatal follow-up period.

The groups did not differ in terms of antenatal mental health symptoms (depression, anxiety and OCD symptomology and severity), ethnicity, employment status, whether their baby was conceived naturally, whether they had prior experience of mental health difficulties and self-oriented and socially prescribed perfectionism scores. However, women participating at 6-12 weeks postpartum were slightly older (t (-2.93) = 81, p=0.04), more likely to be married or in a civil partnership (χ^2 (3) = 11.67, p =0.009), had a higher level of education (χ^2 (7) = 28.9, p =0.000), were more likely to have planned their pregnancy (χ^2 (1) =10.13, p =0.01) and scored higher on the other-oriented perfectionism subscale (t (-2.17) = 82, p =0.032) than women who did not participate. (See Table 2 for a full list of characteristics for both groups).

Table 2: Characteristics of participants who did and did not complete the postnatal questionnaires (6-12 weeks after birth) and total sample where appropriate

Characteristic	Completed (N=59)	Not Completed (N=25)	Total (N=84)
Age*	31.53 (4.19)	28.25 (5.54)	30.5 (4.82)
Ethnicity			
Asian/Asian-British- Bangladeshi or other Asian Background	7 (8.4%)	1 (1.2%)	8 (9.5%)
Black or Black British Caribbean	1 (1.2%)	2 (2.4%)	3 (3.6%)
Mixed- White & Asian or any other mixed background	2 (2.4%)	1 (1.2%)	4 (4.8%)
White British or Irish	42 (50%)	18 (21.4%)	59 (70.2%)
Any other White background	7 (8.3%)	1 (1.2%)	8 (9.5%)
Any other ethnic background	1 (1.2%)	1 (1.2%)	2 (2.4%)
Marital Status**			
Single	4 (6.8%)	5 (20%)	9 (10.7%)
Cohabiting	12 (20.3%)	10 (40%)	22 (26.2%)
Married/ Civil Partnership	43 (72.9%)	10 (40%)	53 (63.1%)
Education **			
None	0 (0%)	2 (2.4%)	2 (2.4%)
GCSE/ E-Bacc	1 (1.2%)	7 (8.3%)	8 (9.5%)
Further Education	9 (10.7%)	8 (9.5%)	17 (20.2%)
Undergraduate degree	11 (13.1%)	6 (7.1%)	17 (20.2%)
Postgraduate study	10 (11.9%)	1 (1.2%)	11 (13.1%)
Professional qualification	27 (32.1%)	2 (2.4%)	29 (34.5%)
Employment Status			
Unemployed	3 (3.6%)	6 (7.1%)	9 (10.7%)
Full Time	48 (57.1%)	15 (17.9%)	63 (75%)
Part Time	4 (4.8%)	2 (2.4%)	6 (7.1%)
Student	1 (1.2%)	0 (0%)	1 (1.2%)
Self-employed	2 (2.4%)	3 (3.6%)	5 (6.0%)

Natural Conception	56 (66.7%)	24 (28.6%)	
Planned pregnancy*	53 (63.1%)	15 (17.9%)	
Prior mental health difficulties	11 (13.1%)	2 (2.4%)	
Antenatal Depression (>12 EPDS)	5 (6%)	4 (4.8%)	
Antenatal Anxiety (>6 EPDS)	9 (10.7%)	6 (7.1%)	
Antenatal OCD symptom severity (>8 FOCI)	4 (4.8%)	3 (5.1%)	
Mean Self-oriented perfectionism (T-Score)	51.92 (9.0)	49.36 (8.3)	
Mean Other-oriented perfectionism (T-Score)*	50.10 (7.6)	46.24 (6.8)	
Mean Socially prescribed perfectionism (T-Score)	48.85 (8.9)	45.96 (8.0)	

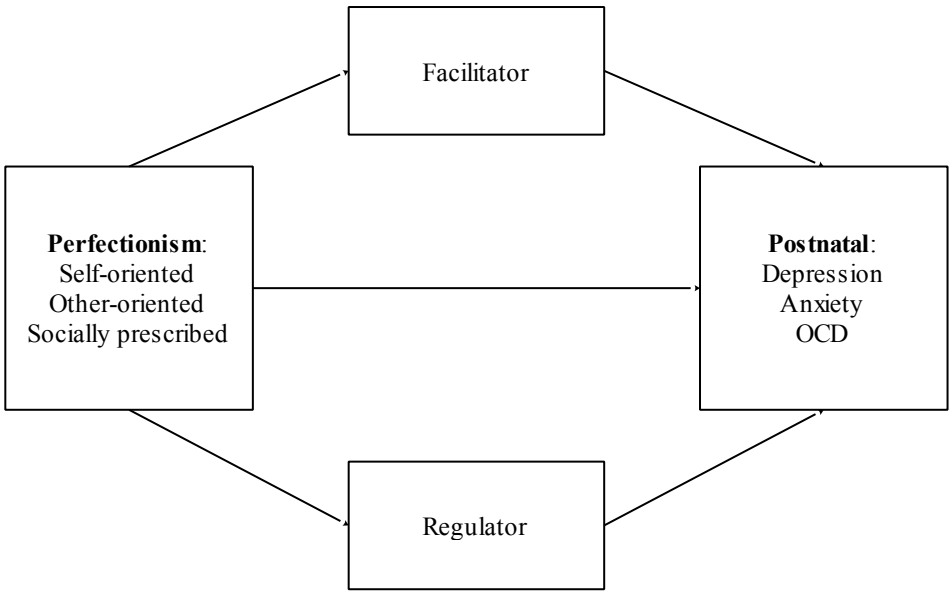
Percentages are given in brackets for categorical variables and standard deviations for continuous variables

* $p<0.05$, **$p<0.01$ differences between groups

Are the relationships between perfectionism and postnatal depression, anxiety and/or OCD mediated by women's antenatal maternal orientation?

The role of maternal orientation as a mediator in the relationship between perfectionism and postnatal distress was explored using the Preacher and Hayes (2008) method. Specifically the model included the three perfectionism constructs (self-oriented, other-oriented and socially prescribed perfectionism) and postnatal depression, anxiety and OCD. The direct relationship for each of these was assessed as well as whether this was mediated by maternal orientation (the Facilitator or Regulator subscale). Please see Figure 2 for a summary of the overall hypothesised model.

Figure 2: The hypothesised direct and indirect relationships between perfectionism and postnatal mental health.



A significant relationship was found between socially prescribed perfectionism and postnatal depression (β=0.39, p=0.001). This relationship was not mediated by maternal orientation (either facilitator or regulator subscale). The relationships between self-oriented perfectionism (β = 0.234, p= 0.158) and other-oriented perfectionism (β= 0.273, p= 0.102) and postnatal depression were not significant in this sample (see Figures 3, 4 and 5).

A significant relationship was also found between socially prescribed perfectionism (β = 0.48, p= 0.001) and postnatal anxiety. This relationship was not mediated by either the facilitator or regulator subscales comprising maternal orientation. The relationships between self-oriented perfectionism (β=0.21, p-0.18) and other-oriented perfectionism (β = 0.20, p= 0.14) and postnatal anxiety were not significant (See Figures 6, 7 and 8).

No significant relationships were found for either self-oriented perfectionism (β= 0.173, p= 0.657), other oriented perfectionism (β= 0.186, p= 0.621) or socially prescribed perfectionism (β = 0.316, p=0.213) and postnatal obsessive-compulsive disorder (see Figures, 9, 10 and 11).

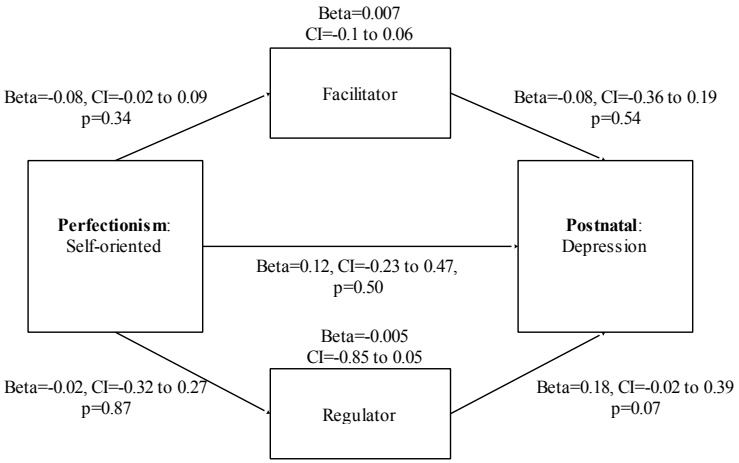


Figure 3: The direct and indirect effect of the relationship between self-oriented perfectionism and postnatal depression

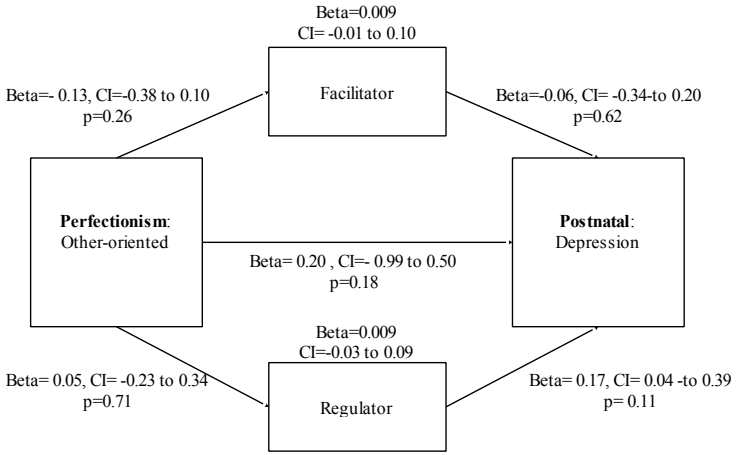


Figure 4: The direct and indirect effect of the relationship between other-oriented perfectionism and postnatal depression.

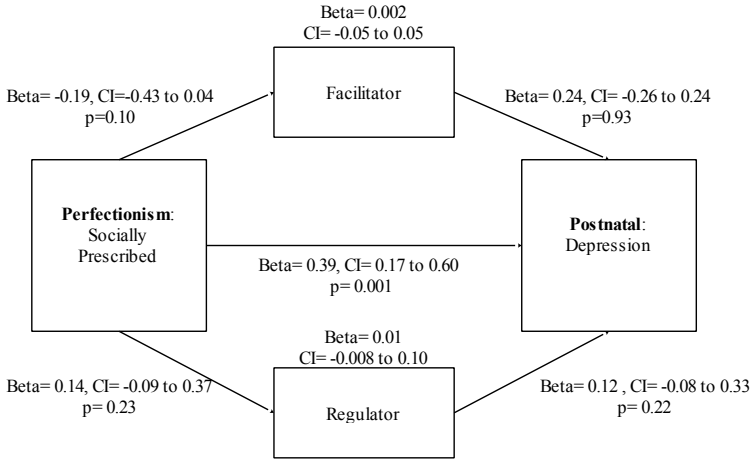


Figure 5: The direct and indirect of the effect of the relationship between socially prescribed perfectionism and postnatal depression

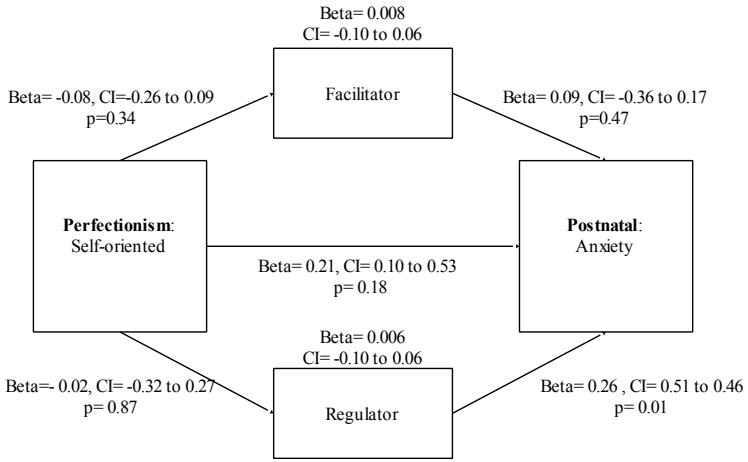


Figure 6: The direct and indirect effect of the relationship between self-oriented between perfectionism and postnatal anxiety

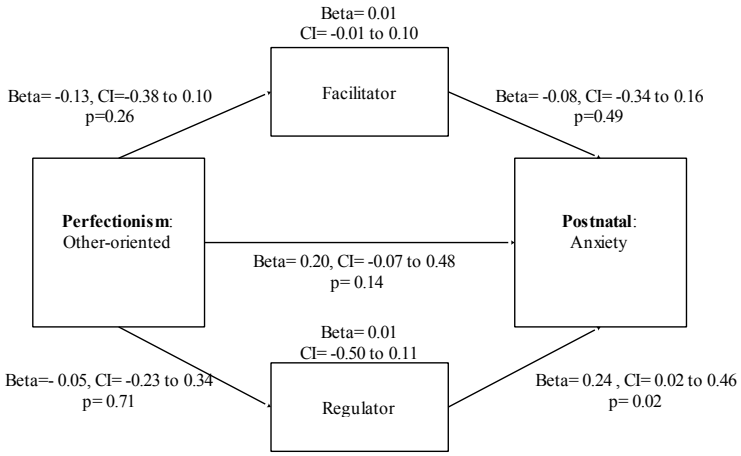


Figure 7: The direct and indirect effect of the relationship other-oriented perfectionism and postnatal anxiety

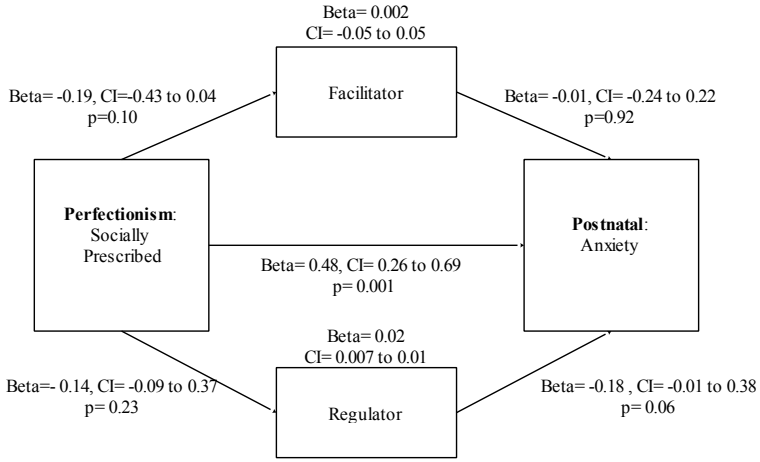


Figure 8: The direct and indirect of the effect of the relationship between socially prescribed perfectionism and postnatal anxiety

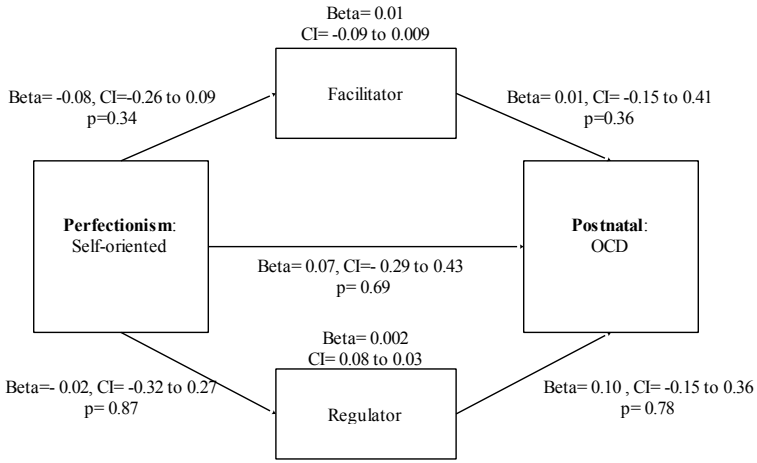


Figure 9: The direct and indirect effect of the relationship between self-oriented between perfectionism and postnatal OCD

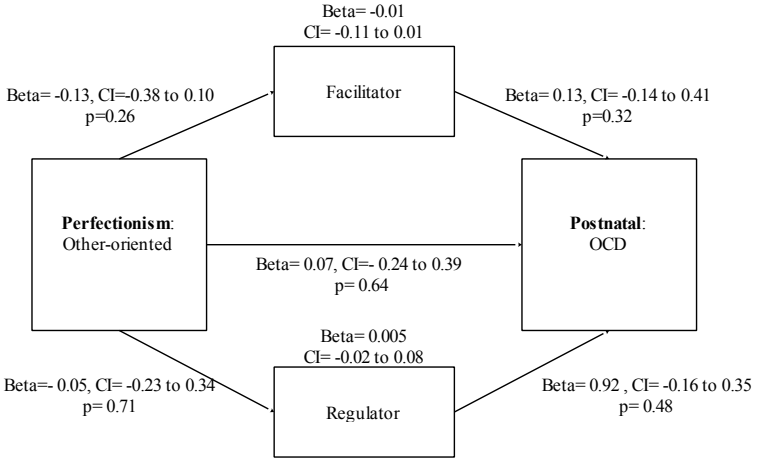


Figure 10: The direct and indirect effect of the relationship other-oriented perfectionism and postnatal OCD

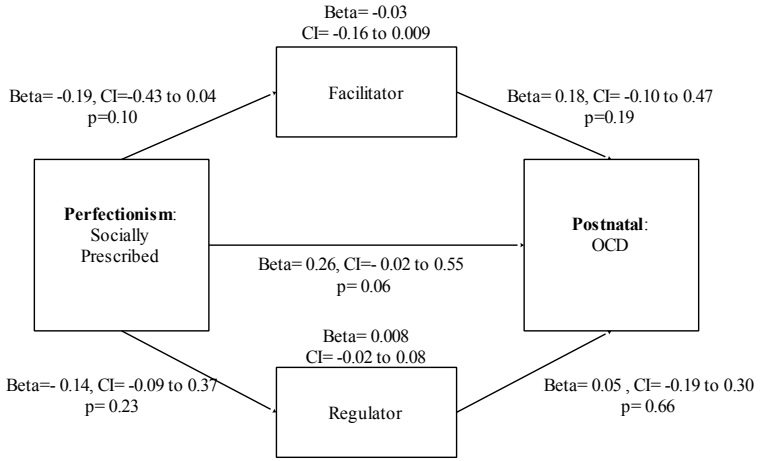


Figure 11: The direct and indirect effect of the relationship between socially prescribed perfectionism and postnatal OCD

Post-Hoc Analysis

Does experience of being a mother account for the relationship between perfectionism and postnatal distress?

Given that neither maternal orientation (Regulator or Facilitator) was shown to mediate the relationship between socially prescribed perfectionism and postnatal depression and anxiety, further investigation to explore the degree to which this relationship was further moderated by the experience of becoming a mother (hypothesis two) were rendered invalid. However, the available literature would suggest that aspects of the experience of becoming a mother would themselves be predictive of postnatal distress. Therefore post-hoc analysis using regression tree models for each of the three main postnatal mental health outcomes- depression, anxiety and OCD were conducted with relevant potential predictor variables.

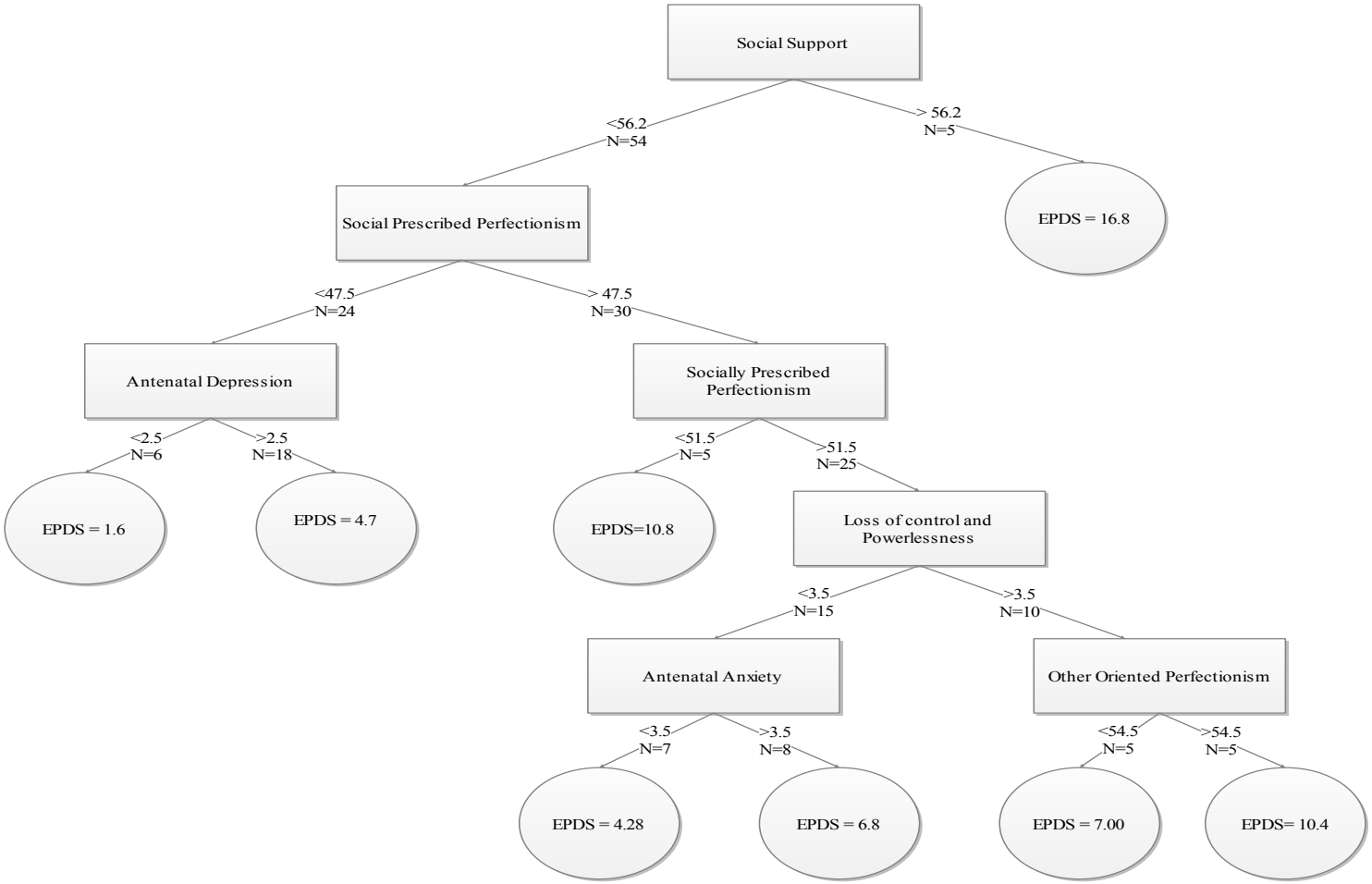
Regression trees have several advantages over traditional regression methods, in that they handle different types of predictor variables and are robust to missing data. They have no need for prior data transformation or elimination of outliers; they can fit complex nonlinear relationships; and automatically handle interaction effects between predictors. Regression tree methods are useful when exploring multivariate data sets, which may have complex interactions between the independent variables (standard linear models (for example OLS regression) require a priori specification of such interactions). Therefore, regression trees have major advantages over standard linear models in exploring a data set with potentially complex interactions and hierarchical relationships, as well as nonlinear effects.

A regression tree is built through a process of binary recursive partitioning, which is an iterative process that splits the data into partitions or "branches". Initially, all records in the data set are grouped into the same partition. The algorithm then begins allocating the data into the first two partitions or "branches", evaluating every possible binary split on every predictive variable. The algorithm selects the split that minimises the sum of the squared deviations from the mean in the two separate partitions (i.e., creates two branches in which the sets within each branch are maximally alike). This splitting "rule" is then applied to each of the new branches. This process continues until the further branching does not minimizes the sum of the squared deviations from the mean in the two separate partitions.

Postnatal Depression

A regression tree model was fitted for the EPDS measure of postnatal depression. The potential predictor variables were antenatal depression, antenatal anxiety, antenatal OCD, self-oriented, other-oriented and socially prescribed perfectionism, relationship with baby, loss of control and powerlessness, sleep, social support, breastfeeding and relationship with partner. The regression tree algorithm converged on the model depicted in Figure 12

Figure 12: A regression tree model for postnatal depression



This model contains seven branching rules. The first branch divides into two groups based on whether the level of social support is less than 56.2 (N=54) or greater than 56.2 (N=5). Social support greater than 56.2 (with scores of 0 signifying good social support and 100 the worst) was associated with high level of postnatal depression (EPDS = 16.8, N=5).

The second branch was within the higher social support group, and separated participants on the bases of socially prescribed perfectionism at a value of 47.5. For participants with lower socially prescribed perfectionism scores, then antenatal depression showed a small effect upon postnatal depression severity. However it should be noted that in both groups showing the low (<2.5, n = 6) and high (>2.5, n=18) antenatal depression the level of postnatal depression were considered non-clinical (EPDS= 1.6 and 4.7).

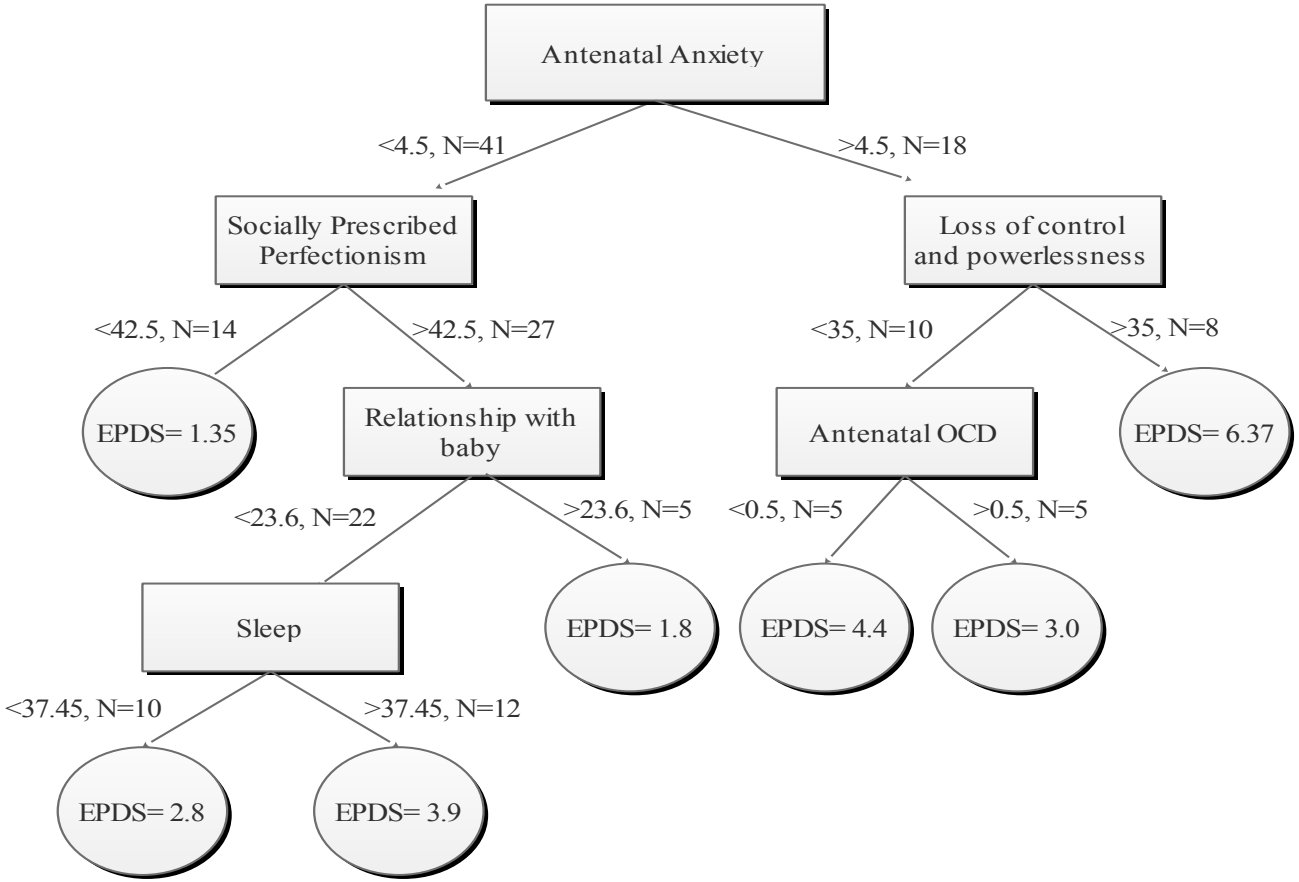
The third branch was within the higher social support group, and separated participants again on the basis of socially prescribed perfectionism, creating a group of participants with a perfectionism score between 47.5 and 51.5. Scores in this range were associated with high levels of postnatal depression (EPDS = 10.8, n=5).

For participants with a socially prescribed perfectionism score greater than 51.5, outcomes appear to differ dependent on the mother's perceived lack of control and powerlessness. Lack of control and powerlessness (MPHI <37.5) were associated with lower postnatal depression scores (EPDS=3.98, N=24) and considered non-clinical. Antenatal anxiety evidenced a small but clinically insignificant discrepancy within this subgroup. Whereas, higher perceived control (MPHI>37.5) was associated with higher levels of postnatal depression, and in participants with higher values of other oriented perfectionism (MPS>54.5) the level of postnatal depression was in the near clinical range.

Postnatal Anxiety

A regression tree model was also fitted for the EPDS measure of postnatal anxiety using the potential predictor variables already described. The regression tree algorithm converged on the model is depicted in Figure 13.

Figure 13: A regression tree model for postnatal anxiety



This model contains 6 branching rules. The first branch divides into two groups based upon participants' antenatal anxiety scores being over (EPDS, N=18) or under 4.5 (N=41) and divided again to form the second branch based upon mothers' perceived lack of control and powerlessness. Scores over 35 on the MPHI subscale for control and powerlessness were associated with clinical levels of postnatal anxiety (EPDS=6.37, N=8).

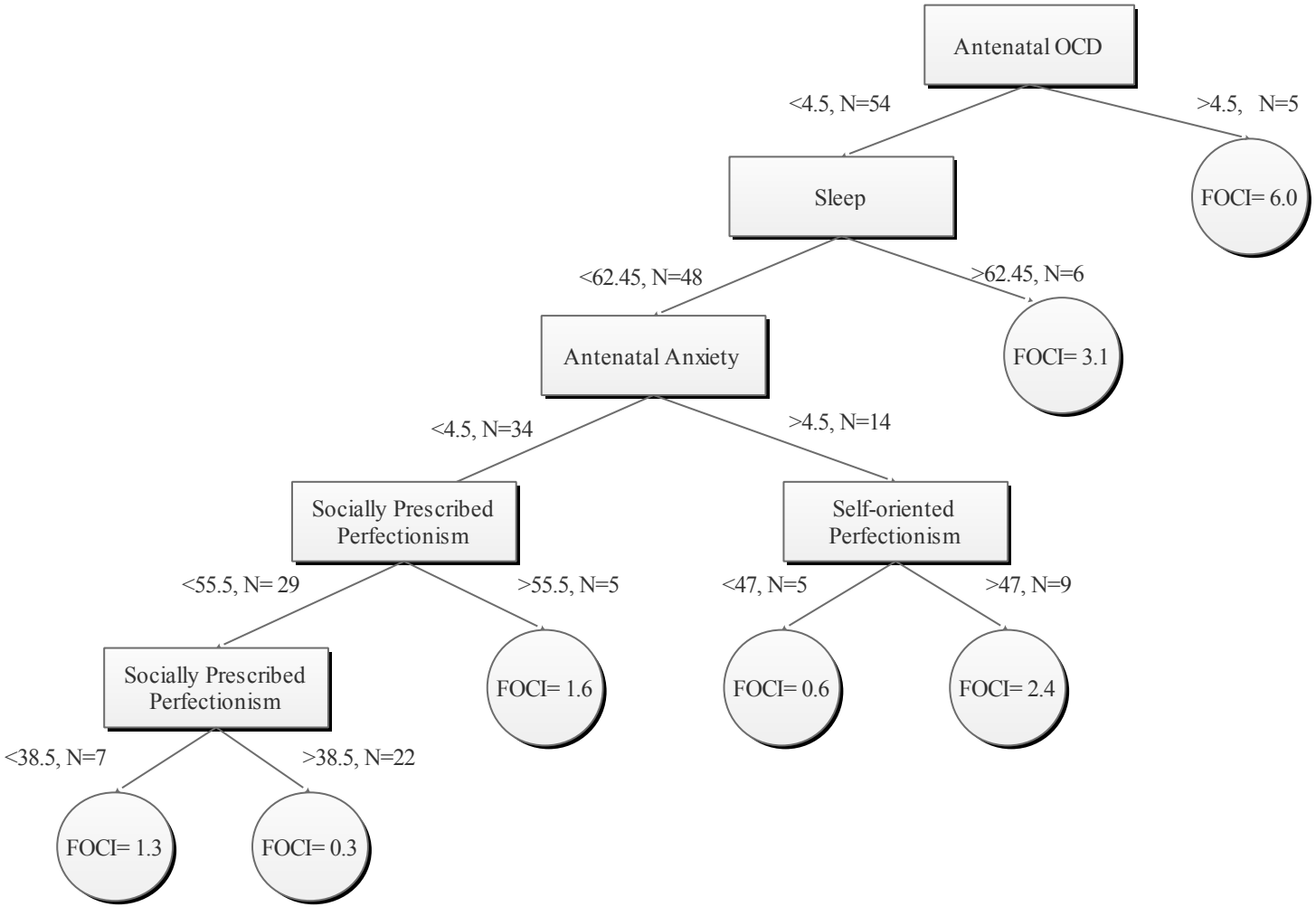
The third branch constituted the higher antenatal OCD group and separated participants based on scores under 0.5 (N=5) and over 0.5 (N=5) on the anxiety subscale of the EPDS. For participants with lower levels of antenatal anxiety (<4.5 EPDS, N=41), outcomes appear to differ based on levels of socially prescribed perfectionism, with those achieving scores under 42.5 (below clinical significance) having very low postnatal anxiety scores (EPDS=1.35, N=10). Those with scores above 42.5 (N=27) were separated again based upon their perceived relationship with their baby, with scores over 23.6 (out of 100 constituting the 'worst' relationship) also being associated with low postnatal anxiety scores (EPDS=1.80, N=5).

Those with lower scores (thus 'good' perceived relationship) on the relationship with baby subscale of the MPHI were separated on the basis of their scores on the sleep subscale of the MPHI, with those scoring lower (thus sleep being less of a difficulty) having low postnatal anxiety scores (EPDS=2.8, N=10) and those scoring higher (>37.45, N=12) having higher postnatal anxiety scores (EPDS=3.9) although these failed to meet clinical cut off (>6).

Postnatal OCD

A regression tree model was also fitted for the FOCI measure for postnatal OCD using the potential predictor variables already described. The regression tree algorithm converged on the model is depicted in Figure 14.

Figure 14: Regression tree model for postnatal OCD



The model for postnatal OCD also consisted of 6 branches. The first branch divides into two groups based upon scores on the antenatal OCD measure being above (N=5) or under 4.5 (N=54, FOCI). The five participants with scores above 4.5 on the FOCI had higher scores using this measure (6 out of a possible score of 20), but less than the cut-off score of 8 which would thus suggest a non-clinical score. The second branch constituted participants with lower antenatal OCD scores and separated the group again according to scores on the sleep subscale being above (N=48) or below 62.45 (N=6). Those with scores above 62.45 (100 representing the 'worst' possible rating) were associated with higher (but still non-clinical) levels of postnatal OCD (FOCI=3.16).

The third branch constituted the lower antenatal anxiety group and separated participants according to scores above (N=34) and below 4.5 (N=14) on the EPDS. Lower scores were associated with self-oriented perfectionism. The group was again separated based upon perfectionism scores being under 47 (N=5) or over 47 (N=9) on the MPS. Scores both over and fewer than 47 represented very low levels of postnatal OCD (FOCI= 2.4 and 0.6 respectively).

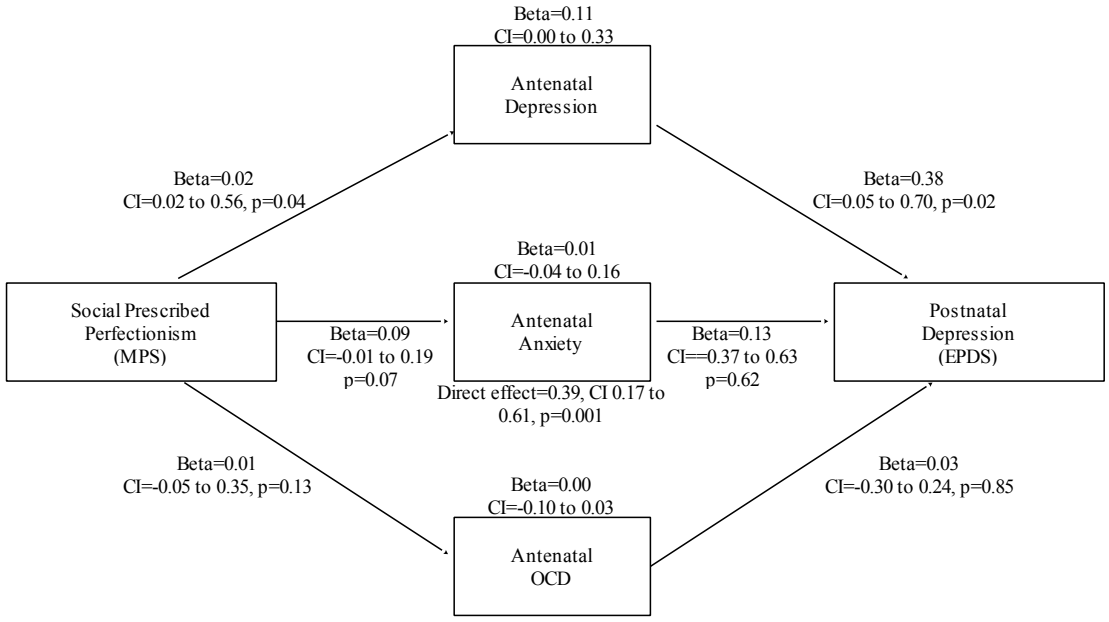
Scores of less than 4.5 on the antenatal anxiety measure (EPDS) were associated with socially prescribed perfectionism being above (N=29) or under (N=5) 55.5. Those scoring above were again associated with very low levels of postnatal OCD (FOCI=1.6). For participants with lower levels of socially prescribed perfectionism, participants were once again separated on the basis of socially prescribed perfectionism, creating a group of participants with a perfectionism score between 0 and 38.5 and 38.5 and 55.5, both associated with very low levels of OCD (<38.5, FOCI=1.28, N=7 and >55.5, FOCI=0.38, N=22).

Do antenatal mental health scores mediate the significant relationships between socially prescribed and other-oriented perfectionism and postnatal depression and anxiety?

Due to the antenatal mental health scores for depression, anxiety and OCD being important in the previous regression tree models, a further post-hoc mediation model was conducted to explore whether antenatal mental health scores explained the relationship between perfectionism and postnatal distress. Specifically the relationships found to be significant in earlier mediation analysis (socially prescribed perfectionism and postnatal depression and anxiety).

There was a statistically significant relationship between socially prescribed perfectionism and postnatal depression (β=0.27, p= 0.01), which was mediated by antenatal depression (β= 0.11, p=0.00) but not antenatal anxiety or OCD (See Figure 15). No mediation effects were found for relationships between socially prescribed and postnatal anxiety.

Figure 15: Indirect effect of the relationship between socially prescribed perfectionism and postnatal depression.



Discussion

The present study explored relationships between perfectionism and postnatal distress in a sample of UK first-time mothers and investigated whether this was mediated by mothers' antenatal maternal orientation and moderated by their early experiences of motherhood. The results highlighted significant relationships between socially prescribed perfectionism and postnatal anxiety and depression. No significant relationships were found between the constructs of perfectionism and postnatal OCD in the current sample. Furthermore, the significant relationships found between perfectionism and postnatal depression and anxiety were not mediated by maternal orientation (Regulator or Facilitator scores).

It was not possible to conduct moderation analysis due to the mediation analysis for the first model not being statistically significant. However regression tree models showed that antenatal mental health, perfectionism and other variables important to the experience of early motherhood (sleep, feelings of control and powerlessness, perceived relationship with baby and levels of social support) were associated with postnatal depression, anxiety and OCD. Post-hoc mediation analyses found that the relationship between socially prescribed perfectionism and postnatal depression was partially mediated by participants' antenatal depression scores but not by their antenatal anxiety or OCD scores. Antenatal scores were not found to mediate the relationship between socially prescribed perfectionism and postnatal anxiety.

Prevalence of perinatal mental health in the current sample

The prevalence of postnatal depression and anxiety was lower in the current sample than in previous studies (e.g. Gavin et al, 2005; Yelland, Sutherland & Brown, 2010; Wisner

et al, 2013). The percentage of women reaching the cut off of 12 on the EPDS was 6% and 7.1% for anxiety (defined by questions 3, 4 and 5 on EPDS cut-off > 6). In comparison, previous research has suggested prevalence rates of 10-20% for postnatal depression (e.g. Gavin et al, 2005) and 12.7% of women experiencing anxiety in the postnatal period (e.g. Yelland, Sutherland & Brown, 2010). The prevalence of postnatal OCD in this sample was calculated using scores of >8 on the symptom severity scale of the Florida Obsessive Compulsive Inventory (FOCI, Storch et al, 2007). Using this cut-off, 5.1% of the current sample were screened as having potentially clinically significant levels of OCD symptomology. This is higher than previous research (e.g. Russell, Fawcett & Mazmanian, 2013). However, it has been suggested that normal maternal preoccupation can be mistaken for OCD in the very early postnatal period (e.g. Abramowitz et al., 2003a; Fairbrother &Woody, 2008). Thus given that the FOCI is a screening tool, this conclusion should be interpreted with some caution.

Despite the low prevalence rates for postnatal depression and anxiety, the current findings are somewhat comparable to the literature regarding perfectionism and its associations with postnatal psychopathology. Socially prescribed perfectionism (the belief that in order to be accepted and approved by others one has to meet unrealistic expectations and standards from others) was associated with postnatal depression and anxiety in this sample, similar to other findings (e.g. Maia et al, 2012), thus suggesting that societal pressures may influence development of postnatal depression and anxiety.

Maternal Orientation

Contrary to previous research by Sharp & Bramwell (2004) and Van Bussel et al (2009), no relationship was found between participants' antenatal maternal orientation and

postnatal distress (anxiety, depression and OCD). Furthermore, antenatal maternal orientation did not mediate the relationship between perfectionism and postnatal depression and anxiety. There may be theoretical reasons for this finding. Only a small number of women were found to have a 'Facilitator' (N= 15, 17.9%) or 'Regulator' orientation (N=10, 11.9%) with the majority of the sample (N=55, 65%) not reaching 1 standard deviation above the mean for either orientation. This suggests that women in this sample were experiencing less rigidity across the 'Facilitator' and 'Regulator' philosophies. Furthermore, a very small proportion of the sample (N=4, 4.8%) fell into a 'bipolar' (Raphael-Leff, 2001) category of women who embrace both mothering orientations at once. The theory proposed by Raphael-Leff (2001) did evolve to include an orientation, described as 'Reciprocators' (those in negotiation between the two orientations). However, this was not measured explicitly within this sample, as the AMOM-R (Roncolato & McMahon, 2012) only measures women's scores on the 'Facilitator' and 'Regulator' orientations. Although speculative, the high number of women experiencing a less rigid maternal orientation may help to explain the low prevalence of postnatal depression and anxiety in the current sample, with research (Raphael-Leff, 2001; Sharp & Bramwell, 2004) finding that 'Reciprocators' (although still susceptible to some depression due to the 'ambivalent' nature of their philosophy) may be less likely than 'Regulators' and 'Facilitators' respectively to experience distress postnatally.

Although the author strived to utilise reliable and valid measures, the AMOM-R (Roncolato & McMahon, 2012) used to measure participants' antenatal maternal orientation was found to have poor reliability (α= .52) compared to the Australian sample (α= .71) with which it was validated (Roncolato & McMahon, 2012). In the current sample, the Cronbach's alpha for the Facilitator subscale was improved by removing three questions pertaining to intentions regarding infant feeding. This suggests that participants' responses to questions

regarding infant feeding are important in understanding their anticipated mothering philosophy. This requires further investigation for the current sample. Due to the complexity of the results regarding maternal orientation within the sample, it is difficult to ascertain whether the non-significant results are due to inaccuracies in measurement using the AMOM-R or alternatively whether this 30-year-old concept is still relevant for women in its current form.

Perceptions of feeding and social desirability may also relate to findings regarding socially prescribed perfectionism and postnatal depression and anxiety, with previous literature (e.g. Sockol, Epperson & Barber, 2014) suggesting that women feel under significant pressures to carry, give birth to and parent their baby in particular ways according to societal expectations and norms. For example, the UK actively promotes the breastfeeding of infants, citing its long-term benefits (Horta & Victora, 2013) with the UK government and World Health Organisation (WHO) suggesting that infants should be exclusively breastfeed for the first six months (NICE, 2014; WHO, 2001). Despite this guidance, Department of Health (DoH) statistics for 2012-2013 found that although the initiation of breastfeeding was high (73.9%), prevalence rates at 6-8 weeks fell to 47.2% (DoH, 2013). For the current sample, although the majority (88%) stated some intention to breastfeed, only 35.7% were exclusively breastfeeding at 6-12 weeks postpartum, with a further 15.5% using a combination of breast and bottle-feeding. This suggests a possible tendency for pregnant women to respond in a way that they believe is expected to garner acceptance from pregnancy-related services. This could be exacerbated by a lack of information and accessibility for mothers who chose to bottle-feed or are unable to breastfeed, with many midwifery units and hospitals no longer providing formula for women who cannot or choose not to breastfeed unless medically indicated (as suggested by NICE, 2014).

The UK context regarding breastfeeding may also help to understand the differences in reliability coefficients in the AMOM-R between the current and Australian sample (Roncolato & McMahon, 2012). When considering infant feeding, Australian women are given the same guidance by the WHO (2001) and encouraged to exclusively breastfeed, as are women in the UK. However, removing the three questions regarding feeding in this sample improved the reliability of the measure from 'poor' to 'good' indicating that such pressures regarding feeding may be more notable in the current sample than the Australian one. The Australian National Breastfeeding Strategy 2010-2015 was published in 2010 (Australian Health Ministers' Conference, 2009) to increase the number of mothers' breastfeeding their infants across Australia. It seems intuitive that this may have increased systemic pressure (e.g. by maternity services) to breastfeed, as currently seen in the UK and could account for the differences found between the current and Australian (Roncolato & McMahon 2012) samples, given the research was published in 2012. Furthermore, whether the feeding questions would now have any impact on the reliability of the measure in the Australian sample is unclear.

Demographics

Demographic factors may also help to make sense of some of the findings. Previous research has suggested that a range of characteristics are associated with the development of postnatal mental health difficulties. Examples of these include low maternal education level, lack of social support, low socio-economic status and prior mental health difficulties (e.g. Martini, Petzoldt, Einsle, Beesdo-Baum, Hofley & Wittchen, 2015; Schmied et al, 2013; Scrandis et al, 2007; O'Hara and Gorman, 2004; Robertson et al, 2004). In comparison, the current sample of first time mothers were highly educated (with 34.5% having a professional qualification and thus unlikely to be defined as being of low socioeconomic status), mostly

married or cohabiting (suggesting some level of support) and only 15% of the sample reported prior mental health difficulties suggesting many protective factors against development of postnatal mental health in the present sample.

Both antenatal distress (which may include prior mental health difficulties) and lack of social support were found to be associated with postnatal depression, anxiety and OCD in this sample. The current study also highlighted other important variables including mothers' perceived relationship with their baby, feelings of control and powerlessness and sleep experiences to be important in grouping the sample according to severity of postnatal distress. Those lacking social support had high levels of postnatal depression (EPDS=16.8) and antenatal OCD and anxiety predicted higher levels of symptomology 6 to 12 weeks postpartum than in other participants.

Strengths and Limitations

The prospective longitudinal design of this study, which allowed for the collection of data from pregnancy through to the early postnatal period with women from the general population, is generally considered superior to retrospective longitudinal designs, which are inherently susceptible to recall biases.

However, there are several limitations of the current study that might mitigate against external validity. Twenty-five women were not contactable during the postnatal period, reducing the sample size to n=59, indicating an attrition rate of 29%. Although this may somewhat limit the ability to generate reliable conclusions regarding postnatal mental health, it is suggested that attrition up to 20% rarely presents a serious levels of bias to the results found (e.g. Fewtrell et al, 2008), with 29% thus being suggested as a moderate attrition rate

and not presenting particular bias. However, this sub-section of participants may represent a proportion of women experiencing higher levels postnatal anxiety, depression or OCD, who are possibly finding the transition to motherhood challenging. This may also account for the lower than expected prevalence of postnatal anxiety and depression found in the current sample.

Another limitation involves the use of self-report measures rather than the use of formal psychiatric diagnosis, as utilised in previous studies (e.g. Gelabert et al, 2012). However measures such as the EPDS (to measure perinatal depression) have been found to have good specificity and sensitivity and therefore confidence is given to its ability to screen for depression and anxiety (Mathey, Fisher & Rowe, 2013; Murray & Carothers, 1990). Furthermore, although not validated for a perinatal population specifically, the FOCI has been found to have good internal consistency with questions appearing to relate to concerns found in perinatal OCD (for example concerns regarding harm to a loved one, experiencing images of death or other horrible events and concerns regarding contamination as described by McGuinness, Blissett & Jones, 2011; Uguz & Ayhan, 2011 & Misri & Kendrick, 2007). It may, however have been beneficial to have utilised a screening measure specific to the perinatal period (although only one has become available since the development of the current study).

Clinical Implications

Given the use of post-hoc analyses, the clinical implications discussed are tentative in nature. Nevertheless, the results may have implications for assessment and intervention with community samples of women in the perinatal period.

As found by other research (e.g. Coelho, Murray, Royal-Lawson & Cooper, 2011; Heron et al, 2004), the presence of antenatal mental health difficulties was associated with the development of mental health difficulties into the postpartum, suggesting that distress is not specific to the postnatal period for many women, with the prevalence in this sample being higher in the antenatal period than the postnatal one. Furthermore, research by Coelho, Murray, Royal-Lawson & Cooper (2011) found that antenatal anxiety and depression predicted postnatal anxiety and depression as early as 10-14 days postpartum up to two years after birth. Given this, it seems important for services to routinely monitor and assess women for mental health difficulties during pregnancy, as well as completing the current postnatal screening. Given the profound effect that perinatal mental health difficulties can have on the mother and her baby (e.g. Lee & Chung, 2007; Goodman, 2004) early intervention may play a role in reducing the severity of these outcomes. Systemic interventions addressing hopes of motherhood, cultural expectations and realities (e.g. around breastfeeding) may reduce poor outcomes and difficulties. Examples of systemic interventions may include work with wider communities regarding the pressures on women to seek perfection and more support from services regarding bottle-feeding. Individual interventions may focus upon perfectionism traits and associated beliefs specific to the woman during pregnancy to support her to enjoy her experience of early motherhood, hopefully experiencing less pressure to meet the unrealistic standards set by oneself and others.

The findings regarding the association between the experience of motherhood and postnatal distress are also interesting and suggest a complex constellation of factors that impact upon maternal wellbeing. Some of these factors are already well researched, such as lack of social support (e.g. Martini, Petzoldt, Einsle, Beesdo-Baum, Hofley & Wittchen, 2015) but previous research (e.g. Maia et al, 2012) and the current findings, also suggest that

some cognitive and internalised factors and attitudes are important and might also be important to consider in terms of both interventions and future research.

Future Research

Future research could consider a more detailed exploration of maternal orientation to include the Regulator and 'bipolar' philosophies, to ascertain whether the four philosophies remain to be measurable constructs for UK women in the 21st Century. This could inform the further development of appropriate assessment tools to measure antenatal maternal orientation. Particular consideration of wider cultural issues (for example pressures to breastfeed by midwifery and hospital services as well as wider societal norms) and the societal pressures and expectations that women now experience compared to when the concept was first defined is warranted. Although there is an abundance of research regarding the predictors of perinatal mental health difficulties, specific research regarding the factors that influence women's experiences of early motherhood would complement this, as well as an increase in services (e.g. GPs and health visiting) ability to support women more appropriately during the early postnatal period.

Conclusions

This study aimed to explore the relationship between perfectionism and postnatal distress in a sample of UK first-time mothers, and specifically whether this relationship was mediated by mothers' maternal orientation and moderated by early experiences of motherhood. Relationships were found between socially prescribed perfectionism and postnatal anxiety and depression but these were not mediated by antenatal maternal

orientation. Antenatal depression was found to partly explain the relationship between perfectionism and postnatal depression. Other variables such as sleep, social support, perceived relationship with baby and feelings of control and powerlessness were also found to be important factors in the understanding of early motherhood and postnatal distress. Limitations of the study relate to some of the assessment tools utilised and the low prevalence of postnatal depression and anxiety in this sample when compared to previous studies. Despite some limitations, the results contribute to the evidence-base regarding important factors associated with postnatal distress in first-time mothers.

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Chapter Three
Public Domain Briefing Document

This document provides an overview of the thesis submitted in partial fulfilment of the requirements for the degree of Doctorate of Clinical Psychology (Clin.Psy.D.) at the University of Birmingham. This document summarises both a systematic review and an empirical paper.

Paternal Mental Health During the Perinatal Period and its Impact upon Preadolescent Outcomes: A Systematic Review

Background: It is now recognised that fathers as well as mothers may experience mental health difficulties in the perinatal period (pregnancy to the child's first birthday), with a review by Bradley & Slade (2011) suggesting that fathers may experience mood disorders (such as anxiety, depression and Obsessive Compulsive Disorder (OCD) and even more severe difficulties such as Post Traumatic Stress Disorder (PTSD) and psychosis. Other research has suggested that the risk factors found for maternal mental health are similar for fathers, with low socioeconomic status, low education level and marital/ relationship dissatisfaction (Bergstrom, 2013) being found to be associated with those experiencing postnatal depression. Fathers are now found to be playing a much more central role in caring for their children and it has been argued that this shift has contributed to higher levels of anxiety and depression in men trying to manage this new role (Buist, Morse & Durkin, 2003). Although a wealth of information is available regarding the impact of maternal mental health on their children (e.g. see Sanger, Iles, Andrews & Ramchandani, 2015 and Stein et al, 2014 for reviews), much less is known about the same relationship for paternal mental health,

although some evidence of risks are emerging, including associations between paternal depression and internalising and externalising problems in their children (Wilson & Durbin, 2010).

Aim: The review aimed to explore whether there is a relationship between paternal mental health in the perinatal period and poor outcomes in their preadolescent children.

Method: A systematic search of five databases was conducted to identify relevant research papers focusing upon paternal mental health in the perinatal period (pregnancy to child's first birthday) and child outcomes measured before the age of thirteen. After screening, 18 papers were chosen to be included in the review. Relevant information about the studies including the sample size, research design, and questionnaires used and key findings were extracted and the quality of the study assessed.

Findings: The review found fairly consistent evidence for internalising (e.g. depression and/or anxiety disorders, somatic complaints, and experiences of fear or loneliness) and externalising (e.g. aggression, conduct disorder and oppositional defiant disorder (Sanger et al, 2015) problems and mixed evidence for socioemotional and cognitive difficulties and child temperament. However there were a number of limitations within the 18 studies, including the difficulty in being able to conclude if perinatal mental health in fathers *causes* poor child outcomes and high levels of participant dropout. Furthermore a lack of clarity regarding the outcomes being explored was noted in some studies, with a number using generic terms such as externalising and internalising problems rather than a focus on specific behaviours (e.g. hitting) or emotional difficulties (e.g. experiencing anxiety).

Conclusion: The review found mixed evidence supporting a relationship between paternal perinatal mental health difficulties and poor outcomes in their preadolescent children.

However, more consistent evidence was found for externalising and internalising problems in children. More research is required regarding fathers' mental health during this period more generally as well as exploring *how* preadolescent child outcomes may be influenced by their fathers' mental health in the perinatal period.

Empirical Paper: The Role of Antenatal Maternal Orientation in Exploring the Relationship between Perfectionism and Postnatal Distress

Background: Many women find pregnancy and becoming a mother a happy and exciting time. However for others, mental health problems such as depression, anxiety and OCD may develop or existing problems may worsen. It is estimated that 1 in 10 women will experience mental health problems during pregnancy and the year after birth, defined the perinatal period (O'Hara & Swain, 1996), which can have a detrimental impact upon the woman, her child and wider family (e.g. Lee & Chung, 2007; Goodman, 2004; Grace, Evindar & Stewart, 2003; Murray & Cooper, 1997; Sharp, Hay, Pawlby, Schmucker, Allen & Kumar, 1995). A range of factors are known to predict perinatal mental health in women, including perfectionism (Macedo et al, 2009; Maia et al, 2012), maternal orientation (referring to particular intentions and beliefs about being a mother) (defined by Raphael-Leff, 1983), age, a low level of education and lack of social support (e.g. Martini, Petzoldt, Einsle, Beesdo-Baum, Hofley & Wittchen, 2015).

Aim: The aim of the current study was to explore whether perfectionism was related to experiences of postnatal distress (depression, anxiety and OCD) in first time mothers and whether this relationship could be explained by maternal orientation measured during pregnancy. The second aim was to explore whether the strength of any aforementioned relationships were affected by participants' experience of being a mother.

Method: Women were asked to complete six questionnaires during pregnancy (Multidimensional Perfectionism Scale, Edinburgh Postnatal Depression Scale, Florida Obsessive Compulsive Scale, the Antenatal Maternal Orientation Measure-Revised) and some demographic information including their education, age and whether their pregnancy was planned. They were then asked to complete three more questionnaires, six to twelve weeks after giving birth (the Edinburgh Postnatal Depression Scale, Florida Obsessive Compulsive Scale and the Mothers Postnatal Health Questionnaire) and asked some questions regarding their experience of being a mother including information about labour, their baby's sleep and their level of stress.

Findings: Eighty-four women completed the questionnaires in pregnancy and fifty-nine were followed up after the birth of their baby. The results illustrate a relationship between socially prescribed perfectionism (the pressure to meet the unrealistic expectations of others) and postnatal depression and anxiety. Participants' antenatal maternal orientation (intentions and beliefs about being a mother) had no impact upon this relationship. Mental health in pregnancy, the impact of lack of sleep, feelings of control and powerlessness, perceived relationship with baby and levels of social support were found to be important in understanding what might predict depression, anxiety and OCD after the birth of a baby.

Conclusion: Understanding what may predict maternal mental health problems in the postnatal period is a complex undertaking. However this study has highlighted that pressure to meet the unrealistic expectations of others, mental health in pregnancy and other aspects of becoming a mother are important in understanding the development of postnatal distress in first time mothers.

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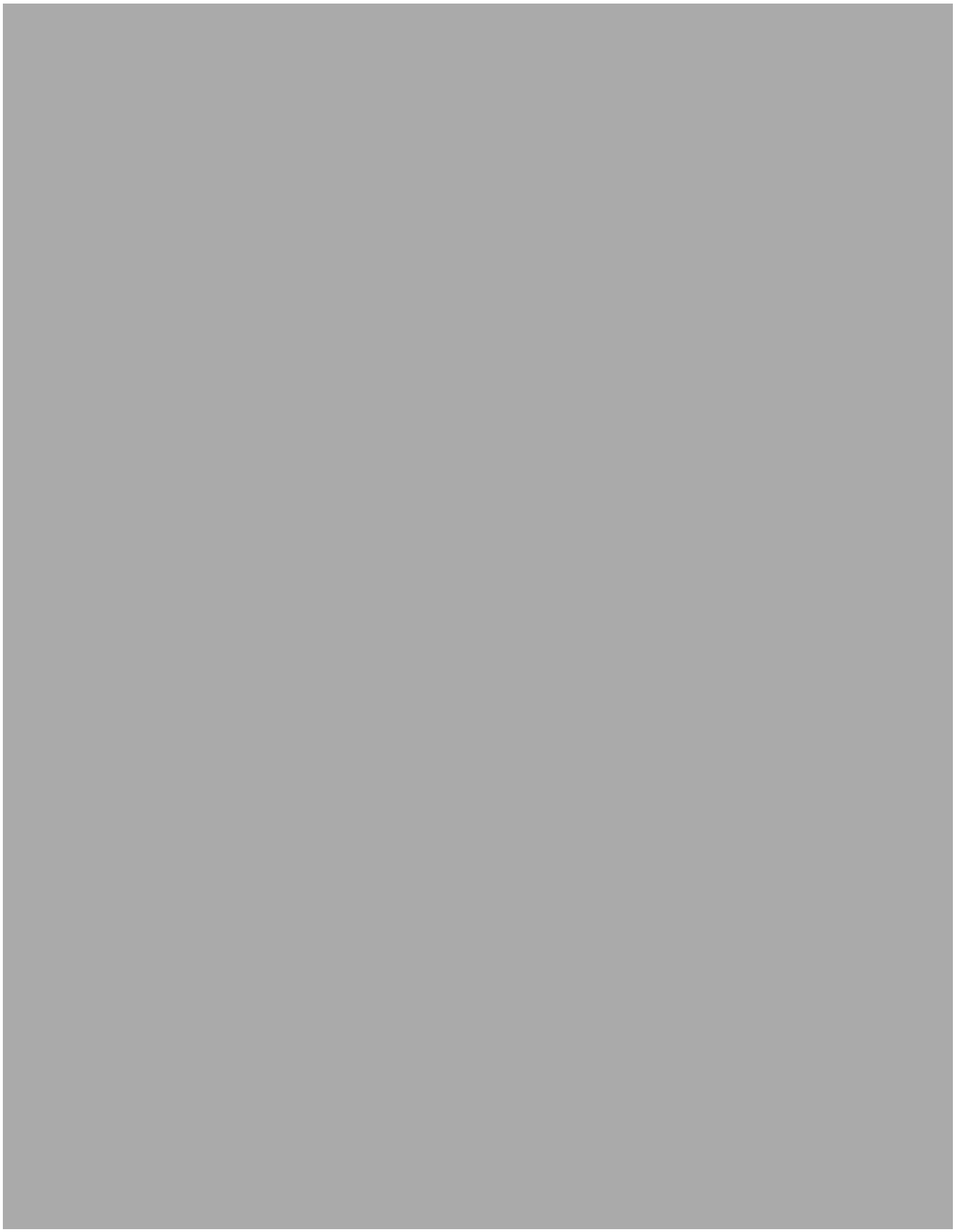
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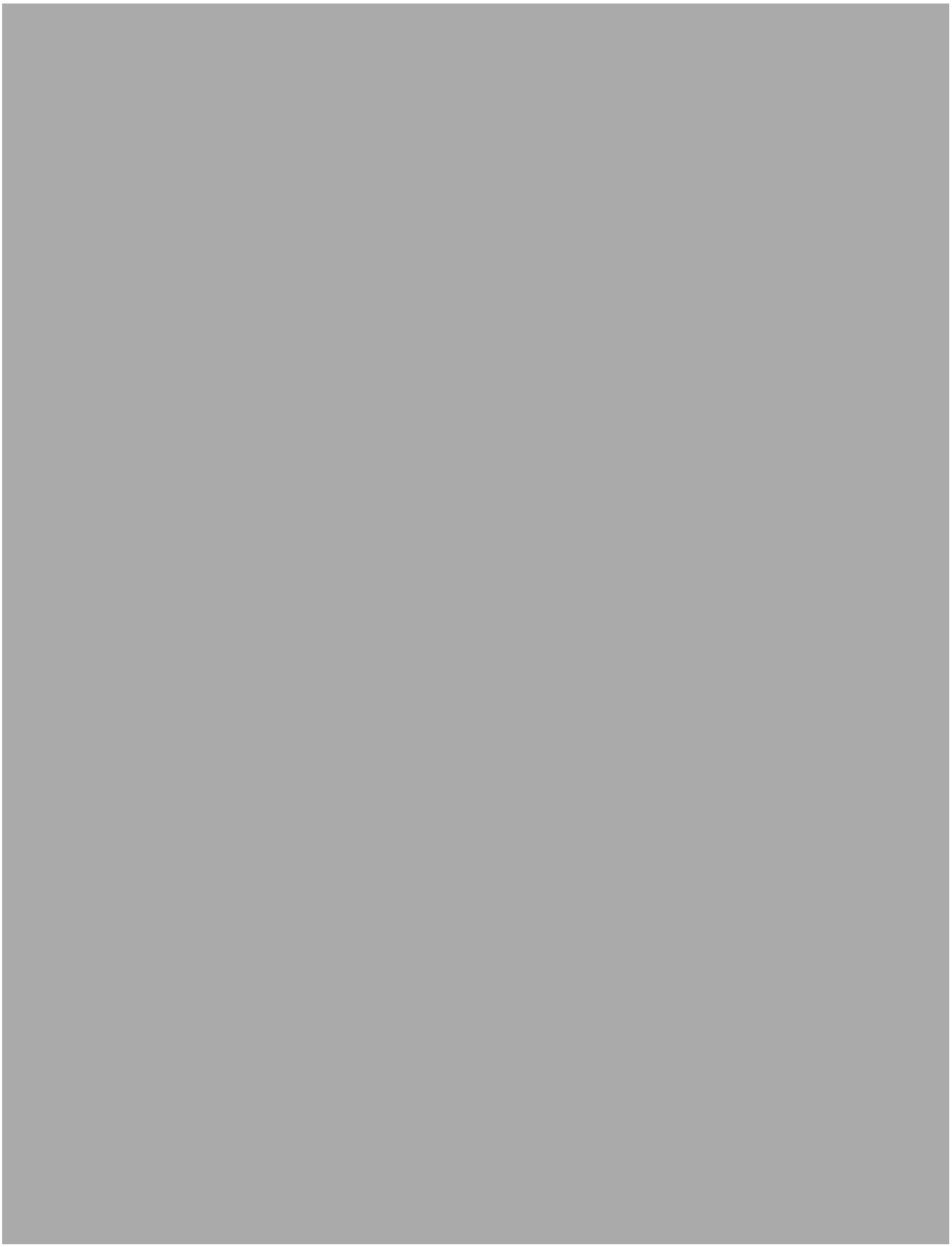
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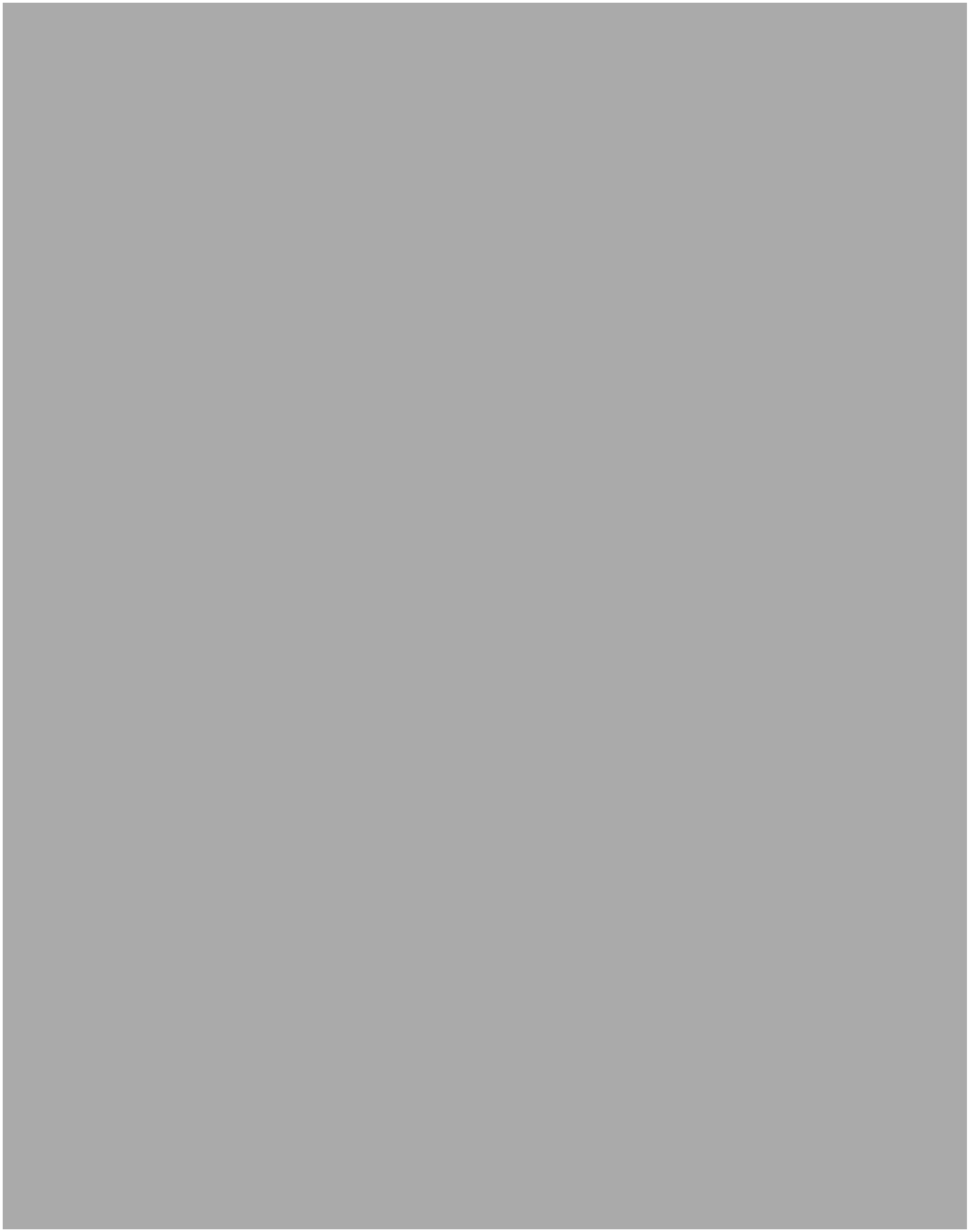
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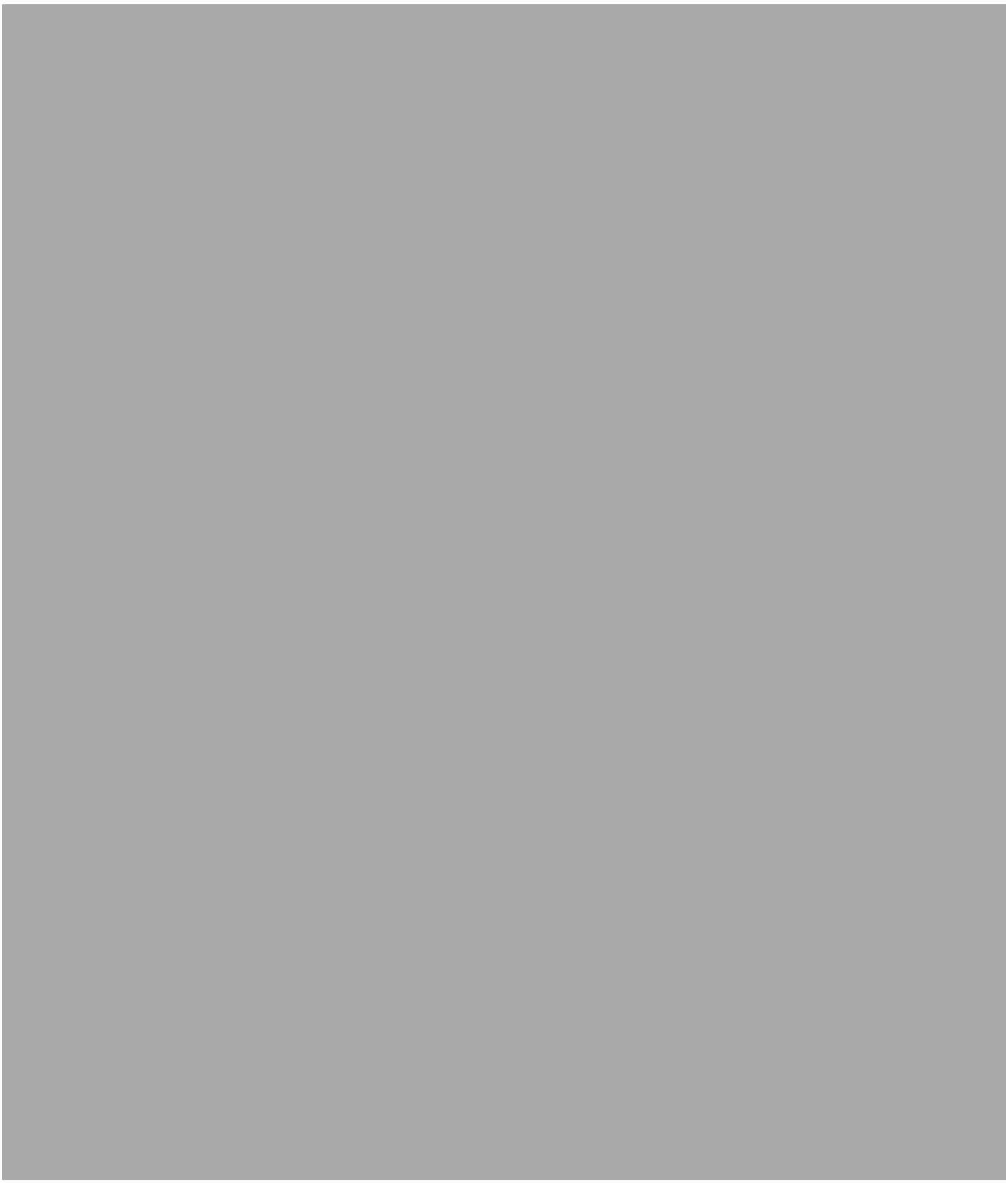
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Appendix A: Research Ethics Committee Approval Letter

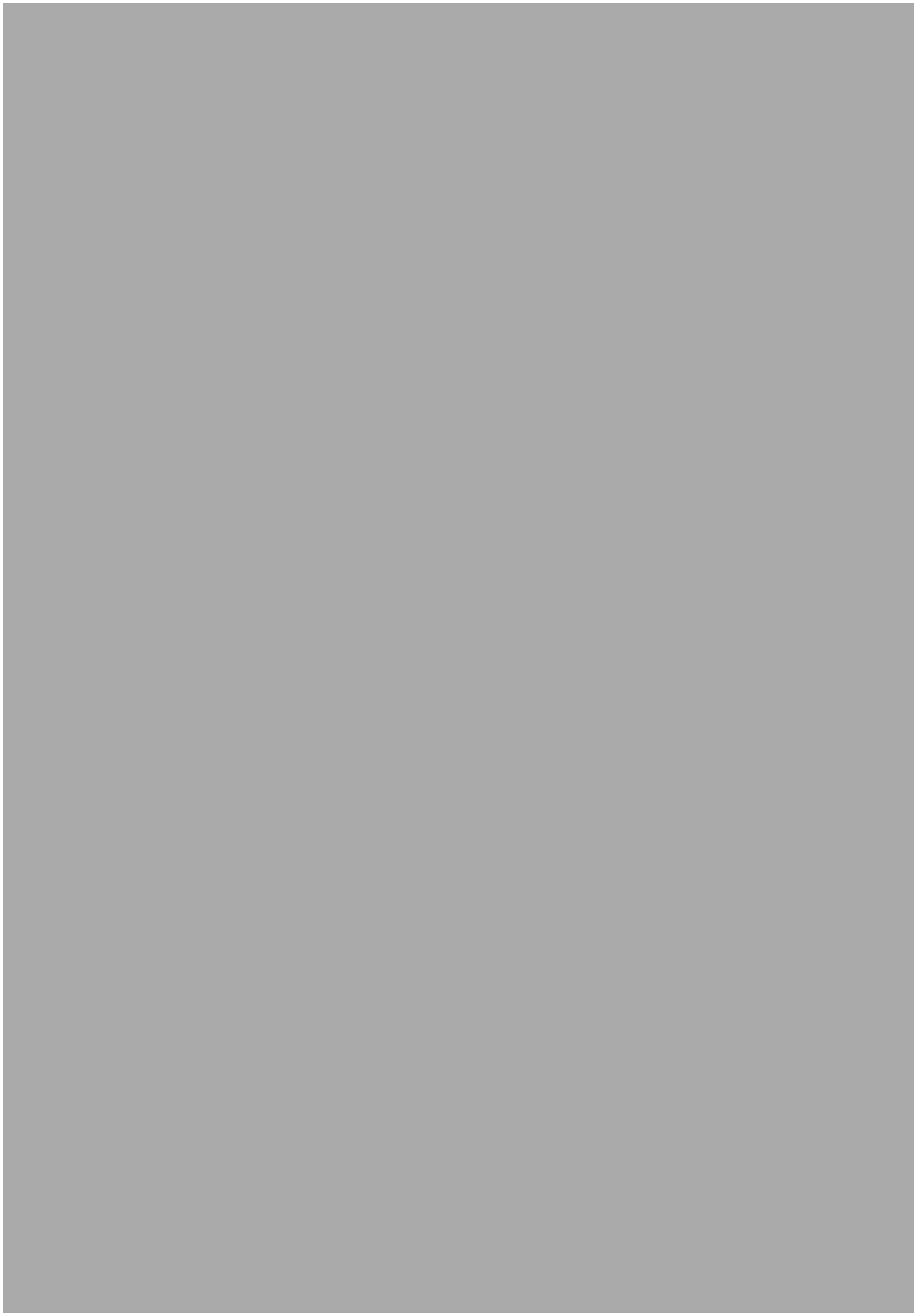


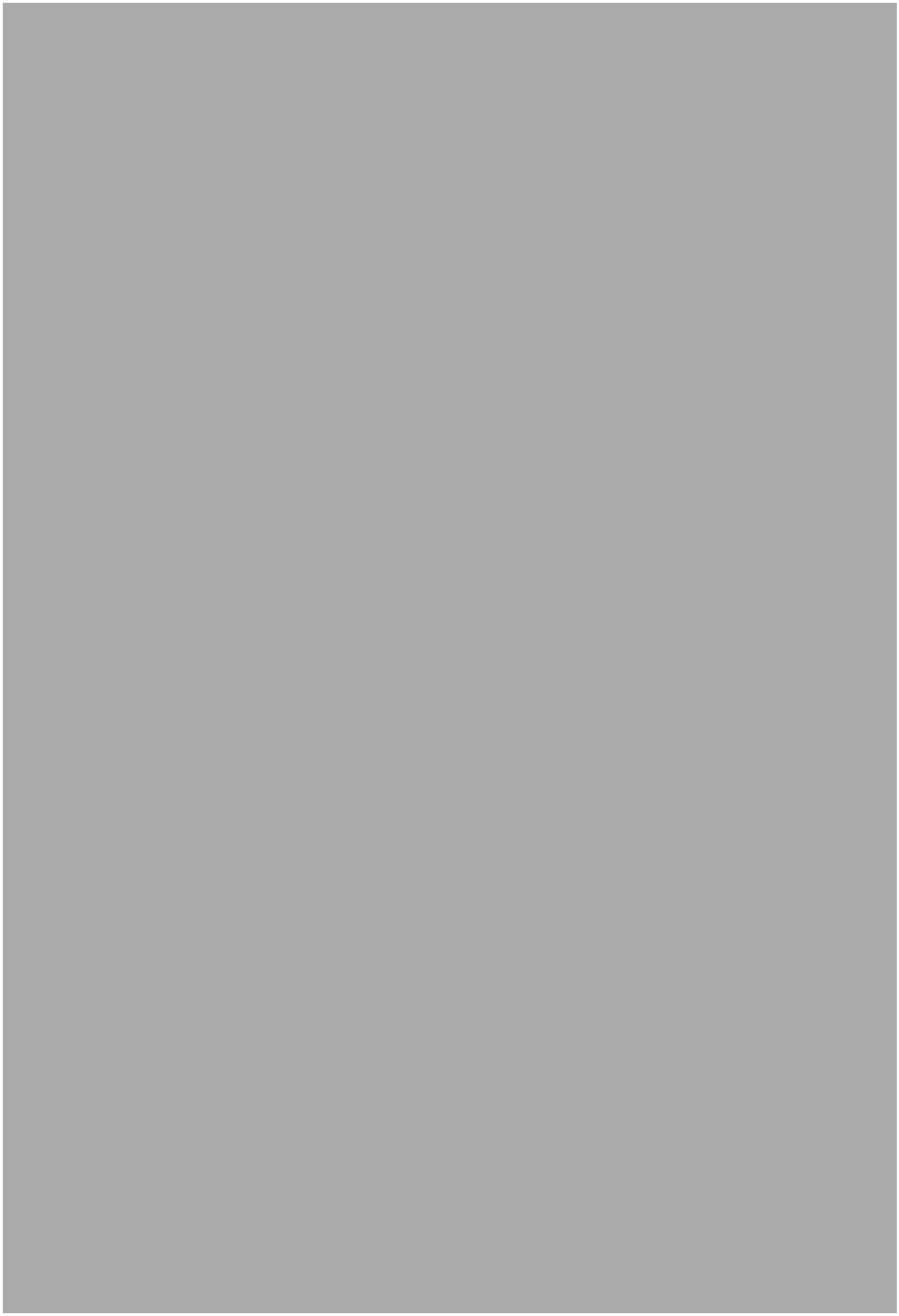






Appendix B: Research and Development Department Approval Letter





Appendix C: Participant Information Sheet

UNIVERSITY OF BIRMINGHAM

Participant Information Sheet

The expectations and experiences of new mothers

My Name is Lucy Murray and I am a Trainee Clinical Psychologist studying for a Doctorate in Clinical Psychology at the University of Birmingham. I am Chief Investigator of this research project and am supervised by Dr Ruth Butterworth (Clinical Psychologist, University of Birmingham), Dr Chris Jones (Consultant Clinical Psychologist, University of Birmingham and Dr Mary McGuinness (Consultant Clinical Psychologist, Perinatal Mental Health Service, Birmingham and Solihull Mental Health Trust). Charlie Bamford is also a member of the research team assisting with data collection and is studying for a Masters in Research at the University of Birmingham.

We would like to invite you to consider participating in this research study regarding the expectations and experiences of first time mothers. Prior to you giving consent to participate in the research it is really important that you understand why the research is being conducted and what you will be asked to do. Please take time to read the following information sheet and discuss it with others if you wish. You are under no obligation to participate in the study. If you do decide that you would like to participate you will be asked to sign a consent form. You can change your mind at any time and withdraw from the study at any time without giving a reason. This will in no way impact upon the care that you or your baby receives. The research has been given ethical approval by NRES Committee West Midlands in Edgbaston.

What is the purpose of this research?

Pregnancy and motherhood are exciting and fulfilling life events for many women. Unfortunately for some they may also be a time of difficulty where they feel depressed, anxious or experience negative thoughts. There may be many reasons for the different ways that women experience pregnancy and motherhood such as social support, personality and access to financial resources. This research is investigating whether there is a link to some psychological predictors (such as certain personality traits) and the development of emotional difficulties in early motherhood (in this case postnatal depression and postnatal obsessive-compulsive disorder (OCD). Furthermore, if women's expectations and experience of early motherhood play a role in this. It is hoped that the results of this research will

inform the development of psychological interventions for women who experience mental health difficulties such as depression or obsessive-compulsive disorder (OCD) after the birth of their baby.

Why have I been invited to take part?

You have been invited to take part as you are currently pregnant, in your third trimester and you are attending antenatal appointments at a community midwifery clinic within Birmingham.

What will happen to me if I agree to take part?

If you agree to take part you will be asked to:

(1) Complete a consent form

(2) Complete a demographic information questionnaire – to give us some information about you such as your employment status and age.

(3) Complete 4 questionnaires looking at your personal characteristics and traits For example - *I strive to be the best at everything I do*); expectations of becoming a mum (e.g. What do you imagine your baby will be like at first?); your current mood (e.g. *I have been anxious or worried for no good reason*) and unpleasant thoughts or worries (e.g. *Have you worried a lot about terrible things happening?)* whilst you are in your third trimester of pregnancy. This may take about 20 minutes.

(4) Once you have given birth to your baby, we will contact you around 4-6 weeks after this to arrange another meeting. This can take place at your home or at the clinic (wherever feels most convenient).

(5) At this meeting you will be asked to complete another brief information questionnaire about your experience of early motherhood (example question- *It is really interesting to watch my baby develop*). You will also be asked to complete the same two questionnaires that you completed whilst you were pregnant regarding your current mood and any unpleasant thoughts or worries. I will also ask you some questions about your baby's sleep and feeding patterns as well as a little about the birth. This may take about 25 minutes.

What happens if I agree to take part and then change my mind?

You can refuse to finish the questionnaires at any point during the study. Your treatment will not be affected if you decide not to take part or withdraw at any point. If you decide to withdraw from the study after completing the questionnaires please contact us and we will use your ID code to identify and remove your results. We will not keep a record of your results or any personally identifiable information.

Will anyone be informed that I am taking part in the study?

Yes, with your agreement, your GP will be informed that you are participating in the study. This is the case for many research studies. However, all data and answers that you give will be kept confidential to the research team, unless there are serious concerns about your safety or the safety of others.

What are the potential benefits and disadvantages of taking part in this study?

The information we get from this study will help improve the understanding of the psychological predictors of emotional difficulties in first time mothers. Sometimes people feel inconvenienced by spending time completing questionnaires. Some people may get distressed when answering questions about their expectations or experiences of being a mum and their mood and anxiety. Everyone who takes part will be provided with a list of potential sources of help or support. You can also contact your GP initially or midwife or health visitor.

Will my taking part in the study be kept confidential?

All information which is collected about you during the course of this study will be kept strictly confidential. This research follows the Code of Conduct, Ethical Principals and Guidelines published by the British Psychological Society. All participants will be given a unique ID code. Consent forms will be stored separately from the questionnaires. All data will be kept in a secure location with assess only permitted to members of the research team. Information will be kept securely for 12 months and then will be destroyed. No names or identifying information will be released in any publications. Your personal contact details (e.g. address and telephone numbers) will be stored securely at the University of Birmingham and will only be used to contact you for follow up after the birth of your baby and to send you a copy of the results of the research.

What will happen to the results of the research study?

The results of the research study will be combined with other pieces of work to create a thesis as part of the requirements for my doctorate in clinical psychology. I hope to write up the research study as an article to be published in a scientific journal. As all data will be anonymous your confidentiality and anonymity will be ensured.

What happens if I have any further concerns?

If you have any further concerns about your participation in this research you can contact the chief investigator Lucy Murray on [redacted] o [redacted]. You may also contact the principal investigator, Coralie Rogers (Maternity Outpatient Matron) on [redacted] to discuss any concerns you have about participating in this study.

You may also discuss your participation in the research with a member of the NHS Patient Advice and Liaison Service (PALS). The telephone number for PALS at Birmingham Women's NHS Foundation Trust is 0121 627 2747. Should you have cause to complain, PALS can also help you with this process via the NHS complaints service. You may also complain via the Course Director of the Clinical Psychology Doctorate Course at the University of Birmingham –

Dr Theresa Powell
University of Birmingham
School of Psychology
Edgbaston
Birmingham
B15 2TT
Tel: 0121 414 7124

If you require any further information please do not hesitate to get in touch as outlined above.

Thank-you in advance,

Lucy Murray

Appendix D: Informed Consent Form



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Informed Consent Form

Project Title: The expectations and experiences of new mothers

Researcher: Lucy Murray, Trainee Clinical Psychologist

Participant ID Number: ____

Please initial each box

1. I confirm that I have read and understood the information sheet (date 09.05.14 version 3) for the above study. I have had the opportunity to consider the information, ask any questions and have had these answered to a satisfactory standard. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time (including at the postnatal stage), up until 31st December 2014 without giving any reason, without my medical care or legal rights being affected in any way. ☐

3. I agree to my GP and midwife being informed of my participation in the study. (No information as to my responses will be shared unless there are serious concerns about safety) ☐

4. I agree for the lead researcher to contact my midwife and / or health visitor to ascertain when I have given birth and obtain up to date contact details so they are able to contact me to complete the second part of the study. ☐

5. I agree for my data to be stored securely by the chief investigator at the University of Birmingham. I understand that aspects of my data (e.g.annonymised questionnaires) will be looked at by the research team at the University of Birmingham as part of the research process. ☐

6. I agree to take part in the study. ☐

7. I agree to the lead researcher contacting me in the following ways:

Text Phone Letter Email

_____	_____	_____
Name of participant	Date	Signature
_____	_____	_____
Name of researcher	Date	Signature

Appendix E: Self-Harm Protocol



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Self-harm risk protocol

Title of the project: Postnatal distress and the expectations and experiences of new mothers

Overview

For the purpose of this protocol, risk of self-harm is defined as:

a) A score of 2 or 3 in the relation to question 10 on the EPDS *'The thought of harming myself* has occurred *to* me (An answer of *'Sometimes'* scores 2 and an answer of '*Yes, Quite Often'* scores 3). Risk is also defined as other disclosures or thoughts to harm self.

Procedure

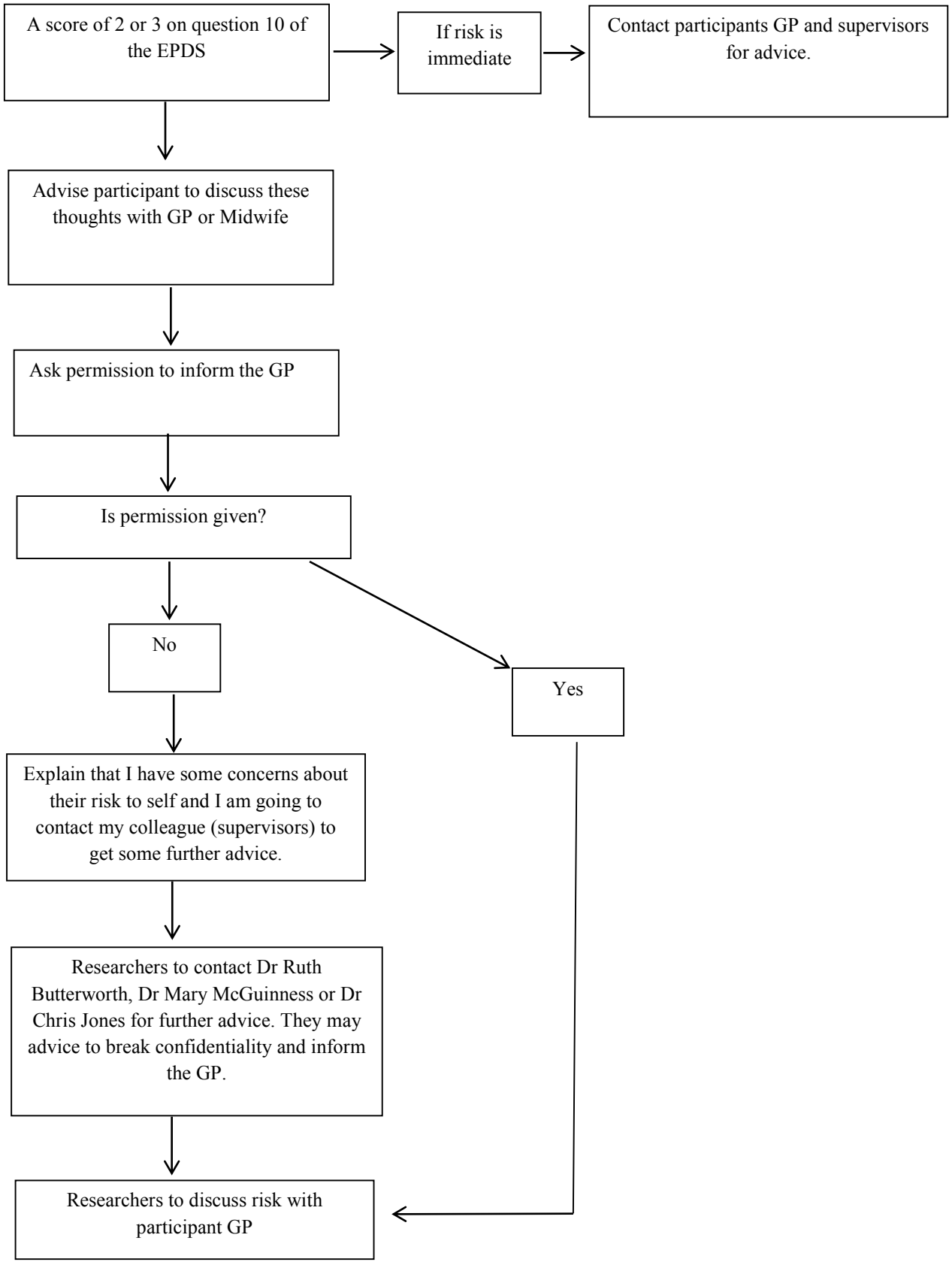
Prior to the researcher leaving the participant, the response to question 10 of the EPDS will be checked. If the participant has scored either 2 or 3 on question 10 her response will be explored further to determine the most appropriate course of action

If any risk is identified but this is **not immediate**, it will be suggested that the participant contacts their GP or midwife in the first instance to seek further support. Permission will be asked for the researcher to contact their GP. If consent is not given, the researchers will explain that they have some concerns about the participant's thoughts and would like to contact their supervisors for further advice. Supervisors may suggest the need to break confidentiality and inform the GP.

If the risk is **immediate** (i.e. the participant discloses firm plans to harm herself), the researchers will stay with the participant. During this time, the researchers will contact the participant's GP for advice. Research supervisors will also be contacted.

The chief investigator (Lucy Murray) is a Clinical Psychologist in Training with experience of assessing and managing risk. She also has access to support and supervision from Dr Ruth Butterworth (Academic Tutor and Clinical Psychologist), Dr Mary McGuinness (Consultant Clinical Psychologist) and Dr Chris Jones (Research Director and Consultant Clinical Psychologist) where this is required. Charlie Bamford (MRes student) also has access to the above supervision and support if required.

Self-Harm Action Flow Diagram



Appendix F: Letter to General Practitioners



UNIVERSITY OF BIRMINGHAM

Lucy Murray
Trainee Clinical Psychologist
Department of Clinical Psychology
School of Psychology
Frankland Building
University of Birmingham
Edgbaston
Birmingham
B15 2TT

Dear Dr_____,

Re: Patient Name_____, Patient DOB_____

I am writing to inform you that the above named patient has given their consent to participate in the research study entitled: *Postnatal distress and the expectations and experiences of new mothers*

This research aims to explore the relationship between perfectionism and postnatal distress and the expectations and experiences of first time mothers. To complete this, participant's will be asked to complete some questionnaires regarding their mood and expectations of motherhood in their third trimester of pregnancy. Approximately 6-12 weeks after the birth of their baby, they will be asked to complete some more questionnaires regarding postnatal health and mood. Demographic data will also be collected.

In the event that participants identify significant distress while completing the questionnaires they will be directed initially to you as their GP and secondly to their midwife or other care professional including A & E in the event of any immediate risk.
Their participation in the research is entirely voluntary and they are free to withdraw at any time. All data will be anonymous and stored on a secure computer which only the chief investigator and the research supervisors can access.

Yours Sincerely,

Lucy Murray

Trainee Clinical Psychologist & Chief Investigator

Appendix G: Antenatal Data Collection Form





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Antenatal Data Collection Form

Title of the project: The expectations and experiences of new mothers

Date:
Due date:
Participant number:
Age:
Date of Birth:

How would you describe your ethnicity? (Please tick relevant box):

Arab	Mixed- White and Black Caribbean
Asian or Asian British – Indian	Mixed- White and Black African
Asian or Asian British – Pakistani	Mixed- White and Asian
Asian or Asian British – Bangladeshi	Mixed- Other mixed background
Asian or Asian British – any other Asian background	White- British
Black or Black British – Caribbean	White- Irish
Black or Black British – African	Any other white background
Black or Black British – any other Black background	Any other ethnic origin group
Chinese	Please specify_____

Are you:

Single	Married
Co-habiting	Civil partnership
Widowed	

What educational qualifications do you have (Tick all that apply):

None	GCSE/E-Bacc
A level	NVQ/College course
Undergraduate degree	Masters degree
PhD/Doctorate	Professional qualification

Please state: _____

What is your employment status? (if appropriate tick the status that you were employed under prior to your maternity leave)

Unemployed	Employed-Part time
Employed- Full time	Self-employed
Student	

If you are in a relationship, what is your partner's employment status?

Unemployed	Employed-Part time
Employed- Full time	Self-employed
Student	

D**id you conceive naturally?** Yes No

Did you plan this pregnancy with your partner? Yes No

Have you ever experienced any mental health difficulties before this pregnancy?

Yes No

If so, have you received any support, medication or intervention in relation to this?

Appendix H: Postnatal Data Collection Form



UNIVERSITY OF BIRMINGHAM

Postnatal Data Collection Form

Title of the project: The expectations and experiences of new mothers

Date:
Participant number:

Did your birth experience go as you had hoped?_____

_____

What type of delivery did you have?

Vaginal uncomplicated
Vaginal complicated (e.g. assisted by forceps or vacuum)

Planned caesarean section
Emergency caesarean section

Did you experience any complications? Yes No

If so what were these? _____

What has been your experience of feeding since the birth of your baby?_____

Are you:

Breast feeding
Bottle feeding
A combination of both

How are you finding your baby's sleep? _____

Has your baby had any illness since they were born? Yes No

If yes what were/are these?_____

Outside of being a mum, how much stress would you say you currently under? (Please tick)

Low
Medium
High

Thank you for taking the time to complete this form

Appendix I: Participant Debrief Form

[redacted]



UNIVERSITY OF BIRMINGHAM

Participant Debrief Sheet

[redacted]

Title of the Research: The expectations and experiences of new mothers

Researcher: Lucy Murray, Trainee Clinical Psychologist

Participant ID Number:

Thank you for taking the time to participate in the research study

The purpose of the research is to understand some of the psychological predictors of postnatal distress in first time mothers. We are particularly interested in whether perfectionism and expectations and experiences of early motherhood play a role in this.

It is hoped that the research findings will help to develop a better understanding of the psychological factors influencing postnatal distress and inform the development of evidenced based psychological interventions.

Can I still decide to withdraw my data?

If you decide that you would like to withdraw your data from the study you can do this up until 1st November 2014 by contacting the lead researcher Lucy Murray on [redacted]

What will happen to the research findings?

The results will be written up as an academic report as part of my Doctorate in Clinical Psychology qualification and submitted to an academic journal. If the results contribute to the knowledge in this area they will be submitted to an academic journal where the results can be viewed by the wider population. They may also be presented at academic conferences. Your confidentiality will be completely maintained at all times.

If you would like a copy of the research findings please initial here ☐

If you have found any of the questions upsetting or you feel that you require some additional support you may consider contacting the following services:

NHS Services

Your GP

Your midwife or health visitor

Your local A & E department in an emergency

Charities and voluntary organisations

Acacia Family Support Service 0121 301 5992 (General Enquiries) 07944 900499 (helpline)
www.acacia.org.uk
Provides support for women experiencing pre and postnatal depression. Based in North Birmingham

Mind 0845 766 0163 www.mind.org.uk
Provides information on mental health conditions

Samaritans 08457 90 90 90 www.samaritans.org
Provides confidential emotional support for people experiencing distress

OCD UK 0845 120 3778 support@ocduk.org
Provides support to those experiencing symptoms of Obsessive Compulsive Disorder

If you do have any further questions about the research. Please contact Lucy Murray [redacted]

Please keep this sheet for future reference

Thank you again for your participation

Yours Sincerely

Lucy Murray

Appendix J: Summary table to illustrate the mediation results for perfectionism and postnatal depression.

	Asymptotic Path Estimate	**Bootstrap Path Estimate**	**Standard Error**	**Lower 95% Bootstrap Confidence Interval**	**Upper 95% Bootstrap Confidence Interval**
Perfectionism: Self oriented and Postnatal Depression (β= 0.23, p= 0.15)					
Direct effect in mediated model	0.11		t = 0.64, p = 0.52		
Mediated Path: Regulator		-0.05	0.03	-0.08	0.05
Mediated Path: Facilitaor		0.007	0.01	-0.01	0.06
Total of Direct and Indirect Effects	0.12		t= 0.67, p= 0.50		
Perfectionism: Other oriented and Postnatal Depression (β= 0.27, p= 0.10)					
Direct effect in mediated model	0.18		t= 1.17, p= 0.24		
Mediated Path: Regulator		0.009	0.03	-0.03	0.09
Mediated Path: Facilitaor		0.009	0.02	-0.01	0.10
Total of Direct and Indirect Effects	0.20		t= 1.34, p= 0.18		
Perfectionism: Socially Prescribed and Postnatal Depression (β= 0.41; p= 0.003)					
Direct effect in mediated model	0.36		t= 3.06, p= 0.003		
Mediated Path: Regulator		0.01	0.02	-0.008	0.10
Mediated Path: Facilitaor		0.002	0.02	-0.05	0.05
Total of Direct and Indirect Effects	0.39		t= 3.57, p=0.001		

Appendix K: Summary table to illustrate the mediation results for perfectionism and postnatal anxiety.

	Asymptotic Path Estimate	**Bootstrap Path Estimate**	**Standard Error**	**Lower 95% Bootstrap Confidence Interval**	**Upper 95% Bootstrap Confidence Interval**
Perfectionism: Self oriented and Postnatal Anxiety (β= 0.34, p= 0.02)					
Direct effect in mediated model	0.21		t = 1.33 , p = 0.18		
Mediated Path: Regulator		-0.006	0.04	-0.10	0.06
Mediated Path: Facilitaor		-0.008	0.01	-0.01	0.06
Total of Direct and Indirect Effects	0.21		t= 1.34, p= 0.18		
Perfectionism: Other oriented and Postnatal Anxiety (β= 0.32; p= 0.05)					
Direct effect in mediated model	0.18		t = 1.31, p = 0.19		
Mediated Path: Regulator		0.01	0.03	-0.05	0.11
Mediated Path: Facilitaor		0.01	0.02	-0.001	0.10
Total of Direct and Indirect Effects	0.20		t= 1.47, p= 0.14		
Perfectionism: Socially Prescribed and Postnatal Anxiety (β= 0.52; p=0.001)					
Direct effect in mediated model	0.45		t = 4.09, p = 0.001		
Mediated Path: Regulator		0.02	0.02	-0.07	0.10
Mediated Path: Facilitaor		0.02	0.02	-0.05	0.05
Total of Direct and Indirect Effects	0.48		t= 4.46, p=0.001		

Appendix L: Summary table to illustrate the mediation results for perfectionism and postnatal OCD

	Asymptotic Path Estimate	**Bootstrap Path Estimate**	**Standard Error**	**Lower 95% Bootstrap Confidence Interval**	**Upper 95% Bootstrap Confidence Interval**
Perfectionism: Self oriented and Postnatal OCD (β= 0.13, p= 0.67)					
Direct effect in mediated model	0.07		t= 0.41, p = 0.67		
Mediated Path: Regulator		-0.03	0.02	-0.06	0.03
Mediated Path: Facilitaor		-0.03	0.01	-0.04	0.01
Total of Direct and Indirect Effects	0.07		t=0.39, p= 0.69		
Perfectionism: Other oriented and Postnatal OCD (β= 0.28; p= 0.13)					
Direct effect in mediated model	0.26		t= 1.85, p = 0.06		
Mediated Path: Regulator		0.01	0.02	-0.01	0.09
Mediated Path: Facilitaor		-0.01	0.02	-0.08	0.01
Total of Direct and Indirect Effects	0.26		t= 1.90, p=0.06		
Perfectionism: Socially Prescribed and Postnatal OCD (β= 0.28; p= 0.13)					
Direct effect in mediated model	0.26		t= 1.85, p = 0.06		
Mediated Path: Regulator		0.01	0.02	-0.01	0.09
Mediated Path: Facilitaor		-0.01	0.02	-0.08	0.01
Total of Direct and Indirect Effects	0.26		t=1.90, p=0.06		

Appendix M: Summary table to illustrate the mediation results for socially prescribed perfectionism, postnatal depression and antenatal depression, anxiety and OCD.

	Asymptotic Path Estimate	**Bootstrap Path Estimate**	**Standard Error**	**Lower 95% Bootstrap Confidence Interval**	**Upper 95% Bootstrap Confidence Interval**
Perfectionism: Socially Prescribed and Postnatal Depression (β= 0.57, p =0.001)					
Direct effect in mediated model	0.27		t= 0.27, p = 0.01		
Mediated Path: Antenatal Depression		0.11	0.08	0.00	0.33
Mediated Path: Antenatal Anxiety		0.01	0.05	-0.04	0.16
Mediated Path: Antenatal OCD		0.00	0.03	-0.10	0.03
Total of Direct and Indirect Effects	0.39		t=3.58, p= 0.001		

Appendix N: Summary table to illustrate the mediation results for socially prescribed perfectionism, postnatal anxiety and antenatal depression, anxiety and OCD.

	Asymptotic Path Estimate	**Bootstrap Path Estimate**	**Standard Error**	**Lower 95% Bootstrap Confidence Interval**	**Upper 95% Bootstrap Confidence Interval**
Perfectionism: Socially Prescribed and Postnatal Anxiety (β= 0.60, p = 0.001)					
Direct effect in mediated model	0.38		t= 2.85, p = 0.01		
Mediated Path: Antenatal Depression		0.10	0.09	-0.03	0.31
Mediated Path: Antenatal Anxiety		0.01	0.10	-0.01	0.28
Mediated Path: Antenatal OCD		0.00	0.03	-0.05	0.07
Total of Direct and Indirect Effects	0.48		t= 4.46, p= 0.01		

Appendix O: Instructions for authors for nominated journal

Journal of Reproductive and Infant Psychology

