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Faculty of Medicine and Health Sciences

Thesis submitted in partial fulfilment of the degree of Doctor of Clinical Psychology

An Exploration of the Contributions of Posttraumatic Growth Following Postnatal Depression, Perceived Social Support and Current Depression to the Strength of the Maternal Bond

Sherilyn Jarvis

Candidate registration number: 100148233

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Thesis Portfolio Abstract

Background: Postnatal depression (PND) has been found to have detrimental effects on the mother-infant (M-I) relationship, parenting and maternal bond (MB). *Objective:* To explore some of the factors that may have an association with the strength of the M-I relationship, parenting or MB. These include factors within the individual such as posttraumatic growth (PTG), PND, current depression and perceived social support as well as external factors such as the impact of treating PND on the M-I relationship and parenting. *Method:* Electronic databases were used to conduct a systematic review on the current available evidence to assess the impact of treating PND on the M-I relationship and parenting. In addition, a quantitative research study was conducted using a cross-sectional design to explore whether the presence of PTG following PND contributes to the MB whilst controlling for social support and current depression. Participants ($N=98$) for this study were recruited online and completed measures of MB, PTG, perceived social support and current depression. *Results:* Systematic Review: eight papers met the inclusion criteria, of which, five papers were rated as methodologically ‘strong’ and three were rated as ‘moderate’ in relation to the review aims. There were some consistent findings suggesting the positive impact of treating PND on both the M-I relationship and parenting. Quantitative research study: Results showed that PTG can be achieved following PND. In addition, of the variables included, current depression was the strongest indicator of the strength of MB. *Conclusion:* The need for further investigation into variables that contribute to the strength of all aspects of the mother-child relationship has been highlighted within this thesis portfolio. A greater understanding into these variables could inform the expansion of interventions to better suit the needs of postnatally depressed women and their children.

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Chapter 1:
Introduction to the Thesis Portfolio

Introduction to the Thesis Portfolio

The mother-infant (M-I) relationship is the emotional relationship and interaction between mother and infant (Putnam-Hornstein, Needell, & Rhodes, 2013). It involves an interplay of the mother's feelings for her infant and the infant's feelings for his/her mother. It is closely linked to the maternal bond (MB) which is the emotional tie of the mother to her child (Nonnenmacher, Now, Ehrental, & Wreck, 2016) and parenting which involves practical tasks ensuring the child's safety (Meaney, 2001) as well as providing emotional stability to the child (Forman et al., 2007). These concepts are also closely linked to attachment which is the bond that infants form towards their caregiver/s (Nelki, Power, & Gopfert, 2010). Although attachment is closely related to MB, M-I relationship and parenting, it is beyond the scope of this thesis for reasons discussed later on in the thesis. M-I relationship, parenting and MB are all important in promoting adaptive development in children and in building solid foundations which allow for secure attachments, social and emotional development to occur (Tsivos, Calam, Sanders, & Wittkowski, 2015).

Postnatal depression (PND) can occur within the first 12 months after giving birth (Goodman, 2009; O'Hara, 2009). It is not only distressing for the mother but can also have an immediate and longer-term damaging effect on the M-I relationship, parenting and MB which subsequently impacts on attachment, cognitive, behavioural and emotional development in the child (Harmon, 2010). For these reasons, National Institute for Health and Care Excellence (NICE) Guidelines (2015) have stated that research should focus on investigating how effective treatments are for postnatal women with mental health problems in improving the relationship between them and their infants.

This thesis portfolio therefore explores the association between PND and M-I relationship, parenting and MB. Chapters 2 and 4 are two self-contained papers written to the specifications of the *Infant Mental Health Journal*. The first is a systematic review of

current evidence and is followed by a quantitative research study (empirical paper) that was conducted to extend current knowledge. The systematic review sets out to evaluate the current available evidence to assess the impact of treating PND on the M-I relationship and parenting. The empirical paper explores how a range of factors, namely Posttraumatic Growth following PND, current depressive symptoms and perceived social support, may impact on the strength of the MB. Chapter 3 elucidates the link between the systematic review and the empirical paper and Chapter 5 describes additional methodology considered in the quantitative research study. Chapter 6 contains additional results and discussion from the quantitative research study and the final chapter (Chapter 7) integrates all findings from the systematic review and the quantitative research study in a closing discussion and critical appraisal.

Chapter 2:
Systematic Review Prepared for Submission to the
Infant Mental Health Journal

Impact of Treating Postnatal Depression on the Mother-Infant Relationship and Parenting: A Systematic Review

(Written for submission to the Infant Mental Health Journal)

Sherilyn Jarvis

Doctoral Programme in Clinical Psychology

University of East Anglia

Faculty of Medicine and Health Sciences

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Abstract

Background: Postnatal depression (PND) has been found to have detrimental effects on a number of factors including the mother-infant (M-I) relationship and parenting. *Aims:* To assess the impact of treating PND on the M-I relationship and parenting. *Method:* A systematic search was undertaken of five electronic bibliographic databases for randomised controlled trials and controlled clinical trials considering treatment of mothers with PND that also assessed outcomes in children, specifically M-I relationship and parenting. Findings of these studies were then analysed. *Results:* Eight papers met the inclusion criteria. Of those included, interventions were generally focused on forms of either Cognitive Behavioural Therapy or a variety of other forms of Psychotherapy but all involved therapies directed at the M-I relationship or parenting. There were some consistent findings suggesting the positive impact of treating PND on both the M-I relationship and parenting. However, to date, the focus of most interventions remains on improving symptoms of PND alone. *Conclusions:* The M-I relationship as well as parenting in depressed mothers might be improved with sustained interventions focusing on treatment of PND as well as issues within the M-I relationship and parenting. Trials assessing treatments for PND would benefit from looking more closely at benefits for children as well as mothers, using validated objective measures.

Introduction

Postnatal Depression

Postnatal Depression (PND) is a relatively common form of depression (Cust, 2016), the onset of which is usually within the first year after giving birth (Kendall-Tackett, 2017). Recent research has shown that between 10 – 20% of new mothers are affected by PND (Cust, 2016). Martin (2012) reported that PND can persist for months or even years if left untreated.

Amongst other factors, mothers are more likely to experience PND if they have a history of depression, difficulties in their relationship with their partners, poor social support and stressful life events which can include a difficult birth (Wilkinson & Mulcahy, 2010). The symptoms, course and outcome of PND is the same as that of major depressive disorder diagnosed outside of the postnatal period with the only difference being that the mother's relationship with her baby is particularly significant in PND (Hornstein et al., 2006). According to Kendall-Tackett (2017), PND can present with the following symptoms: “moods of sadness, anhedonia, low self-esteem, apathy and social withdrawal, excessive emotional sensitivity, pessimistic thinking, irritability, sleep disturbance, appetite disturbance, impaired concentration and agitation” (Preston & Johnson, 2009; cited in Kendall-Tackett, 2017, p.4).

Mother-Infant Relationship and Parenting

The term “mother-infant (M-I) relationship” refers to the emotional relationship and interaction between mother and infant (Putnam-Hornstein, Needell, & Rhodes, 2013). It may start to form during pregnancy, labour, at birth or after birth (Hornstein et al., 2006). Mothers with a strong M-I relationship subjectively experience and objectively appear to have warm feelings for their children (Hornstein et al., 2006). The relationship between

mother and infant can be strengthened by interaction when the mother responds to the infant's cues and shows affection to the infant through making eye contact, talking to, smiling at and cuddling the infant (Hornstein et al., 2006). M-I relationship is closely linked to attachment which is the bond that infants form towards their caregiver (Nelki, Power, & Gopfert, 2010). It is dependent on the level of care provided by caregivers and whether or not this promotes a sense of security in the infant.

Parenting involves practical tasks such as feeding, bathing and ensuring the infant's safety (Meaney, 2001) as well as providing emotional stability through caring for, talking to, playing with, comforting and offering appropriate developmental support to an infant (Forman et al., 2007). Meaney (2001) describes poor parenting as a possible mechanism which transmits risk across the generations from parent to child through poor caregiving.

Quality of parenting is a factor associated with quality of the M-I relationship (Tsivos, Calam, Sanders, & Wittkowski, 2015). Both the M-I relationship and parenting are important as the primary caregiver (usually the mother) is central in promoting adaptive development in children and in building solid foundations which allow for social and emotional development to occur (Tsivos et al., 2015).

Relationship Between Postnatal Depression, Mother-Infant Relationship and Parenting

A healthy M-I relationship and good parenting allow the formation of a secure bond or attachment to the mother through facilitating cognitive, behavioural and emotional development in the child (Harmon, 2010). The existence of a poor M-I relationship and poor parenting together with PND can impact severely on the above areas of development (Harmon, 2010). Due to the potential damaging impact of PND on the M-I relationship and parenting, it has been extensively researched (Apter, Devouche, Gratier, Valente, &

Nestour, 2012). Numerous studies have demonstrated an association between even minimal depressive symptoms and the strength of the M-I relationship and parenting capabilities (Nolvi et al., 2016; Hornstein et al., 2006; Ohoka et al., 2014).

Maternal depressive symptoms rob mothers of the energy and focus needed for supportive, stimulating parenting (Beeber et al., 2013) and the mother's ability to notice and interpret her infant's cues is affected (Horowitz et al., 2013). Mothers with PND show harsher and less positive parenting than non-depressed mothers and these parenting styles are associated with children's emotional and behaviour problems (Sheeber et al., 2012). In addition, depressed mothers are more likely to interpret their children's behaviours in a negative manner and have marked difficulty in coping with child behaviours such as crying (Berkule et al., 2014). Depressed mothers are also more likely than their non-depressed counterparts to perceive their children as having a challenging temperament (Berkule et al., 2014). Mothers with PND may be withdrawn with a decrease in smiling at and talking to their infants or they may be overly intrusive or rough in handling their infants (Puckering, McIntosh, Hickey, & Longford, 2010). In response, infants may become more withdrawn, distressed or passive (Puckering et al., 2010). It has been documented, however, that not all mothers with PND experience an impaired M-I relationship and in fact, approximately 15-40% of all new mothers may experience a delay in the onset of affection for their baby (Edhborg, Matthiesen, Lundh, & Widstrom, 2005).

The impact of PND, a poor M-I relationship and parenting have been considered as a "vicious cycle" by Cooper, De Pascalis, Woolgar, Romaniuk, and Murray (2015). van Doesum, Riksen-Walraven, Hosman, and Hoefnagels (2008) explain that when a mother is not responsive to her child, the child is likely to display behavioural difficulties and a lack of positive affect, which in turn has a negative effect on the mother's behaviour. In addition, poor M-I relationship and parenting may affect the infant's early bonding with the

mother which can lead to a less secure attachment style which may remain into adulthood (Feeney & Noller, 1996).

Alternative studies have, however, found that when mothers recover from PND, up to a third of children of these mothers experience a decrease in the severity of their behavioural difficulties (Weissman et al., 2006). Poobalan et al. (2007) were the first to carry out a systematic review on the impact of treating PND on child outcomes. They highlighted the importance of such a study, stating that with the high prevalence of PND and its negative impact on children, it constitutes a highly significant public health problem. Poobalan et al. (2007) showed the lack of treatments which directly consider the impact of intervention on not only mothers, but infants too. It was found that all treatments for postnatally depressed mothers had some benefits in improving the quality of the mother–infant relationship, and the level of behavioural management problems and cognitive development in children. In addition, it was considered that improvements observed in the infants could also have been a direct reflection of improvement in maternal depression score (Poobalan et al., 2007).

Poobalan et al. (2007) were, however, unable to identify whether it was the direct impact of elements of the interventions which focused on the mother-child relationship which resulted in improved child outcomes or if improved child outcomes were instead an indirect effect of an improvement in the mother's mood due to treating her symptoms.

Current National Institute for Health and Care Excellence (NICE) Guidelines (2015) state that research should focus on investigating how effective treatments are for women with mental health problems in improving the relationship between them and their babies.

Method

Aim

The aim of this systematic review is to investigate the impact of treating PND on the M-I relationship and parenting.

Literature Search Strategy

A search of the Cochrane database of systematic reviews (CENTRAL) revealed that there were no recent or current reviews closely linked to this topic. It was found that the last systematic review on this topic was done by Poobalan et al. in 2007. Five electronic bibliographic databases: MEDLINE, ASSIA, EMBASE, CINAHL and PsycINFO were then systematically searched. The search covered the period since the Poobalan et al. (2007) search; from 2005 to 2017. Search terms used in each database were postnatal depression OR postpartum depression AND baby, infant, toddler OR child AND randomised controlled trial OR controlled clinical trial OR RCT. A restriction of English language was applied and 'grey' literature such as conference proceedings and unpublished data were not searched to ensure that only peer-reviewed articles of a high quality were included. Further relevant studies were identified through checking reference lists of all included articles.

Inclusion and Exclusion Criteria

As outlined in the Centre for Reviews and Dissemination (CRD) Guidelines (2017), inclusion and exclusion criteria were determined based on PICOS (Participant, Intervention, Comparison, Outcome) criteria.

Inclusion Criteria

Included studies had to fulfil the following criteria:

- Randomised controlled trials or controlled clinical trials
- Psychological treatment interventions for mothers diagnosed with PND
- Outcomes measured in children up to the age of two-years-old

Exclusion Criteria

Studies were excluded based on the following:

- Non-randomised interventions
- Interventions for mothers without a diagnosis of PND
- Interventions that did not collect outcome measures for children
- Studies measuring physical health or development of the child only
- Preventative interventions for those deemed to be at risk for developing PND

Assessment of Studies

A standard data extraction form was used to critically appraise each included study. Where there were queries about inclusion, this was resolved through discussion with research supervisors. Information on study design, location, quality, sample characteristics, intervention and delivery, measurement instruments used, follow up and results was extracted. Main outcomes assessed were M-I relationship and parenting.

Quality Assessment

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Liberati et al., 2009) states that standardised criteria should be used to assess risk of bias and adapted based on the nature of included studies. Quality criteria were developed based on the Scottish Intercollegiate Guidelines Network (SIGN 50; 2015) and, as suggested in the PRISMA statement and by the CRD (2017); adapted to the needs of the current review question. Minor adaptations to the wording of the quality criteria

were made to ensure the criteria were clear for the current review. For example, in criterion 3, the words “age of mother, age of child, number of children” were added and in criterion 5, the words “for mother-infant relationship or parenting” were added. Adapted quality criteria used within this review can be found in Table 1.

Table 1

Quality Criteria

Number	Quality Criteria	Description	Rating
1	Appropriate and clearly randomised control group	Random allocation, investigator(s) blinded, treatment and control groups comparable at start of trial	Well covered (2)
		Control group adequately randomised or groups not comparable	Adequate (1)
		Control group inappropriate or not randomised	Poor (0)
2	Assignment to the groups should be adequately concealed on participant entry into the study and to those scoring results	Researchers are unaware which group participants are being allocated to at the time they enter the study. Centralised allocation, computerised allocation or use of coded identical containers/envelopes used to allocate to group. Those scoring the results should also be blind to treatment condition.	Well covered (2)
		Researchers are unaware which group participants are being allocated to at the time they enter the study or those scoring the results are blind to treatment condition.	Adequate (1)
		Poor method of concealment used or an easy to subvert method used to allocate to group and those scoring the results not blind to treatment condition.	Poor (0)
3	Participants in each group are sufficiently alike at baseline in terms of key variables that may impact on intervention outcome (age of mother, age of child, number of children). Any differences controlled for appropriately.	Differences are assessed between treatment and control groups and they are sufficiently alike at the start of the trial on key variables that may affect outcome (age of mother, age of child, number of children). Alternatively, differences on these variables are controlled for in the analysis (e.g. added as a covariate).	Well covered (2)
		No difference between groups on measures of anxiety, or any differences controlled for in the analysis.	Adequate (1)
		No comparison between treatment and control groups at baseline	Poor (0)

Table 1 Continued.

Quality Criteria

Number	Quality Criteria	Description	Rating
4	Levels of attrition reported and equivalent for treatment vs. control. Details of those leaving the trial given.	Details given regarding drop out for both groups and similar for each group (from pre-post intervention within 10% of each other and 20% of total participants)	Well covered (2)
		Drop out somewhat alike between groups (within 20% of each other and less than 30% of total participants from pre- to post-intervention)	Adequate (1)
		High drop out in general or uneven drop out	Poor (0)
5	Primary outcome measures evidenced to be valid and reliable for mother-infant relationship or parenting.	Valid and reliable standardised outcome measure(s) used in measuring mother-infant relationship or parenting. Child outcomes measured pre- and post-intervention.	Well covered (2)
		Standardised outcome measure(s) pre- and post-intervention with adequate psychometric properties but little or no evidence of reliability and validity in measuring mother-infant relationship or parenting.	Adequate (1)
		Non-standardised outcome measure(s) used. Mother-infant relationship or parenting measured at only one time point.	Poor (0)
6	Intervention described clearly ensuring reliability and external validity of intervention.	Intervention described clearly, treatment protocols followed closely and are replicable. External validity of therapy ensured.	Well covered (2)
		No treatment protocols used or adequate description of intervention.	Adequate (1)
		Poor validity of therapy or poorly described intervention	Poor (0)

Table 1 Continued.

Quality Criteria

Number	Quality Criteria	Description	Rating
7	Intervention conducted appropriately ensuring internal validity and treatment fidelity	Intervention carried out appropriately by a trained professional, and attempts (e.g. regular supervision) made to ensure treatment fidelity	Well covered (2)
		Intervention not facilitated by trained professional. Only adequate attempts made to ensure treatment fidelity.	Adequate (1)
		No attempts made to ensure treatment fidelity and intervention not facilitated by a trained professional.	Poor (0)
8	Time of follow-up (FU)	A FU following post-treatment of six months or more completed and at least 80% of participants completing pre-measures retained for follow-up.	Well covered (2)
		A three to six-month FU post treatment completed. At least 60% of participants completing pre-measures retained.	Adequate (1)
		No FU or short (less than three months) FU or less than 60% of those completing pre-measures retained.	Poor (0)
9	Appropriate statistical analysis that is clearly reported	Statistical analysis appropriate and reported clearly	Well covered (2)
		Statistical analysis appropriate and adequately reported	Adequate (1)
		Statistical analysis inappropriate or poorly reported.	Poor (0)

Primary studies were assessed on the quality of random allocation to groups, concealment of assignment to group by participants and scorers, comparability of groups at baseline, details of attrition, validity and reliability of outcome measures, fidelity, treatment protocols, time and percentage of follow up and quality of analysis. Studies were ranked for each criterion from zero to two according to how closely they complied with each criterion, with a maximum total of 18. Each study was categorised based on the score it obtained. Scores falling below nine were considered to be weak, scores between 10 and 14 were considered to be moderate and scores above 15 were considered to be strong in quality. Quality ratings for each criterion in all studies are displayed in Table 2.

Table 2

Quality Criteria Ratings for Studies Included in Review

Quality criteria number	O'Mahen et al. (2014)	Mulcahy, Reay, Wilkinson & Owen (2010)	Reay et al. (2012)	Puckering et al. (2010)	Clark, Tluczek & Brown (2008)	Goodman, Prager, Goldstein & Freeman (2015)	Pugh, Hadjistavropoulos & Dirk (2016)	Milgrom et al. (2016)
1	Well covered	Well covered	Well covered	Adequate	Poor	Well covered	Adequate	Well covered
2	Well covered	Well covered	Well covered	Adequate	Poor	Well covered	Poor	Well covered
3	Well covered	Well covered	Well covered	Poor	Well covered	Well covered	Well covered	Well covered
4	Well covered	Well covered	Poor	Poor	Well covered	Well covered	Adequate	Well covered
5	Well covered	Well covered	Well covered	Adequate	Well covered	Well covered	Adequate	Well covered
6	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered
7	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered
8	Adequate	Adequate	Well covered	Adequate	Poor	Adequate	Poor	Well covered
9	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered	Well covered
Quality score	17	17	16	10	12	17	11	18

Data Analysis

As studies were varied in their target populations, interventions and outcome measures, performing a meta-analysis was inappropriate. Instead a narrative synthesis was conducted drawing comparisons across the studies and direction of effect sizes was discussed. Results are presented according to child outcomes assessed; M-I relationship and parenting.

Results

A total of 405 studies were identified through the search and following the scanning of reference lists, an additional four papers were identified. The titles and abstracts of these 409 papers were scanned and duplicates and ineligible studies were removed. The remaining 44 articles were then critically appraised. Seven randomised trials or controlled clinical trials (eight papers) that met the inclusion criteria assessing the impact of treatment of PND on child outcomes were included in this review. Two papers (Mulcahy, Reay, Wilkinson & Owen, 2010 and Reay et al., 2012) came from one study with one of the papers (Reay et al., 2012) being a follow-up of the initial study (Mulcahy et al., 2010). Figure 1 shows a summary of the selection process.

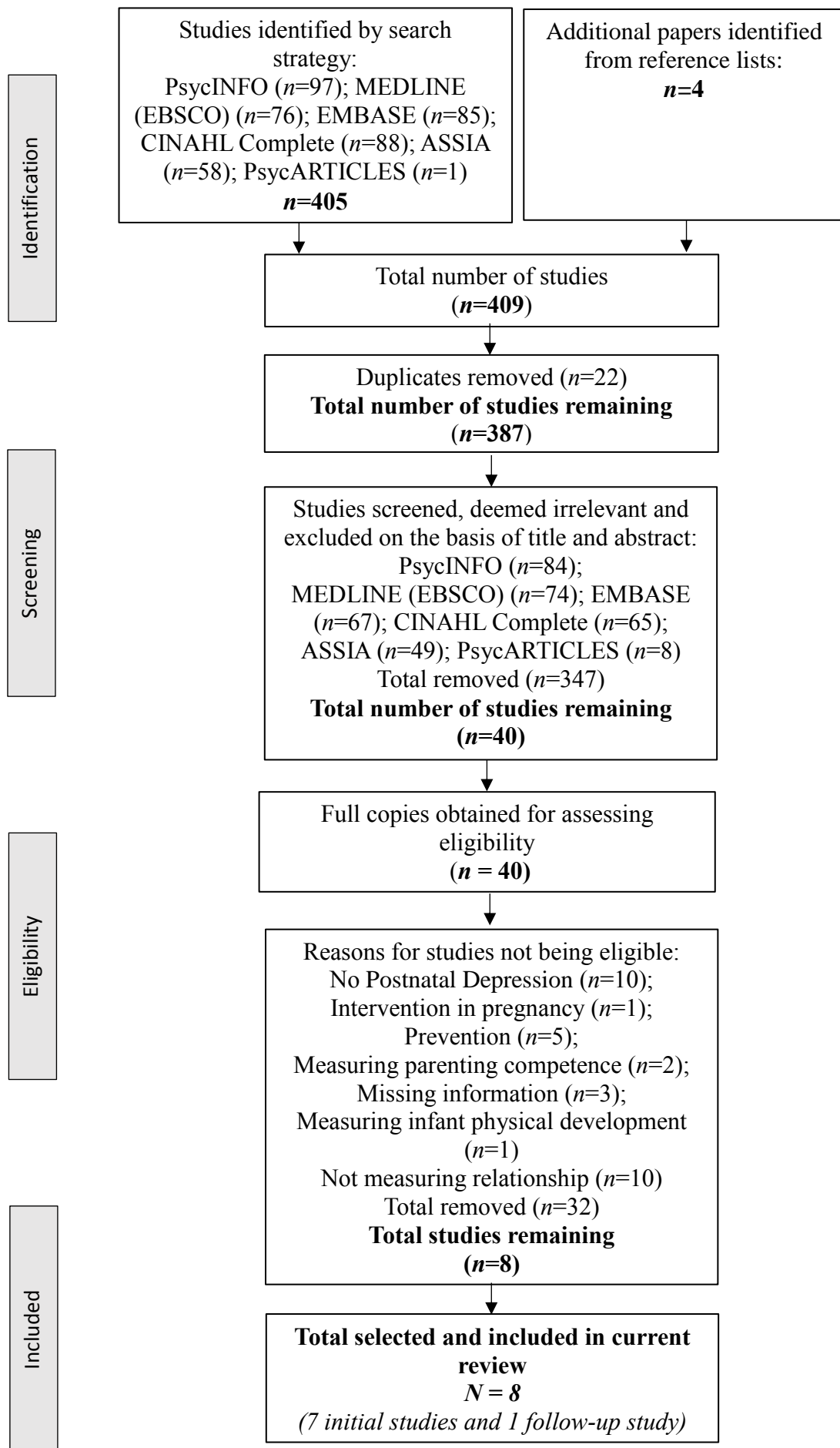


Figure 1: Selection Process of Studies Based on PRISMA (Liberati et al., 2009) Flow Diagram

Study Characteristics

All studies were either randomised controlled trials (RCTs) or controlled trials that were published in English. The durations for the interventions ranged from six to 16 sessions and follow ups ranged from no follow up to four months follow up. The Reay et al. (2012) paper was the exception documenting a two-year follow up on the Mulcahy et al. (2010) study. The included studies had between 18 and 83 participants and some studies included not only mothers but also babies, partners or both. Trials took place in England, Scotland, Australia, the USA and Canada.

Outcomes were based on what the studies were measuring. Of the seven studies identified, two measured parenting only (Milgrom et al., 2016; Pugh, Hadjistavropoulos, & Dirk, 2016) three studies (four papers) measured the M-I relationship only (Mulcahy et al., 2010; Reay et al., 2012; Puckering et al., 2010; O'Mahen et al., 2014) and two measured both parenting and the M-I relationship (Clark, Tluczek, & Brown, 2008; Goodman et al., 2015). For this reason, although other concepts such as attachment were of interest, parenting and M-I relationship were used as outcomes in this review.

Mother-Infant Relationship

The five studies (six papers) that assessed the M-I relationship (Table 3) were varied in their participants. Two of these five studies (O'Mahen et al., 2014; Mulcahy et al., 2010; Reay et al., 2012) had only mothers as participants, whereas the other three studies (Puckering et al., 2010; Clark et al., 2008; Goodman et al., 2015) included mothers and their infants. Clark et al. (2008) as well as Mulcahy et al. (2010) included partner sessions within the interventions. O'Mahen et al. (2014) was the only study offering an online Behavioural Activation (BA) intervention; the other four studies

Table 3

Studies Assessing Mother-Infant Relationship

Study	Location, Design and Quality	No. of Participants	Age of Participants	Intervention	Delivery	Outcome Measurements	Results
O'Mahen et al. (2014)	Location: England Design: RCT Quality: strong	Mothers (n=83)	Age not reported	Netmums HWD (n=41) or TAU (n=42)	Online programme, 12 session treatment course consisting of a core BA module and a relapse prevention session along with two optional modules (chosen out of a possible six). Weekly 20-30min calls from IAPT PWP's to answer questions and work through treatment barriers. TAU: access to normal care as well as Netmums general depression chat room. Follow up: 17 weeks	Primary outcome: maternal. Secondary child outcome: Postnatal Bonding Questionnaire PBQ	There was a small effect size for postnatal bonding in treatment group
Mulcahy et al. (2010)	Location: Australia Design: RCT Quality: strong	Mothers (n=50)	Mean age: mothers, 32.2 years. (Infants, mean 6.2 months)	IPT-G (n=23) compared with TAU (n=27)	Groups were delivered by therapists with IPT training for eight weeks with two individual sessions and one partner session. TAU: access to normal care including antidepressant medication, counselling, Maternal and Child Health Nurse support, support groups, and individual or group psychotherapy Follow up: three months	Primary outcome: maternal. Secondary child outcome: MAI	There was a significant improvement in the IPT-G mothers' perceptions of the mother-infant relationship by the end of treatment. By the completion of treatment, a significant difference also existed between the groups in relation to their MAI scores in favour of the IPT-G condition. TAU showed no statistically significant improvement. Scores remained stable at three months follow up.
Reay et al. (2012)*	Location: Australia Design: RCT follow up Quality: strong	Mothers (n=44)	Age: mothers, mean 34.5 years. (Infants, mean 2.6 months)	See above	All women in original RCT (N=50) were invited to participate in mailed follow up. Recent life events and treatments sought over two years follow up were measured. Respondents demographic, life events, depression and interpersonal variables were compared with non-respondents - only difference was that non-responders were less likely to recover at the end of the two years follow up	Primary outcome: maternal. Secondary child outcome: MAI	MAI showed a significant difference between the two conditions in favour of IPT-G. Mothers who received IPT-G improved more rapidly in mother-infant bonding Overall, IPT-G participants were significantly less likely to require follow-up treatment.

Notes: RCT=Randomised Controlled Trial, HWD=Help with depression, TAU=Treatment as usual, BA=Behavioural Activation, IAPT=Improving Access to Psychological Therapies, PWP=Psychological Wellbeing Practitioner, PBQ= Postnatal Bonding Questionnaire; IPT-G=Interpersonal Psychotherapy Group, IPT= Interpersonal Psychotherapy, MAI= Maternal Attachment Inventory.

*Reay et al. (2012) is a two year follow up of the Mulcahy et al. (2010) study

Table 3 Continued.

Studies Assessing Mother-Infant Relationship

Study	Location, Design and Quality	No. of Participants	Age of Participants	Intervention	Delivery	Outcome Measurements	Results
Puckering et al. (2010)	Location: Scotland Design: RCT Quality: moderate	Mother-infant dyads (n=18)	Age not reported	Experimental group (n=12 mother-infant dyads) receiving Mellow Babies group compared with a control group (n=6 mother-infant dyads) receiving TAU	Psychotherapeutic group followed by activities to improve bonding. Afternoon parenting workshop using the mothers' own videos of interacting with their baby during a feed. 14 weekly group sessions for five hours. Waitlist control group subsequently had access to same treatment and all other supports normally offered (e.g. referral to adult psychiatry, medication). Follow up: four months	Primary outcome: maternal. Secondary child outcome: Mellow Parenting observation coding scheme	Greater positive interaction was observed between mothers and infants who had attended the group with statistical significance of $p=.015$. Less negative interaction was observed between mothers and infants who had attended the group with $p=.07$, approaching statistical significance
Clark et al. (2008)	Location: USA Design: Controlled trial Quality: moderate	Mother-infant dyads (n=32)	Age: mothers, mean 31.3 years; infants, mean 9.8 months	M-ITG (n=18) compared with infant and depressed mother controls (n=14)	Groups delivered on a weekly basis with six to eight families for two hours for 12 consecutive weeks. Mothers Therapy Group running at same time as Infant Developmental Group, followed by dyadic group. Fathers/partners invited to attend two out of 12 sessions. Waitlist group were encouraged to continue receiving services as normal and subsequently received the M-ITG.	Primary outcome: maternal. Secondary child outcome: Parent-Child Early Relational Assessment	Mothers in the M-ITG group showed more positive emotional involvement and interaction with their infants after treatment than controls at 12 weeks. There were no significant differences between the M-ITG and the controls on the Mental Development Index at the 12-weeks
Goodman et al. (2015)	Location: USA Design: RCT Quality: strong	Mother-infant dyads (n=42)	Age: mothers, mean 30.7 years; infants, age not reported	PDP treatment group (n=21) compared to control group (n=21)	The Perinatal Dyadic Psychotherapy consisted of eight one-hour long sessions conducted in the participants' homes and delivered over three months. Controls received 10-minute phone calls at same times as treatment group. Follow up: three months	Primary outcome: maternal. Secondary child outcome: Coding Interactive Behaviour manual	There were no significant differences between groups on mother-infant relationship at post-intervention and follow-up.

Notes: RCT=Randomised Controlled Trial, TAU=Treatment as usual, M-ITG=Mother-Infant Therapy Group, PDP= Perinatal Dyadic Psychotherapy

offered varying forms of psychotherapy mainly in the structure of group intervention. Treatment as usual (TAU) or waitlist control (WLC) groups in all studies had access to treatment that was normally available in that locality to women with PND. This included antidepressant medication, non-directive counselling, individual or group psychotherapy and visits from a nurse or health visitor.

O'Mahen et al. (2014) compared the efficacy of an online BA programme, namely the Netmums Help with Depression (HWD) programme with TAU ($n=42$). TAU had access to normal care as well as the Netmums general depression chat room. The treatment group ($n=41$) received a 12-session online treatment course consisting of a core BA module and a relapse prevention session along with two optional modules (chosen out of a possible six) as well as weekly 20-30 minute telephone calls from trained therapists to answer questions and work through treatment barriers. The Postnatal Bonding Questionnaire (PBQ; Brockington et al., 2001) was used as a secondary measure to assess parental perceptions of the relationship with the infant both at baseline and at 17 week follow up. There was a small effect size for postnatal bonding in the treatment group. A limitation of the study is that only self-report measures were used, observational assessments of mother-child interaction may have been more accurate.

Mulcahy et al. (2010) compared the efficacy of group interpersonal psychotherapy (IPT-G) for mothers with PND ($n=23$) with TAU ($n=27$). IPT-G was delivered over eight weeks (two hours duration) with two individual sessions and one two-hour partners only session. Treatment as usual included antidepressant medication, natural remedies, counselling, nursing support, community support groups and individual or group therapy. The Maternal Attachment Inventory (MAI; Muller, 1994) was used to assess the M-I relationship at baseline, midway through treatment, at

the end of treatment and at three months follow up. There was a significant improvement in the IPT-G mothers' perceptions of the M-I relationship by the end of treatment. By the completion of treatment, a significant difference also existed between the groups in relation to their MAI scores in favour of the IPT-G condition. TAU showed no statistically significant improvement. Scores remained stable at three months follow up. Limitations of the study included some mothers taking antidepressant medication, TAU may have been more effective than standard treatment due to repeated contact with services related to taking part in the study, and a short follow up time.

Reay et al. (2012) investigated the long-term outcomes of Mulcahy et al. (2010) IPT-G for postnatally depressed mothers. All women in the original RCT ($N=50$) were invited to participate in a mailed two-year follow up. Of these participants, $n=44$ (respondents) completed the two-year follow up. All six participants who dropped out (non-respondents) of the study were from the TAU group. Respondents' demographic, life events, depression and interpersonal variables were compared with non-respondents and the only difference found was that non-respondents were less likely to achieve recovery at the end of treatment (Fisher's exact test $p=.022$) and at the three-month follow-up (Fisher's exact test $p=.040$) than respondents. Recent life events and treatments sought over the two years since the end of treatment were measured. The M-I relationship was assessed again using the MAI which showed a significant difference between the two conditions in favour of IPT-G, however, tests of within subjects improvements revealed that there were no differences between the two conditions at the two years' follow up. Further, the study relied on self-report measures and life event data were restricted to common parental difficulties and did not include severe or stressful life events such as bereavement.

Puckering et al. (2010) investigated the efficacy of the Mellow Babies programme; a 14-week day group lasting for five hours in which both mothers and babies attended. The experimental group consisted of 12 mother-baby dyads and was compared with six mother-baby dyads who were receiving TAU. TAU subsequently had access to the same treatment and all other supports normally offered such as referral to adult psychiatry and medication. Fathers of the experimental group were invited to attend three evening sessions. The Mellow Parenting observation coding scheme (Puckering et al., 2010) was used to measure the M-I relationship at baseline, at the end of treatment and at four months follow up. Greater positive interaction was observed between mothers and infants who had attended the group with statistical significance of $p=.015$. Less negative interaction was observed between mothers and infants who had attended the group with $p=.07$, approaching statistical significance. The main limitations of the study were the small sample size and retention within the waiting list group.

Clark et al. (2008) undertook a controlled trial where 18 M-I dyads attending the Mother-Infant Therapy Group (M-ITG) were compared with 14 M-I dyads in a WLC group. Groups were delivered on a weekly basis with between six and eight families for two hours for 12 consecutive weeks. For the first hour and a half, mothers attended the Mothers Therapy Group focusing on mothers' difficulties. This ran concurrently with the Infant Developmental Group where infants were provided with sensitive and responsive care. Mothers and infants would then come together for the dyadic group focusing on the M-I relationship and interaction. Fathers/partners were invited to attend two sessions. The WLC group were encouraged to continue receiving services as normal and subsequently received the M-ITG. Quality of the M-I relationship was measured by the Parent-Child Early Relational Assessment (Clark, 1985) at point of

entry into the study and 12 weeks later; there was no follow up. Participants in the M-ITG found parenting their infants to be more rewarding as compared with controls at 12 weeks. In addition, they were rated as exhibiting significantly more positive affective involvement and communication with their infant after treatment than controls at 12 weeks. However, with the small sample size, the study was underpowered, children's ages varied from one to 24 months and assignment was sequential to treatment and control groups.

Goodman et al. (2015) conducted a RCT comparing M-I dyads receiving Perinatal Dyadic Psychotherapy (PDP; $n=21$) with a control group of M-I dyads ($n=21$). The PDP intervention was developed to promote maternal mental health and to facilitate optimal M-I relationships. It consisted of eight one-hour long sessions conducted in the participants' homes and delivered over three months. The control group received 10-minute telephone calls on the same frequency schedule as the intervention group. Calls were used to monitor participants' depression status and to maintain engagement in the study. M-I dyads were video-recorded in 10-minute free-play sessions to measure the M-I relationship at both post-intervention and at three months follow-up. Recordings were analysed using the Coding Interactive Behaviour manual (Feldman, 1998). The M-I relationship was not measured at the start of the study. No significant differences between groups were reported on parenting stress or M-I relationship post-intervention and at follow-up.

In summary, there is some evidence that psychological therapies treating PND have a positive impact on the M-I relationship. Four out of the five studies were relatively consistent in terms of the content of interventions, namely forms of psychotherapy, three of which were delivered in the form of groups. In addition, the quality rating for four out of the six papers was deemed to be "strong" for quality with

the remaining two being rated as “moderate.” Despite this, firm conclusions cannot be drawn due to a variety of sample sizes as well as outcome measures varying considerably, with some being self-report measures and others being observational measures. In addition, Goodman et al. (2015) reported there to be no significant results with regard to the M-I relationship between treatment and control groups and the Reay et al (2012) paper revealed no differences between the two conditions as described by Mulcahy et al. (2010) at two years follow up.

Parenting

Four studies assessed parenting (Table 4). Once again, the interventions varied, ranging from a M-I therapy group to individual home-based therapy to online intervention. Two studies assessed the M-I relationship (as above) as well as parenting (Clark et al., 2008; Goodman et al., 2015) and two studies assessed parenting only (Pugh et al., 2016; Milgrom et al, 2016). The interventions for both of the latter studies were online therapist-assisted Cognitive Behaviour Therapy (CBT) which involved mothers only.

Pugh et al. (2016) investigated the efficacy of Therapist Assisted Internet CBT (TA-ICBT). The intervention group ($n=25$) were given access to seven online modules to treat PND. It was suggested that modules be completed one per week, however, some participants took more time to complete the modules. Participants received weekly emails from therapists answering any questions and providing support and encouragement. Participants randomized to the WLC condition were provided with an

Table 4

Studies Assessing Parenting

Study	Location, Design and Quality	No. of Participants	Age of Participants	Intervention	Delivery	Outcome Measurements	Results
Pugh et al. (2016)	Location: Canada Design: RCT Quality: moderate	Mothers (n=50)	Mean age of mothers and infants not reports	TA-ICBT (n=25) compared with WLC (n=24)	Internet based intervention with seven modules. Participants had email contact (between 10-20mins for therapist to compose email). WLC received TAU and subsequently received the TA-ICBT intervention. Follow up: four weeks	Primary outcome: maternal. Secondary child outcome: PSI-SF	TA-ICBT participants demonstrated a reduction in parental distress, when compared to the WLC participants
Milgrom et al. (2016)	Location: Australia Design: RCT Quality: strong	Mothers (n=43)	Age: mothers, mean 31.5 years. (Infants, mean 6.5 months)	MumMoodBooster (internet CBT) intervention group (n=21) compared with TAU (n=22)	Internet-based six-session intervention for PND based on CBT and adapted for needs of postnatal women with low intensity guided telephone support (maximum 30 minutes/week). Access to monitored peer- based web forum and relevant articles. TAU: referred to healthcare professional and offered usual PND treatment options.	Primary outcome: maternal. Secondary child outcome: PSOC	The intervention's impact on the parenting self-efficacy measure constituted a medium effect size
Goodman et al. (2015)	Location: USA Design: RCT Quality: strong	Mother- infant dyads (n=42)	Age: mothers, mean 30.7 years; infants, age not reported	PDP treatment group (n=21) compared to control group (n=21)	The Perinatal Dyadic Psychotherapy consisted of eight one-hour long sessions conducted in the participants' homes and delivered over three months. Controls received 10-minute phone calls at same times as treatment group. Follow up: three months	Primary outcome: maternal. Secondary child outcome: PSI	There were no significant differences between groups on mother-infant interaction at post- intervention and follow-up.

Notes: RCT=Randomised Controlled Trial, TA-ICBT= Therapist-assisted internet cognitive behavioural therapy, WLC= Waitlist Control, TAU=Treatment as usual, M-ITG=Mother-Infant Therapy Group, PSI-SF= Parenting Stress Index – Short Form, CBT=Cognitive behavioural therapy, PND=Postnatal Depression, PSOC= Parenting Sense of Competence Scale, PDP= Perinatal Dyadic Psychotherapy, PSI= Parenting Stress Index

Table 4 continued.

Studies Assessing Parenting

Study	Location, Design and Quality	No. of Participants	Age of Participants	Intervention	Delivery	Outcome Measurements	Results
Clark et al. (2008)	<i>Location:</i> USA <i>Design:</i> Controlled trial <i>Quality:</i> moderate	Mother- infant dyads (<i>n</i> =32)	Age: <i>mothers</i> , mean 31.3 years; <i>infants</i> , mean 9.8 months	M-ITG (<i>n</i> =18) compared with infant and depressed mother controls (<i>n</i> =14)	Groups delivered on a weekly basis with six to eight families for two hours for 12 consecutive weeks. Mothers Therapy Group running at same time as Infant Developmental Group, followed by dyadic group. Fathers/partners invited to attend two out of 12 sessions. No follow up	<i>Primary outcome:</i> maternal. <i>Secondary child outcome:</i> PSI	Mothers in the M-ITG group reported that they found parenting their infants to be more rewarding as compared with mothers in the WLCG at the 12-week data point.

Notes: M-ITG=Mother-infant therapy group, PSI= Parenting Stress Index, WLCG= Waitlist control group.

information pamphlet that included psychoeducation on PND and websites to access local mental health services. The Parenting Stress Index Short-Form (PSI-SF; Abidin, 1995) was used to measure a secondary outcome of parent-child problem areas at baseline, end of treatment and at four weeks follow-up. TA-ICBT participants demonstrated a reduction in parental distress, when compared to the WLC participants, although this was not statistically significant. Notably, the study comprised of a small sample size and only self-report measures were used.

Milgrom et al. (2016) conducted a RCT comparing the MumMoodBooster intervention group ($n=21$) with TAU group ($n=22$). The treatment group comprised an internet-based six-session intervention for PND based on CBT and adapted for needs of postnatal women with low intensity guided telephone support (maximum 30 minutes per week) where practitioners encouraged participants in their use and practice of strategies. Participants also had access to a monitored peer-based web forum and relevant articles. TAU participants were referred to healthcare professionals and offered usual PND treatment options. The Parenting Sense of Competence Scale (PSOC; Johnston & Mash, 1989) was used to measure parenting self-efficacy. The impact of the intervention on the PSOC constituted a medium effect size. However, participants allocated to TAU reported high levels of alternative help seeking and this may have made detection of true treatment effects relative to TAU more difficult.

The two studies assessing the M-I relationship (as above) as well as parenting (Goodman et al., 2015; Clark et al., 2008) had mothers as well as infants as participants and although interventions varied, they both offered a form of psychotherapy. Goodman et al.'s (2015) study compared M-I dyads receiving Perinatal Dyadic Psychotherapy (PDP) with a control group of M-I dyads. They used the Parenting Stress Index (PSI; Abidin, 1995) to identify potentially dysfunctional parent-child relationships. Data at

post-intervention and follow-up revealed no significant differences between groups on parenting stress.

Clark et al's (2008) study compared the Mother-Infant Therapy Group (M-ITG) with a WLC group. They measured participants' stressors related to the parent-child relationship using the PSI (Abidin, 1995). This was done at point of entry into the study and 12 weeks later; there was no follow up. M-ITG mothers found parenting their infants to be more rewarding as compared with controls at 12 weeks. A significant main effect was found for the M-ITG on mother's perception of her child's reinforcement value, $F = 10.98(1, 26)$, $p < .05$, $ES = 1.32$. However, as above, with this study's small sample size, it was underpowered, children's ages varied from one to 24 months and assignment was sequential to treatment and control groups.

Overall, these four studies measuring parenting showed mixed results with two studies reporting statistically significant changes (Clark et al., 2008; Milgrom et al., 2016) and two studies reporting no significant differences (Goodman et al., 2015; Milgrom et al, 2016). Two studies (one in each of these categories) were rated as "strong" in terms of quality and the remaining two (again one in each of these categories) were rated as "moderate." They varied in terms of homogeneity of participants (i.e. mothers only or mothers and infants), type and content of intervention. In addition, all four studies instruments used to measure outcome need to be taken into consideration; the PSI (Abidin, 1995) and the PSOC (Johnston & Mash, 1989) measured parental adjustment to parenting rather than outcomes in children per se.

Discussion

The aim of this systematic review was to investigate the effects of treating PND on the M-I relationship and parenting. Overall, there are some consistent findings

suggesting the positive impact of treating PND on both the M-I relationship and parenting. However, to date, the focus of most interventions remains on improving symptoms of PND alone.

Methodological Issues and Limitations

There are a number of methodological limitations which must be taken into consideration when examining the results of the studies included in this review. Despite a comprehensive search, only seven RCTs or controlled trials (eight papers) assessing infant outcomes in response to PND treatment were identified, since most studies focused only on maternal outcomes. Poobalan et al. (2007) reported a similar outcome after searching for similar papers from 1966 to 2005, finding eight studies (nine papers). This reveals that, despite national guidelines calling for research focusing on investigating how effective treatments are for women with mental health problems in improving their relationships with their babies, there is little reflection of this action being taken in studies.

Treatment interventions in the identified studies varied widely, but all contained elements that sought to influence the M-I relationship or parenting. It is possible, however, that improved infant behaviour could have been a direct reflection of improvement in maternal mood. In all studies, there was a significant decrease in mothers' scores for PND (although due to the scope of this review, this outcome was not considered). In four out of the seven studies, outcome measures were in the form of self-report only, completed subjectively by mothers. It is therefore not possible to conclude from the studies that there was a real treatment effect on child outcomes or if the effects shown were a consequence of mothers' improved mood and their perceptions of a more positive mother-child relationship. Studies did not compare how mothers' PND scores

correlate with child outcomes. It is therefore not possible to tell if improvements in the M-I relationship result from treatment of PND, other elements of the study or other factors entirely.

A variety of outcome measures were used to measure the mother-child relationship, some of which were self-report and others that were objectively measured. Three out of four studies (Pugh et al., 2016, Goodman et al., 2015 and Clark et al., 2008) that considered parenting, however, made use of a common measure, the PSI. The results of these studies are therefore more accurately comparable. All measures used were relevant and meaningful for the interventions; however, some were designed specifically for the research (Puckering et al., 2010 and Pugh et al., 2016) and were less valid and reliable than more widely used and researched measures. This impacted on the quality of these studies and results from them should therefore be considered carefully.

There was heterogeneity regarding the interventions, including the number and duration of sessions, delivery and treatment modality used. The number of sessions ranged from six to fourteen in different studies and the duration of the sessions ranged from time taken to complete online modules (approximately 30 minutes) and receiving a telephone call from a therapist (up to 30 minutes) to five-hour group day treatments as seen in Puckering et al. (2010).

The studies also varied in content and delivery of the interventions. Interventions were delivered online and over the telephone, one-to-one in participants' homes or in a group setting, and CBT or a form of psychotherapy were used to treat participants. In addition, some studies offered one to two partner sessions. Although all studies addressed treatment fidelity in terms of ensuring protocols were followed and that therapists received supervision, some studies stated that they had built in idiosyncratic formulations for individuals. Firth (2013) states that structure and consistency in

research is essential to ensure validity and reliability to allow the researcher to accurately assess efficacy of treatment. There are various other methodological design issues that may have affected the quality of the evidence. Small sample sizes and underpowered studies reduce generalisability of results. It was explained in a few studies that TAU groups may not have necessarily been representative of TAU due to repeated contact with services related to taking part in the studies. Longitudinal follow-up data is important to gather when conducting research examining efficacy of interventions. Only one study (Mulcahy et al., 2010) reported follow-up information longer than 12 months: by the completion of treatment, a significant difference existed between the control and treatment groups in relation to their child outcomes in favour of the treatment condition. Further research published by Reay et al. (2012) however, revealed that there were no differences between the two conditions at the two years' follow up. Further research with long term follow-up will help clarify whether outcomes are maintained.

Strengths and Limitations of the Current Review

Due to the current comparable search strategy and inclusion and exclusion criteria between this review and that of Poobalan et al. (2007), it provides a continuation of the latter systematic review. It is also beneficial to obtain an overarching view of the evidence for not only the M-I relationship but also for parenting. An additional strength of this review is that five of the eight papers included were rated as “strong” in quality with the remaining three papers were rated as “moderate.”

This review is limited by the fact that only published studies were included and they were limited to papers written in English. By excluding ‘grey’ literature, there may be publication bias which may decrease the generalizability of the findings of the systematic review (Hopewell, McDonald, Clarke & Egger, 2007). Parekh-Bhurke et al. (2011) report that systematic reviews often have the limitation of publication bias,

however the current study did include some papers that were rated as high in quality which reported non-significant findings. An additional limitation is that the inclusion/exclusion criteria, which attempted to reduce heterogeneity and increase ability to compare papers, may have excluded potentially informative research papers.

Implications for Practice

There are important implications with regard to providing psychological therapy to new mothers. Given their increased risk of depression (to that of the general population) (Goodman et al., 2015) and the significant effects that depression can have both on them and their babies, it is essential to find effective treatments. Often, the use of anti-depressant medication is declined in this population due to potential side effects in breastfed babies (Goodman, 2009) therefore meaning psychological therapies have the potential to be particularly beneficial.

From the evidence available, treatment interventions for mothers with PND seem to have some benefits for the M-I relationship in the short-term. However, despite a high-quality study in this review (Mulcahy et al., 2010) reporting positive outcomes, the long-term follow up by Reay et al. (2012) showed there to be no differences between the two conditions at two years' follow-up. Follow-up therapeutic sessions may be of benefit to help to maintain positive effects of therapy.

With regard to parenting, based on the evidence reviewed in this study, it may be of benefit to consider observational outcome measures as well as self-report measures. A common limitation for studies in this area is the use of only self-report measures which may be more indicative of changes in mothers' mood as opposed to changes in parenting itself.

CBT Versus Psychotherapy

From the results of this review, there does not appear to be stronger evidence for either CBT or Psychotherapy when considering indirect impact on child outcomes. For both modalities, some studies reported significant changes and some reported non-significant findings. Puckering et al. (2010) reported greater positive interaction between mothers and infants who had attended the group with statistical significance of $p=.015$. An observational outcome measure was used, however, this study had a small sample size. CBT study samples were generally bigger but with no longer term follow-up.

Implications for Research

This review has shown that the focus of research remains on maternal outcomes with this review finding only seven studies that met the inclusion criteria. In addition, there has been no consideration about whether or not there is an association between maternal outcomes and child outcomes. It may therefore be helpful for future research to consider both mother and child outcomes and how they relate to each other.

Studies should ideally also use observational outcome measures when assessing child outcomes to improve accuracy and ensure that results are real and not indirectly impacted by mothers' own mood. This may, however, be difficult in practice due to additional costs of time taken to record videos and for these to be scored by blind scorers and may also feel more intrusive to participants.

Overall Conclusions

In summary, this systematic review has collated the evidence for the efficacy of PND interventions on positively impacting the M-I relationship and parenting. Eight papers met the inclusion criteria. Of those included, interventions were generally focused on forms of either CBT or Psychotherapy (such as IPT, psychotherapeutic groups and

perinatal dyadic psychotherapy) but all included elements directed at the M-I relationship or parenting. The evidence to date suggests that both CBT and Psychotherapy may be efficacious in improving child outcomes in mothers treated for PND. The available research has several methodological limitations and as such, further high quality RCTs are required. Trials assessing treatments for PND would benefit from looking more closely at benefits for children as well as mothers, using validated objective measures.

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Chapter 3:
Bridging Chapter

Chapter 3: Bridging Chapter

Summary of the Systematic Review

This chapter serves to consider the links between the Systematic Review (SR) and the Empirical Paper (EP). The SR explored how treating Postnatal Depression (PND) may impact on the mother-infant (M-I) relationship and parenting. Eight papers met the inclusion criteria for the review. These papers considered the outcomes for both mothers and children when mothers were treated for PND. The interventions varied but generally took the form of Cognitive Behavioural Therapy and Psychotherapy. All interventions had an element of addressing the M-I relationship or parenting. Interventions were delivered either one-to-one, within a group or online. The SR concluded that with sustained interventions, M-I relationships and parenting may be improved and that future studies should consider measuring both mother and child outcomes and the association between them.

Mother-Infant Relationship and Maternal Bond

Within the SR, the M-I relationship was defined as the emotional relationship and interaction between mother and infant (Putnam-Hornstein, et al., 2013). The maternal bond (MB) as described in the EP, is a mother's affection and emotional tie to her child (Johnson, 2013; Figueiredo, Costa, Pacheco, & Pais, 2009; Nonnenmacher, Noe, Ehrental, & Reck, 2016). The MB is therefore the feelings that a mother has for her child and the M-I relationship involves an interplay of the mother's feelings for her child and the child's feelings for his/her mother. Nonnenmacher et al. (2016) stated that the MB plays an important role in establishing the M-I relationship. It is clear from this that the MB and the M-I relationship can be considered as separate but inter-related entities, with MB being significant in the development and maintenance of the M-I relationship.

Link between the Systematic Review and Empirical Paper

The SR considered how treating PND impacts on the M-I relationship and parenting. As the MB plays an important role in establishing the M-I relationship, the EP therefore goes on to explore the MB and factors that may impact upon it. These factors are posttraumatic growth (PTG) following PND, current depressive symptoms and perceived social support.

Overview of the Empirical Paper

This paper aims to explore the contributions of PTG following PND, current depressive symptoms and perceived social support to the strength of the MB. In the introduction, each of these concepts are considered in turn with links drawn between them. This section will end with the research questions and hypotheses to be investigated. Methodology will then be discussed followed by information on analysis of the data. The results of the study will be presented and the chapter will close with a discussion of the results, limitations of the study and implications for future research and clinical work.

Chapter 4:
Empirical Paper Prepared for Submission to the
Infant Mental Health Journal

**Empirical Paper: An Exploration of the Contributions of Posttraumatic Growth
Following Postnatal Depression, Perceived Social Support and Current Depression
to the Strength of the Maternal Bond**

(Written for submission to the Infant Mental Health Journal)

Sherilyn Jarvis

Doctoral Programme in Clinical Psychology

University of East Anglia

Faculty of Medicine and Health Sciences

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Abstract

Background: Postnatal depression (PND), current depression and social support have all been found to have potential long-term detrimental effects on the maternal bond (MB). Posttraumatic Growth (PTG) is positive psychological growth that can occur following difficult life events. *Objective:* To explore whether the presence of PTG following PND contributes to the MB whilst controlling for social support and current depression.

Method: A cross-sectional design with $n=98$ participants was utilised to explore these relationships. Participants were recruited online and completed an online survey which contained demographic questions and four measures. These were measuring PTG, current depression, perceived social support and MB. The MB measure comprised two orthogonal subscales (perceived child warmth (MB-W) and perceived child invasiveness (MB-I)). *Results:* PTG can occur following PND. Correlations showed weak but significant relationships between current depression and both MB subscales, a significant positive relationship between PTG and MB-W, a significant negative relationship between perceived social support and MB-I, a significant positive relationship between current depression and MB-I as well as a significant negative relationship between current depression and MB-W. Hierarchical multiple regression analyses showed that current depression was the strongest predictor of MB-I and no significant results were found for MB-W. Perceived social support and PTG accounted for significant but minimal variance in MB-I. *Conclusion:* The research has shown that women can experience PTG following PND and that current depression not only has significant relationships with both MB subscales but is also the strongest predictor of MB-I. The need for additional research to further explore PTG following PND as well as the relationship between PTG and MB has been highlighted. By gaining a deeper

understanding into these relationships, this could inform the development of potential interventions to best suit the needs of postnatally depressed women.

Introduction

A strong maternal bond (MB) is crucial in promoting adaptive development in children and in building solid foundations which allow for social and emotional development to occur (Tsivos, Calam, Sanders & Wittkowski, 2015). This study aims to explore the contributions of Posttraumatic Growth (PTG) following Postnatal Depression (PND), perceived social support and current depression to the strength of the MB.

The Maternal Bond

The MB can be defined as the mother's affection and emotional tie to her child (Johnson, 2013; Figueiredo, Costa, Pacheco, & Pais, 2009; Nonnenmacher, Noe, Ehrental, & Reck, 2016). Both maternal sensitivity and maternal responsiveness are key in developing a strong MB (Johnson, 2013). Maternal sensitivity is considered to be the mother's ability to identify, accurately interpret and respond timeously and sensitively to her infant's cues (Kalinauskiene et al., 2009). Maternal responsiveness is the mother's warmth, affection and ability to soothe her infant when he/she is distressed (Johnson, 2013).

Attachment is the bond that infants form towards their caregiver (Nelki, Power, & Gopfert, 2010). It is dependent on the level of care provided by caregivers and whether or not this promotes a sense of security in the infant. Attachment is therefore closely linked to the MB; studies have shown that the stronger the MB, the more secure the infant's attachment to his/her mother (Nelki et al., 2010).

MB includes the involvement of both mother and child. Child behaviour can be interpreted in a multitude of ways; the specific interpretation made by a mother is a consequence of an interplay between her internal views and feelings and the child's

behaviour (Fraiberg, Adelson, & Shapiro, 1983 in Oates & Gervai, 2003). Child behaviours such as crying, facial expression and eye contact involve mutual emotional involvement by providing the mother with cues which draw her in and allow her opportunities to strengthen the MB (Figueiredo et al., 2009). The MB therefore strengthens progressively as more interactions take place between the mother and child. The stronger the MB, the more likely children are to build positive, secure attachments which are important for later mental health (Nelki et al., 2010).

Research has considered mothers' narrative accounts of their children and their experiences with them. In dimensional analyses of parents' beliefs about and behaviour towards their children, the descriptive axes of "care" and "control" are most widely used (Hinde, 1976; Schaefer & Bayley, 1961). Oates and Gervai (2003) further developed these axes and considered the first axis, the "care axis", to have "warmth" and "coldness" at each end of the continuum and the second "control axis", to have autonomy and invasiveness at each end of the continuum. Based on psychometric data obtained from completing measures, mothers' models of their children are organised on these axes.

A number of factors play an important role in the MB. These include infant/child personality, mother's own personality and attachment style, mother's social situation, mother's mental health (including depression) and perceived social support (Figueiredo et al., 2009). As the latter two variables are amongst the strongest predictors of the strength of MB, they will be considered in more depth.

Relationship Between Current Depression and Maternal Bond

Whitney et al. (2013) demonstrated that current depression negatively affects the MB. Depressed mothers may struggle to provide a good level of support, care and

nurturance to their children and may have more negative interactions with their children than non-depressed mothers (Whitney et al., 2013; O'Connor, 2016). In addition, children of depressed mothers may have worse health and developmental outcomes than children of non-depressed mothers (Whitney et al., 2013).

Relationship Between Perceived Social Support and Maternal Bond

Brugha et al. (1998) have defined perceived social support as an individual's perceived sense of closeness to members within their social network which can include close family and friends as well as acquaintances such as work colleagues or casual friends. Social support networks have been shown to be significant in preventing mental health difficulties (Gu, Hu, Hu, & Wang, 2016). For example, Cooper, Murray, Hooper and West (1996) stated that mothers with minimal social support were twice as likely to develop PND as mothers with sufficient support.

Perceived social support from all social network members has been shown to facilitate MB (Condon & Corkindale, 1997). MB is influenced more by satisfaction with available support than the number of such supports (Condon and Corkindale, 1997). The higher the level of care in the partner relationship, the stronger the MB (O'Hara et al., 2017).

Relationship Between Postnatal Depression, Posttraumatic Growth and Maternal Bond

Postnatal Depression

PND is diagnosed if low mood presents within the first 12 months after giving birth and is deemed to relate to postnatal issues (Goodman, 2009; O'Hara, 2009). Symptoms of PND include "uneasiness, irritability, confusion and forgetfulness, anhedonia, fatigue, insomnia, anxiety, guilt, inability to cope, and thoughts of suicide"

(Dennis & Hodnett, 2007, p.2). These replicate the symptoms of Major Depressive Disorder but PND also presents with mood lability and “overconcern” for the infant (O’Hara, 2009).

PND is estimated to affect between 10 and 20% of new mothers (Goodman, 2009) though the large variance in estimates is thought to be due to factors such as sampling, timing of assessment and severity of depression considered (Dennis & Hodnett, 2007). Older mothers, mothers of younger children, mothers who are more likely to ask for support, and mothers who are more satisfied with the support they are receiving experience lower levels of PND (Saligheh, Rooney, McNamara & Kane, 2014). Other sociodemographic factors that predict PND include mothers with a lower income, those who are “younger” mothers (those under 25 years-old) and those who do not have a partner (Rich-Edwards et al., 2006).

O’Hara & Segre (2008) state that between 50 and 80% of new mothers report experiencing episodes of the “baby blues” in which similar symptoms to PND are experienced. This differs from PND though in that it dissipates within 10 days of giving birth and does not require treatment (Seifer & Dickstein, 2000).

Milgrom, Negri, Gemmill, McNeil and Martin (2005) stated that the majority of women diagnosed with PND recover within six months, however, others will go on to experience symptoms of depression up to two years postnatally. Vliegen, Casalin and Luyten (2014) report this length of time to be up to three years postnatally for 30% of women when they were not receiving treatment for PND. In addition, it has been found that PND can lead to chronic and recurring depression throughout a woman’s life (Goodman, 2004).

Depression and anxiety in pregnancy, baby blues, history of depression, stressful life events, traumatic birth, poor relationship and social support are risk factors that have moderate to strong associations with PND (O'Hara, 2009).

Postnatal Depression and Maternal Bond

Effective bonding and the development of the MB during the perinatal period may be prevented if PND occurs during this period (Ohoka et al., 2014). Due to depressive symptoms, it has been documented that mothers with a diagnosis of PND have fewer emotional, intellectual and physical resources to care for their children than their non-depressed counterparts (Laurent & Ablow, 2012). Infants may therefore have little experience of maternal sensitivity and responsiveness (Campbell et al., 2004). In extreme cases they may instead experience repeated negative interactions with the mother, an accumulation of which may result in the development of their own negative affective state (Tronick & Reck, 2009). This negative affective state may be carried into new situations in which the infant may experience and react to these new situations negatively (Tronick & Reck, 2009).

In addition, women who develop psychological difficulties following childbirth may experience problems in terms of their perception of the quality of their relationship with their infants. Due to cognitive biases that are characteristic of depressive disorders, depressed mothers may struggle to objectively process information and may experience their child and relationship to their child in predominantly negative terms (Aaron-Jones, McFall, & Diego, 2004; McMahon, Barnett, Kowalenko, Tennant, & Don, 2001). A study by Davies, Slade, Wright, and Stewart (2008) showed that mothers with psychological difficulties viewed their infants as being less warm towards them and more invasive. Similarly, Milford and Oates (2009) found that depressive

symptoms were positively correlated with mothers' perceptions of their children's invasiveness but not with mothers' perceptions of their children's warmth.

Due to the impact on both mother and child, the longer-term consequences of PND and MB have been widely researched. Infants of depressed mothers have been reported to have lower cognitive abilities and more emotional and behavioural difficulties which can result in problems with school readiness, psychological problems (Vliegen et al., 2014) and an increased risk for developing an insecure attachment (Burke, 2003). These difficulties can extend into adulthood (Goodman & Brand, 2008). Despite these findings, other studies suggested that approximately 33% of children whose mothers had overcome PND, experienced an improvement in their behavioural difficulties once their mothers had overcome PND (Weissman et al., 2006).

Brockington et al. (2001) stated that 29% of mothers diagnosed with PND may experience an impaired MB. There are several factors that play a role in weakening the MB. Condon and Corkindale (1997) found that a weaker MB was characterised by a low level of social support and Brockington (2004) and Figueiredo et al. (2009) identified PND as the strongest predictor for a weakened MB. Other factors include death of a twin baby, undesired pregnancy, infants with diseases/disabilities, premature birth, mother's temperament, and mother's distress due to difficulties with feeding, calming the infant and getting the infant to sleep (Ohoka et al., 2014). This should be held in mind when considering if PND influences a weakened MB or if a weakened MB can influence a mother's mental health resulting in PND (Righetti-Veltema, Bousquet, & Manzano, 2003).

Posttraumatic Growth

PTG is a positive psychology concept which argues that in the aftermath of challenging life events, when an individual's beliefs have been severely tested as well as their worldview having been shifted by the experience of the event, this provides a "fertile ground for unexpected outcomes", such as PTG (Calhoun & Tedeschi, 2014, p. 1). Stressful life events are seen as catalysts for potential positive psychological growth (Tedeschi & Calhoun, 2004). Stressful life events do not always lead to PTG (Stanton & Low, 2004). Tedeschi and Calhoun (1995) reported that between 30% and 90% of people report PTG following difficult life experiences. The development of PTG can therefore be explained by a number of factors such as personality, mood states and demographic variables and socioeconomic status (Stanton & Low, 2004).

The term PTG refers to growth following not only a once-off trauma such as involvement in an accident but also following longer-term highly stressful, life-changing or adverse experiences such as illness (Calhoun & Tedeschi, 2014; Aldwin & Levenson, 2004). Tedeschi and Calhoun (2004) state that in order for PTG to occur, there needs to be a set of circumstances that represent a noteworthy challenge to the individual's adaptive resources. Studies have shown that the perceived severity of the stressor (Armeli, Gunthert, & Cohen, 2001) as opposed to the type of stress is more important in the development of PTG (Linley & Joseph, 2004).

Marshall, Fraizer, Frankfurt and Kuijer (2015) compared fourteen longitudinal studies and found that PTG remains stable over time. For example, Affleck, Tennen, Croog and Levine (1987) measured PTG at both seven weeks and eight years after a challenging life event and found PTG to have remained stable over that period. There were however, two studies (Butler et al., 2005; Dekel, Ein-Dor, & Solomon, 2012)

where PTG decreased significantly over time which is in sharp contrast with Tedeschi and Calhoun's (2004) theory that PTG increases over time. Marshall et al. (2015) therefore recommend that limitations of time of measuring PTG are always considered in interpretation of measures of PTG.

Tedeschi and Calhoun (1995) found that there were five common benefits associated with PTG which provide the framework for their (1996) measure of PTG – the Post Traumatic Growth Inventory (PTGI). These are; “Appreciation of Life” (AoL; appreciating the small things in life), “Personal Strength” (PS; feeling able to handle difficult situations), “Relating to Others” (RtO; sense of closeness to others), “New Possibilities” (NP; developing new interests in life) and “Spiritual Change” (SC; stronger existential belief).

Previous research studies considering the association between social support and PTG have delivered mixed results. The general consensus, however, is that the better the social support, the more likely PTG is to occur (Park, Cohen, & Murch, 1996; Tedeschi & Calhoun, 1995; Kinsinger et al., 2006). Sawyer and Ayers (2009), however, found no correlation between social support during childbirth and PTG.

The evidence about whether or not individuals who experience PTG also experience a reduction in psychological distress is mixed. Some studies found that participants who reported positive changes following a traumatic event had fewer depressive symptoms than those who reported no positive changes (Frazier, Conlon, & Glaser, 2001; Palmer, Graca, & Occhietti, 2016). Other studies, however, have reported no relationship between PTG and distress (Cordova, Cunningham, Carlson, & Andrykowski, 2001; Schulz & Mohamed, 2005; Cobb, Tedeschi, Calhoun, & Cann, 2006; Sattler et al., 2006; Kleim and Ehlers, 2009), whilst others have reported that

distress and PTG can exist together (Tomich & Hegelson, 2004). Therefore, whether PTG relieves some distress remains unclear.

Postnatal Depression and Posttraumatic Growth

There are very few studies that consider mental health difficulties as a source of potential PTG. Paton (2005) found that highly stressful life events such as work-related stress can facilitate PTG. In addition, some studies considering PTG following an episode of psychosis (Mazor, Gelkopf, Mueser, & Roe, 2016; Pietruch & Jobson, 2011 and Romano, McCay, Goering, Boydell, & Zipursky, 2010) have found that individuals can experience PTG following psychosis, with one study (Mazor et al., 2016) reporting moderate to high levels of PTG in 80% of participants. These studies provide valuable information that PTG can occur following mental health difficulties.

There are not yet any studies considering the relationship between PND and PTG. There are however two studies that are closely linked to this area. Firstly, Sawyer and Ayers (2009) researched PTG after childbirth. They found that 50.23% of participants experienced moderate to high PTG however PTG was not associated with post-traumatic stress symptoms. It was concluded that it is possible for postnatal women to experience PTG independently of post-traumatic stress symptoms and that perhaps as argued by Aldwin and Levenson (2004), PTG can occur following developmental life events such as childbirth. The second study researched the relationship between posttraumatic stress disorder (PTSD) after childbirth and MB (Davies et al., 2008). They found that all results linking PTSD and MB, including mothers perceiving their infants as being less warm and more invasive, could be explained by the presence of PND. The only result that could not be explained by the presence of PND was the negative effect of PTSD on MB.

Studies considering rates of women reporting subjective experiences of birth as traumatic vary from 21.3% to 43% (Sawyer & Ayers, 2009; Davies et al., 2008; Alcorn, O'Donovan, Patrick, Creedy, & Devilly, 2010). In addition, Davies et al. (2008) found that 3.8% of participants met full criteria for PTSD. Similarly, Grekin and O'Hara (2014) reported that 3% of women will develop PTSD as a result of childbirth.

Considering the studies cited above, firstly, women can experience PTG which is linked to their experiences of becoming mothers and secondly, it is possible for people to experience PTG linked to a highly stressful mental health experience. It may be worthwhile considering if mothers can experience PTG following PND – a highly stressful mental health experience linked to becoming a mother.

Posttraumatic Growth and Maternal Bond

In the Sawyer & Ayers (2009) study above, new mothers scored highest in the PTG subscales of Appreciation of Life (AoL), Personal Strength (PS) and Relating to Others (RtO). They reported that new mothers felt more able to connect with people with whom they previously had a poor relationship. Sawyer & Ayers (2009) did not specify if better connections to others include a closer relationship to their children (and linked to this is a stronger MB); the potentially interesting link between PTG experienced by mothers and the MB has therefore not yet been explored.

As demonstrated above, research has shown that there is an association between PND and MB. In addition, there is literature to suggest that mothers who have experienced PND have the potential to develop PTG as a result of the PND. This study therefore aims to explore whether the presence of PTG following PND contributes to the MB whilst controlling for social support and current depression.

Although attachment is of interest, this study has chosen to consider MB alone as it is questioning whether mothers experience of PTG following PND contributes to their feelings for their child (MB).

Research Questions and Hypotheses

From the aims above, the research questions and hypotheses are as follows:

Research Questions

1. Can mothers experience PTG following PND?
2. Are AoL, PS and RtO the subscales that are most predictive of a weaker MB-I and a stronger MB-W?
3. What proportion of variance in strength of MB is explained by PTG, social support and current depression?

Hypotheses

1. There is a positive relationship between PTG and MB-I and a negative relationship between PTG and MB-W.
2. Perceived social support has a negative relationship with MB-I and a positive relationship with MB-W.
3. Current depression has a positive relationship with MB-I and a negative relationship with MB-W.

Methodology

Design

A cross-sectional quantitative design was utilised. There were two predictor variables (PND and PTG), two control variables (social support and current depression)

and one dependent variable (MB). A cross-sectional design, where information was gathered at one point in time, was chosen as it allowed inferences to be made about possible relationships between MB, PND and PTG whilst controlling for social support and current depression.

Participants

Participants were recruited through two websites: www.netmums.com and www.connectedbaby.net. Due to an initial poor response, recruitment was broadened to include two social media sites (Facebook and Twitter).

Inclusion criteria:

- Mothers must have been diagnosed with PND by their GP or a healthcare professional (e.g. Mental Health Practitioner, Health Visitor etc.) with their youngest or only child (children in the case of twins etc.).
- Mothers whose youngest or only child(ren) was(were) between the ages of two and four years old. This age range was selected according to the diagnostic criteria for the onset of PND within the first year after giving birth and typically lasting for six months to one year. This age range therefore allows the mother time to overcome PND and for PTG to occur. It is also a valid age range for the measure of MB.
- Adults (18 years and older).

Sample Size

A sample size of 69 participants was required in order to reach statistical power. A total of 98 participants who met the inclusion criteria chose to participate in and complete this study.

Measures

All measures used in this study are freely available, robust psychometric self-response questionnaires that were completed in the study in the same order. The first three measures below were minimally modified to ensure participants considered only the circumstances of interest in this study when answering the questions. Demographic data were collected using a specific self-report measure developed for the current study (Appendix J). Participants were asked to provide demographic information including age, gender, marital status, number of children, level of education and employment status. In addition, participants were asked whether they had experienced any traumatic events since falling pregnant with their last child(ren). This allowed examination of the possibility of previous experience of trauma impacting on participants' current experiences when answering questionnaires.

In addition to the demographic information, participants were asked to complete the following four questionnaires:

The Mothers' Object Relations Scale (Child) (MORS (Child); Simkiss et al., 2013; Appendix L) was used as an indirect measure of MB. It has two scales, a child's emotional "warmth" and "invasiveness" as perceived by the mother. As the MORS (Child) has two orthogonal subscales, the study therefore has two separate outcome variables – warmth (MB-W) and invasiveness (MB-I) which will be considered equally with regard to strength of MB.

The Post Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996; Appendix K) is a 21-item Likert scale questionnaire measuring the five subscales of PTG. It has good validity and high internal consistency of $\alpha = 0.94$ and test-retest reliabilities for the subscales ranged from $r = 0.37$ to $r = 0.74$ (Tedeschi & Calhoun, 1996).

The Multi-Dimensional Scale of Perceived Social Support (MSPSS; Appendix M) is a 12-item inventory measuring perceived social support from family, friends and partner with high internal consistency ($\alpha = 0.91$), good construct and external validity and test-retest reliability (Osman et al., 2014).

The Patient Health Questionnaire 8-Item Scale (PHQ-8; Kroenke et al., 2009; Appendix N) was used to measure current depression. It is widely used in research with high test-retest reliability ($r = 0.84$), high internal consistency ($\alpha = 0.89$) and good construct and external validity (Kroenke et al., 2009).

Procedure

Throughout the development and completion of the current study, the British Psychological Society's code of human research ethics (2010) guidelines were adhered to. In addition, ethical approval was received from the UEA Faculty of Medicine and Health Ethics Review Committee (Appendices B to D).

Participants were recruited online through the "Surveys" page on www.netmums.com. Netmums is an online parenting site with approximately eight million unique users per month. Survey requests can be posted by researchers on a dedicated "Surveys" page and remain active until deleted by the researcher who posted them.

In addition, a link was posted on www.connectedbaby.net which has a following of 50 000 people a week and studies infant attachment (Appendix F).

www.connectedbaby.net is a website that offers information to aide understanding of bonding and attachment and is used by professionals, academics, researchers and parents.

With regard to social media, the "admins" or writers for various "Mums' Groups" were contacted on Facebook and Twitter with a request to post an

advertisement with a link to the survey within their groups. The search terms “mum’s group” and “mother’s group” were used on Facebook; private messages as seen in Appendix E were then sent to the “admin” of each group. The message introduced the researcher and explained briefly about the purpose and topic of the research. In addition, it invited “admins” to contact the researcher should they have any questions. The message asked “admins” to share an advertisement for the study along with a link to the study with the members of their respective groups. The advertisement contained a brief description of the study and inclusion criteria and invited eligible participants to participate. Once this advertisement had been posted by the “admins” it would appear in the newsfeed on members’ screens where they would then have the option of clicking on the link to access the information sheet (Appendix G) and consent form (Appendix H) and to then participate in the survey.

In all recruitment adverts, inclusion and exclusion criteria were described.

Survey Monkey Gold was used to host the online survey.

Participant Procedure

After clicking on links posted on the websites and social media, participants were directed to the participant information sheet, consent form, screening questions, measures and finally debrief page (Appendices G to O). The survey was open from September 2017 and was closed in December 2017.

Analysis

Data were explored and statistical analyses performed using SPSS Version 22 (IBM Corp, 2013). There were no missing data as participants were not able to submit partial answers for questionnaires. Descriptive statistics were performed using mean and standard deviation for normally distributed variables, and percentages for

categorical variables. Data distribution was considered through the examination of histograms, Q-Q plots and statistical analyses to determine whether assumptions of parametric testing were met.

The primary statistical analyses examined the associations between MB, current depression, perceived social support and PTG. Univariate correlations were performed amongst all variables. Statistical significance was taken at the 5% level ($p < .05$) throughout. Holm's correction (Holm, 1979) was used where appropriate to adjust the p -value for Type I errors associated with multiple testing.

Descriptive statistics were consulted to answer research question one. Correlations were used to explore relationships between the variables as outlined in the hypotheses and research question two. The main study question (research question three) was explored using hierarchical multiple regression where strength of MB was considered the main outcome variable. Regression analyses explored the proportion of variance explained by PTG, current depression and perceived social support.

Results

This section begins with a description of the sample and the descriptive statistics for each measure used in the study. This will be followed by preliminary analyses and assumptions of parametric tests being considered. The first research question about whether mothers can experience PTG following PND will then be explored. The hypotheses and second research question which consider the relationship between MB and the other variables are investigated followed by the third research question exploring the extent to which the strength of MB can be explained by PTG following PND.

Attrition

A total of 218 participants completed the consent form, however over half of these participants did not continue with the survey for a variety of reasons as outlined in Figure 1 below. The final sample size used in the analysis was $N = 98$.

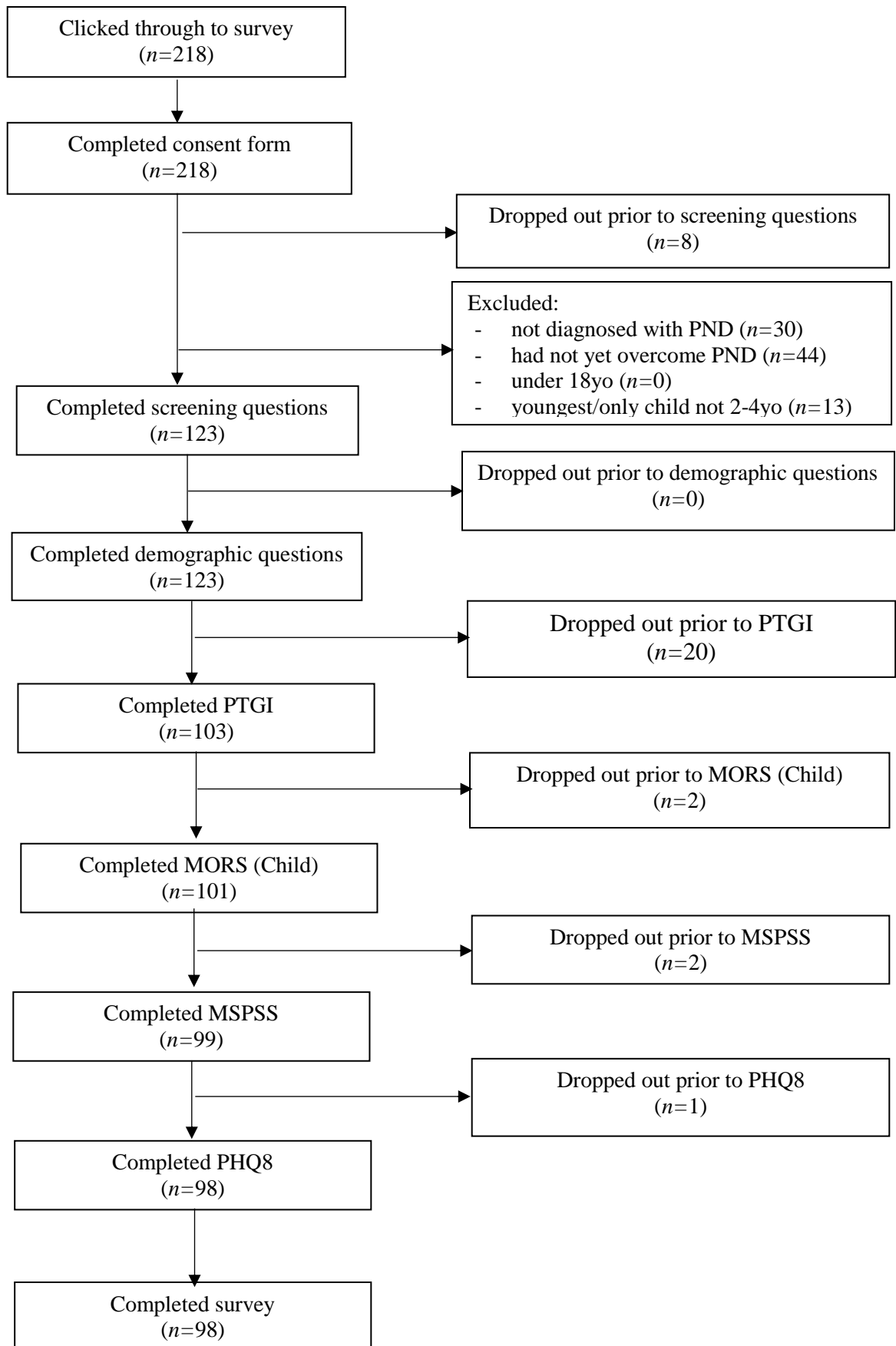


Figure 1. Flow Diagram Demonstrating Points of Attrition During Study

Notes: PND=Postnatal Depression, MORS (Child)=Mothers' Object Relations Scale (Child), PHQ8=Patient Health Questionnaire 8-item scale, MSPSS= Multi-Dimensional Scale of Perceived Social Support; PTGI=Posttraumatic Growth Inventory

A Chi-square test for independence with Yates Continuity Correction was used to identify any association between responders and non-responders. As 80% of cells in all variables had an expected count of less than five, Fisher's exact test was used. No significant group differences were noted, results are reported in Tables 5-7.

Descriptive Data

Means and percentages for the demographic data (age, ethnicity, relationship status, education, employment, household income and housing) are presented in Table 5. The majority of participants (89.8%) were between the ages of 25 and 44-years-old. 79.6% of the sample identified as being White British and the majority of the sample were either married or cohabiting. A high proportion of the sample (61.2%) had completed university degrees or higher and 60.2% had a household income of £30 000 or more.

Table 5

Participant Demographic Information

	Responders <i>N</i> (%)	Non-responders <i>N</i> (%)	Fisher's Exact Test	Sig.
Age			1.71	.42
18 – 24	10 (10.2)	3 (12)		
25 – 34	47 (48.0)	15 (60)		
35 – 44	41 (41.8)	7 (28)		
Over 44	0 (0)	0 (0)		
Ethnicity			3.63	.72
White British	78 (79.6)	18 (72)		
White Other	12 (12.2)	1 (4)		
Black	1 (1.0)	0 (0)		
Mixed race	3 (3.1)	1 (4)		
Asian	1 (1.0)	0 (0)		
Prefer not to say	1 (1.0)	0 (0)		
Marital status			6.64	.21
Married	57 (58.2)	16 (64)		
Cohabiting	13 (13.3)	3 (12)		
Long term relationship	10 (10.2)	1 (4)		
Divorced	4 (4.1)	0 (0)		
Separated	8 (8.2)	0 (0)		
Single	6 (6.1)	5 (20)		

Table 5 Continued.

Participant Demographic Information

	Responders <i>N</i> (%)	Non-responders <i>N</i> (%)	Fisher's Exact Test	Sig.
Education			9.51	.07
GCSEs	15 (13.3)	4 (16)		
College	24 (24.5)	5 (20)		
Undergraduate degree	26 (26.5)	6 (24)		
Postgraduate degree	34 (34.7)	6 (24)		
Other	1 (1.0)	4 (16)		
Employment status			4.08	.66
Full-time	23 (23.5)	7 (28)		
Part-time	36 (36.7)	6 (24)		
Self-employed	8 (8.2)	1 (4)		
Stay-at-home mum	19 (19.4)	7 (28)		
Unemployed	3 (3.1)	2 (8)		
Student	6 (6.1)	1 (4)		
Unable to work	3 (3.1)	1 (4)		

Table 5 Continued.

Participant Demographic Information

	Responders <i>N</i> (%)	Non-responders <i>N</i> (%)	Fisher's Exact Test	Sig.
Household income			1.90	.89
£10 000 - £20 000	12 (12.2)	4 (16)		
£20 000 - £30 000	18 (18.4)	3 (12)		
£30 000 - £50 000	27 (27.6)	9 (36)		
£50 000 - £70 000	16 (16.3)	3 (12)		
£70 000 and above	16 (16.3)	3 (12)		
Prefer not to say	9 (9.2)	3 (12)		
Housing			6.33	.14
Home Owner	56 (57.1)	13 (52)		
Private renting	24 (24.5)	5 (20)		
Renting - council	7 (7.1)	6 (24)		
Friends/family	7 (7.1)	0 (0)		
Other	4 (4.1)	1 (4)		

Data on children (number of children, age of youngest/only child and number that youngest/only child was born) are shown in Table 6. Most participants' (57.1%) youngest or only child was their first born and 43.9% of the sample answered that their youngest or only child was two-years-old.

Table 6

Information on Children in Family

	Responders <i>N</i> (%)	Non-responders <i>N</i> (%)	Fisher's Exact Test	Sig.
Number of other children			4.43	.19
0	41 (41.8)	11 (44)		
1	30 (30.6)	8 (32)		
2	24 (24.5)	3 (12)		
3	3 (3.1)	3 (12)		
4 or more	0 (0)	0 (0)		
Age of youngest or only child (years)			5.74	.22
2	43 (43.9)	16 (64)		
3	35 (35.7)	3 (12)		
4	20 (20.4)	6 (24)		
Number youngest or only child was born			1.71	.63
First	56 (57.1)	15 (60)		
Second	32 (32.7)	7 (28)		
Third	9 (9.2)	2 (8)		
Fourth	1 (1.0)	1 (4)		
Fifth or more	0 (0)	0 (0)		

Data on PND episode (length of PND episode and length of time passed since overcoming PND) can be found in Table 7. Almost three quarters of the sample (72.4%) experienced symptoms of PND for over nine months. 52.04% of participants ($n=51$) recorded that they had experienced a traumatic event since falling pregnant with their youngest/only child.

Table 7

Information on Episode of Postnatal Depression

	Responders <i>N</i> (%)	Non-responders <i>N</i> (%)	Fisher's Exact Test	Sig.
Length of PND			4.01	.38
Up to 3 months	3 (3.1)	3 (12)		
Up to 6 months	17 (17.3)	3 (12)		
Up to 9 months	7 (7.1)	1 (4)		
Up to 1 year	25 (25.5)	8 (32)		
Over 1 year	46 (46.9)	19 (40)		
Length of time since PND symptoms stopped			1.02	.82
2-6 months	23 (23.5)	7 (28)		
6 months – 1 year	29 (29.6)	6 (24)		
1 – 2 years	35 (35.7)	8 (32)		
Over 2 years	11 (11.2)	4 (16)		

Descriptive statistics on the main assessment measures for the whole sample are presented in Table 8 which illustrates the mean score, standard deviation (SD), and range for all measures. The mean current depression score for the sample fell below the

cut off for clinical depression. The mean score for perceived social support fell into the higher end of the “moderate” range and the mean score for PTG (52.55) fell below cut-off (62) with 38.8% of participants reporting at least a moderate level of PTG. The PTG domain with the highest mean was PS (61.2%; >14 on this subscale), followed by AoL (58.8%; >8 on this subscale), NP (44.9%; >14 on this subscale), RtO (39.8%; >20 on this subscale) and SC (13.3%; >5 on this subscale). Scores on the MORS (Child) warmth subscale (MB-W) were higher than those on the invasiveness subscale (MB-I) which is to be expected as low scores on MB-W would represent a lack of warmth and affection from the mother towards the child, which one might expect to be relatively infrequent in a general population sample (Simkiss et al., 2013).

Table 8

Descriptive Statistics on all Measures

Measure	Min	Max	Mean	SD
MORS (Child) Invasiveness	0	35	13.09	5.13
MORS (Child) Warmth	0	35	29.45	3.94
PHQ8	0	24	5.82	5.01
MSPSS	12	84	56.34	17.80
Significant Other	4	28	20.56	6.95
Family	4	28	17.87	7.24
Friends	4	28	17.91	7.21
PTGI	0	105	52.55	23.59
Appreciation of Life (AoL)	0	15	8.47	4.35
Relating to Others (RtO)	0	35	17.84	9.23
New Possibilities (NP)	0	25	12.00	7.13
Personal Strength (PS)	0	20	11.86	5.41
Spiritual Change (SC)	0	10	2.39	2.95

Notes: MORS (Child)=Mothers’ Object Relations Scale (Child), PHQ8=Patient Health Questionnaire 8-item scale, MSPSS= Multi-Dimensional Scale of Perceived Social Support; PTGI=Posttraumatic Growth Inventory

Preliminary Analyses

Prior to conducting hierarchical multiple regression analyses, the relevant assumptions were tested. This was done firstly via visual inspection of histograms, P-P plots and scatterplots to check for homoscedasticity, linearity and normality. Three variables including both MORS (Child) subscales as well as current depression appeared skewed. Kolmogorov-Smirnov tests with Lilliefors Significance Correction were then consulted and confirmed these three variables departed from normality. Difficulties meeting assumptions of parametric tests is common when using MB data, and the data are often skewed (Simkiss et al., 2013). Current depression and MB-I were transformed using square root transformation and MB-W was successfully transformed using a reverse score transformation followed by a square root transformation. Inspection of histograms, P-P plots and scatterplots of the transformed variables standardized residual values indicated that the assumption of normality was then met. Kolmogorov-Smirnov tests with Lilliefors Significance Correction confirmed this. Durbin-Watson test statistics confirmed that residuals were uncorrelated. Table 9 displays correlations among all variables and are based on Pearson's r . All predictors shared weak relationships with each outcome (MB-I and MB-W) and were also weakly correlated with one another. In addition, the collinearity statistics (tolerance and VIF) were all within accepted limits and the assumption of no multicollinearity was therefore met. There were no outliers or missing information.

Table 9

Correlations Among all Variables

	MORS (Child) W	PHQ8	MSPSS	PTGI
MORS (Child) I	-.27**.	.29**	-.23*	.01
MORS (Child) W		-.23*	.11	.22*
PHQ8			-.21*	-.01
MSPSS				.29**

Notes: MORS (Child) W=Mothers' Object Relations Scale (Child) Warmth subscale, MORS (Child) I=Mothers' Object Relations Scale (Child) Invasiveness subscale, PHQ8=Patient Health Questionnaire 8-item scale, MSPSS= Multi-Dimensional Scale of Perceived Social Support; PTGI=Posttraumatic Growth Inventory

*Correlation is significant at the .05 level (2-tailed)

**Correlation is significant at the .01 level (2-tailed)

Table 9 shows that all significant results were weak correlations. These will be explored further in the hypotheses in the next section.

Main Analyses

Research Question One

Can mothers experience PTG following PND?

Descriptive statistics in Table 8 were consulted to answer this question. Results showed that 38.8% of participants reported at least a moderate level of PTG following PND. Mothers can therefore experience PTG following PND.

Hypothesis One

There is a positive relationship between PTG and MB-I and a negative relationship between PTG and MB-W

Correlations in Table 9 were consulted to analyse this hypothesis. The analysis revealed that there was a non-significant relationship between PTG and MB-I ($r(98) = .01, p > .05$). In addition, a significant positive relationship between PTG and MB-W ($r(98) = .22, p < .05$) was identified.

Hypothesis Two

Perceived social support has a negative relationship with MB-I and a positive relationship with MB-W.

Correlations in Table 9 were consulted to analyse this hypothesis. The analysis revealed that there was a significant negative relationship between perceived social support and MB-I ($r(98) = -.23, p < .05$). A non-significant relationship was identified between perceived social support and MB-W ($r(98) = .11, p > .05$).

Hypothesis Three

Current depression has a positive relationship with MB-I and a negative relationship with MB-W

Correlations in Table 9 were consulted to analyse this hypothesis. The analysis revealed that there was a significant positive relationship between current depression and MB-I ($r(98) = .29, p < .05$) as well as a significant negative relationship between current depression and MB-W ($r(98) = -.23, p < .05$). Findings therefore support this hypothesis.

Research Question Two

Are AoL, PS and RtO the subscales that are most predictive of a weaker MB-I and a stronger MB-W?

Correlations in Table 10 below were consulted to analyse this research question. Non-significant relationships were identified between all five subscales of the PTGI and MB-I. The subscales of New Possibilities (NP) and Personal Strength (PS) had the

strongest significant association with MB-W ($r(98) = .24, p < .05$ for both NP and PS).

The subscale Appreciation of Life (AoL) had a slightly weaker correlation with MB-W ($r(98) = .22, p < .05$). Relating to Others (RtO) and Spiritual Change (SC) subscales did not have significant relationships with MB-W. AoL, PS and RtO are therefore not the subscales most predictive of a weaker MB-I and a stronger MB-W.

Table 10

Correlations Between MB-I, MB-W and PTGI Subscales

	AoL	RtO	NP	PS	SC
MORS I	-.02	.05	.03	.05	.06
MORS W	.22*	.12	.24*	.24*	.07

Notes: MB-I=Maternal Bond Invasiveness, MB-W=Maternal Bond Warmth, MORS I=Mothers' Object Relations Scale (Child) Invasiveness subscale, MORS W=Mothers' Object Relations Scale (Child) Warmth subscale, AoL=Appreciation of Life, RtO=Relating to Others, NP=New Possibilities, PS=Personal Strength, SC=Spiritual Change.

*Correlation is significant at the .05 level (2-tailed)

Research Question Three

What proportion of variance in strength of MB is explained by PTG, social support and current depression?

Hierarchical multiple regression was used to assess how much perceived social support as measured by the MSPSS ($M = 56.34, SD = 17.80$), current depression as measured by the PHQ8 ($M = 2.1, SD = 1.12$), and PTG following PND as measured by the PTGI ($M = 52.55, SD = 23.59$) could explain the strength of the MB as measured by MB-I and MB-W.

Separate regression analyses were therefore run with both MB-I ($M = 13.09$, $SD = 5.13$) and MB-W ($M = 29.45$, $SD = 3.94$). The first regression considered MB-I as the outcome variable. Current depression was entered in Model 1, current depression and perceived social support were entered into Model 2 and finally current depression, perceived social support and PTG were entered into Model 3. The variables were entered in this order as this reflects the order of predictive value as described in previous research. Results are displayed in Table 11. Results indicated that current depression explained 10.6% of the variance in MB-I, $F(1, 96) = 11.42$, $p < .05$. With the addition of perceived social support in the second model, it explains a further 2.6% of the proportion of the variance in MB-I, $F(2, 95) = 3.14$, $p < .05$ and Model 3 (current depression, perceived social support and PTG) only explains an extra .3% of the variance, $F(3, 94) = 4.90$, $p < .05$. Although perceived social support and PTG do make a significant contribution to predicting MB-I, the amount of variance is negligible once current depression is taken into account.

Table 11

Hierarchical Regression One: MORS (Child) Invasiveness Subscale

Model	Unstandardised coefficients (<i>B</i>)	Standard error (SE <i>B</i>)	Standardised coefficients (β)	<i>B</i> (95% CI)	Sig.
Model 1					.001
Depression	.20	.06	.33	(.08-.32)	
Model 2					.001
Depression	.18	.06	.30	(.06-.30)	
Social Support	-.01	.00	-.16	(-.01-.00)	
Model 3					.003
Depression	.18	.06	.29	(.06-.30)	
Social Support	-.01	.00	-.18	(-.15-.00)	
Posttraumatic Growth	.00	.00	.06	(-.00-.01)	

Note: MORS (Child) Invasiveness Subscale =Mothers' Object Relations Scale (Child) Invasiveness Subscale

The second regression considered MB-W as the outcome variable. Current depression was entered in Model 1, current depression and perceived social support were entered into Model 2 and finally current depression and perceived social support and PTG were entered into Model 3. Variables were entered in this order for the same reasons as above. Results are displayed in Table 12. Results indicated that neither of the first two models were able to explain a significant proportion of the variance in MB-W: Model 1 (current depression), $F(1, 96) = 3.46, p = .66$ and Model 2 (current depression and perceived social support), $F(2, 95) = 2.11, p = .13$, as they were not significant. Model 3 (current depression, perceived social support and PTG) explained 8.7% of the variance in MB-W, $F(3, 94) = 2.99, p < .05$. Only PTG was therefore able to explain a proportion of variance of MB-W.

Table 12

Hierarchical Regression Two: MORS (Child) Warmth Subscale

Model	Unstandardised coefficients (<i>B</i>)	Standard error (SE <i>B</i>)	Standardised coefficients (β)	<i>B</i> (95% CI)	Sig.
Model 1					.66
Depression	.15	.08	.19	(-.01-.31)	
Model 2					.13
Depression	.14	.08	.17	(.03-.30)	
Social Support	-.01	.01	-.09	(-.02-.01)	
Model 3					.04
Depression	.15	.08	.18	(-.02-.31)	
Social Support	.00	.01	-.03	(-.01-.01)	
Posttraumatic Growth	-.01	.00	-.22	(-.02-.00)	

Note: MORS (Child) Warmth Subscale =Mothers' Object Relations Scale (Child) Warmth Subscale

To reduce the possibility of Type I errors as a consequence of multiple simultaneous comparisons, post-hoc comparisons were conducted on the results that reached statistical significance using Holm's method (Holm, 1979; Appendix P). When

comparing the inferential statistics found in Tables 11 and 12, with the adjusted p -values, all results from the first regression remained significant whereas the significant result from the second regression is no longer significant (see Table 13).

Table 13

Holm's Adjusted p -values for Multiple Comparisons

	i	p_i	p_{Holm}	H_o
MORS I Model 1	1	.001	.008	Rejected
MORS I Model 2	2	.001.	.001	Rejected
MORS I Model 3	3	.003	.0125	Rejected
MORS W Model 3	4	.040	.0167	Accepted
MORS W Model 2	5	.130	.1	Accepted
MORS W Model 1	6	.660	.025	Accepted

Note: i : number of order or p -values; p_i : Unadjusted p -value; p_{Holm} : Holm's adjusted p -value; H_o : null hypothesis, MORS I =Mothers' Object Relations Scale (Child) Invasiveness subscale, MORS W=Mothers' Object Relations Scale (Child) Warmth subscale

Discussion

Overview

Analysis of the results of this study reveals inconclusive support for the research questions and hypotheses. The implications of the results will now be discussed in detail. Following the structure of the Results section, the descriptive statistics will be discussed first. This will be followed by an examination of the data pertaining to research question one, followed by the hypotheses and ending with research questions two and three. A methodological critique of the study design will be presented next, followed by a discussion of the clinical implications of the results of the study and ideas for future research. An overall summary and conclusion will close the discussion.

Descriptive Statistics

A total of 80.32% of eligible participants completed the survey. Although this is a high percentage, similar studies such as Sawyer and Ayers (2009) reported a completion rate of 98.63% in their online survey.

Just over 20% of participants ($n=44$) who chose to take part in the survey were ineligible as they were still experiencing symptoms of PND. This is a similar percentage to that stated in the Vliegen et al. (2014) study which reported that 30% of women who were not receiving clinical treatment for PND were still depressed up to three years after giving birth. Milgrom et al. (2005) however, stated that the majority of women diagnosed with PND recover within six months, but others will go on to experience symptoms of depression up to two years postnatally. As the question asking participants whether or not they had overcome symptoms of PND was posed prior to the question asking them to confirm that their child/ren was/were between the ages of two and four-years-old, it is not possible to tell how long these mothers had been experiencing PND for.

Although the presence of a diagnosis of PTSD was not assessed in the current study, nor the type of trauma experienced, 52.04% of participants ($n=51$) recorded that they had subjectively experienced a traumatic event since falling pregnant with their youngest/only child. Alcorn et al. (2010) found that 43% of women experienced childbirth as traumatic whereas Davies et al. (2008) reported that 21.3% of their sample were found to be partially symptomatic of PTSD following childbirth. Although the current study has a higher percentage of perceived traumatic events than these two studies, it is important to consider that childbirth may have been the perceived traumatic event for a number of the participants. In addition, only approximately 3% of women's post-traumatic stress symptoms are sufficient to be diagnosed with PTSD (Grekin &

O'Hara, 2014; Davies et al., 2008). It should be considered, therefore, that only a portion of the participants who felt they had experienced a traumatic event, were likely to have had a diagnosis of PTSD.

Despite this evidence from previous studies, due to the high percentage of participants who stated that they had subjectively experienced a traumatic event since falling pregnant with their youngest/only child and the fact that this was not further measured, all results in this study should be interpreted accordingly with caution.

In terms of current depression, the sample that completed the survey were representative of a non-clinical sample. Goodman (2004) stated that PND can lead to chronic and recurring depression throughout a woman's life however this was not evident in the current study's sample. A possible explanation for this may be that up to roughly three and a half years would have passed since participants had PND which is a relatively short period of time in the life span.

Research Question One

The results of the present study contribute to a growing body of literature demonstrating that experiences of mental health such as PND can result in PTG, with 38.8% of participants reporting at least a moderate degree (>62 on the PTGI) of positive change. Comparison with previous research suggests that levels of growth in the present study are lower than other studies. Sawyer and Ayers (2009) reported 50.23% of participants with a PTG score of >62 and Tedeschi and Calhoun (1995) reported that between 30% and 90% of people report PTG following difficult life experiences; the present study falls towards the lower end of this figure. It is important to consider that since almost half of the sample answered that they had experienced a traumatic event since falling pregnant with their youngest/only child, it is possible that, despite being asked to answer PTGI questions with their PND in mind, their reported PTG could be

linked to their perceived traumatic event. In addition, their PND could be as a result of or complicated by their perceived traumatic event.

Hypothesis One: Posttraumatic Growth and Maternal Bond

Results showed that there is a significant positive relationship between PTG following PND and MB-W. These results are similar to the Davies et al. (2008) study which considered the association between PTSD and MB. They found that when participants had a diagnosis of PTSD, they reported more negative maternal representations in terms of their infants being less warm and more invasive. They went on to report that this result could, however, be explained by the presence of PND. This suggests that despite a high percentage of participants who felt they had experienced a trauma since falling pregnant with their youngest or only child, the results seen in the present study may still accurately reflect PTG following PND (as opposed to a different trauma) and strength of the MB.

Hypothesis Two: Perceived Social Support and Maternal Bond

MB has been shown to be facilitated by perceived social support both within and outside the partner relationship (Condon & Corkindale, 1997; O'Hara, 2009). Condon and Corkindale found that satisfaction with social support is more influential on MB than the number of such supports. In the partner relationship, high levels of care are associated with a stronger MB (O'Hara, 2009). In the present study, there was a significant negative relationship between perceived social support and MB-I, however no significant relationship was found with MB-W. The results therefore partially support the claims of Condon and Corkindale (1997) and O'Hara (2009) and suggest that low perceived social support does have a role to play in a mother perceiving her child as more invasive towards her. This study did not provide any evidence, however,

to suggest that a high level of perceived social support was associated with a mother perceiving her child as being warmer towards her.

Hypothesis Three: Depression and Maternal Bond

Results showed significant relationships between current depression and both MB-I and MB-W, with depressed mothers scoring higher on MB-I and lower on MB-W than their non-depressed counterparts, indicating a weaker MB. These results repeat some findings in Milford and Oates (2009) where it was found that depression was positively correlated with MB-I but not MB-W. The results are in accordance with Whitney et al. (2013) and O'Connor (2016) which both stated that depression has a negative relationship with MB. In addition, the results are similar to those in the Davies et al. (2008) study which found that the presence of PND could explain the result where participants experiencing symptoms of PTSD reported more negative maternal representations in terms of their infants being less warm and more invasive.

Research Question Two: Subscales of Posttraumatic Growth and Maternal Bond

The PTG domain with the highest mean in the present study was PS (61.2%), followed by AoL (58.8%), NP (44.9%), RtO (39.8%) and SC (13.3%). These results are similar to those found by Sawyer and Ayers (2009) who reported AoL (80.36%) to be the most endorsed domain followed by PS (62.56%), RtO (52.51%), NP (47.95%) and SC (16.44%). Although the percentages of women who experience PTG following PND in this study is lower than that in the Sawyer and Ayers (2009) study, AoL and PS appear to obtain the highest growth in both groups of women and may therefore be the areas that postnatal women are most likely to identify growth in.

Research Question Three: Proportion of Variance in Strength of MB Explained by PTG, Social Support and Current Depression

In the present study, current depression was shown to have a significant relationship with both MB subscales and was also the strongest predictor of the strength of MB-I. However, despite the variance accounted for by current depression, perceived social support and PTG, just under 90% of the variance in MB-I scores remained unaccounted for. More research is therefore needed to identify other possible factors that predict MB-I. None of the variables used in the analysis (current depression, perceived social support and PTG) showed a significant impact on MB-W. This result suggests that MB-W and MB-I have differing predictors. Additional variables such as individual personality, child characteristics and mother's own attachment should be examined as possible predictors.

Methodological Issues

When interpreting the results of this study, the following methodological issues should be considered. First, it is not possible to draw causal inferences regarding the relationship between PTG, perceived social support, current depression and MB due to the cross-sectional design. Whilst cross-sectional research is valuable at an early stage, longitudinal studies are better able to establish the relationships between variables over time.

A number of significant differences in terms of demographic variables appear to evidence a possible response bias in favour of White British women, those who had attained a higher level of educational attainment, and women who reported having experienced a traumatic event to have occurred since falling pregnant with their youngest or only child. In the latter case, although analysis showed that traumatic experiences were not associated with PTG and are therefore unlikely to affect the main

conclusions, results should be interpreted with care. The study would have benefitted from a PTSD measure and further questions around whether the mother experienced the birth of her baby as traumatic. This would have allowed for a more accurate interpretation of the results. The experience of a traumatic event might have served to motivate these women to participate in a study investigating the possible negative psychological sequelae following difficult life events. In addition, the associations demonstrated mostly relate to clinically well women without social difficulties. Results cannot, therefore, be generalized to those in more adverse social or mental health circumstances.

With regard to measures, this study was dependent on maternal self-report assessment of the MB. Attached to this is the possibility of a social desirability response bias where parents are reluctant to portray themselves negatively by reporting minimal levels of obviously positive behaviours and vice versa (Simkiss et al., 2013). As the participants were asked to describe their perceptions of their children, this bias, if present, may have resulted in participants diminishing any difficulties they might be experiencing with the MB. Conversely, however, any negative bias carries the potential in those participants who are more distressed to lead to a greater degree of adverse ratings of the MB.

Future Research and Clinical Implications

This is the first study that the author is aware of that directly examines the possibility of PTG following PND. Based on the results of this study, PTG following PND (and indeed mental health conditions in general) is worthy of further explorative research which would benefit from exploring factors specific to postnatally depressed women which facilitate PTG.

To strengthen generalizability of future research, participants' diagnostic status should be determined via the use of a structured clinical interview. Future studies would also benefit from asking additional questions such as whether participants experienced difficulties bonding, what type of traumatic event they experienced and how severe or difficult participants perceived their symptoms of PND to be. Studies of mother and child relationships in the early postnatal period need to routinely consider a mothers' mental state in a more comprehensive way and incorporate measures of posttraumatic stress symptoms as well as those of depression. Finally, there are other variables that influence PTG and MB outcomes that were not measured in this study. These include maternal physical and mental health and perinatal complications. Future research should consider examining how these other variables may influence PTG following PND.

In terms of clinical implications, through examining positive psychological outcomes, new information is discovered which allows for a more comprehensive understanding of psychological reactions in mothers following childbirth to be developed, which can inform post-natal screening and interventions. From a theoretical viewpoint, studying PTG following PND provides a valuable opportunity to prospectively clarify the development of PTG. In addition, encompassing PTG within the perspective of recovery in mental health rehabilitation, and developing interventions promoting finding value in adversity should be considered.

Summary and Conclusions

This study has shown that women do experience PTG following PND. Further, there is a weak but significant association between PTG following PND and MB-W. Finally, depression is the strongest predictor of the strength of MB-I and also has a significant relationship with MB-W. There were a number of significant differences in

terms of demographic variables which may evidence a response bias and results should be generalised to the wider population with caution. In addition, by using self-report measures, there is the possibility of a social desirability response bias where participants may answer in a manner that they perceive to be desirable. The need for further research has been highlighted to explore PTG following PND, the relationship between PTG and MB as well as the overlap of depressive symptoms and trauma. By gaining a deeper understanding into these relationships, this could inform the development of potential interventions to best suit the needs of postnatally depressed women.

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Chapter 5:

Extended Methodology

Chapter 5: Extended Methodology

Overview of the Chapter

This chapter serves to provide additional detail on certain methodological areas within the empirical paper which has been written according to guidelines for the *Infant Mental Health Journal* (Appendix A). The level of detail below was not necessary for papers within this journal.

Sample Size

As there were no closely related studies to this one, it was not possible to calculate a sample size through G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) and alternative methods were investigated. Clark-Carter (2010) advise that when there are not any studies which might help to suggest what effect size the research is likely to require, prior to conducting the study, the researcher should consider what effect size they expect to detect based on Cohen's classification of effects into small, medium or large. Researchers are then able to perform power calculations. In this study, it was expected that a medium effect size would be seen. This was then used to consult Cohen's (1992) power tables and Soper's (2017) online calculator to determine the sample size required. With two independent variables, two control variables and an alpha set = 0.05, power = 0.8 and a medium effect size, the sample size required was 69 participants. A total of 98 participants who met the inclusion criteria chose to participate in and complete this study.

Measures

Mothers' Object Relations Scale (Child) (Simkiss et al., 2013)

There are not any direct measures of MB in children above the age of two - years-old, however, there are two appropriate scales which measure a parent's perception of their relationship with their child(ren); the Child-Parent Relationship

Scale (C-PRS; Pianta, 2011) and the Mothers' Object Relations Scale (Child) (MORS (Child); Simkiss et al., 2013). These scales were developed to identify potential areas of difficulty in the early mother–infant relationship—in particular, how the mother views the relationship (Davies et al., 2008). The MORS (Child; Appendix L) was used as an indirect measure of MB as it has been documented to outperform the C-PRS in several respects (Simkiss et al., 2013).

MB is defined by Putnam-Hornstein, Needell and Rhodes (2013) as the mother's perception of her emotional relationship with her child. The MORS (Child) captures the parent's perception of the parent–child relationship and would therefore indeed measure the MB. The MORS (Child) consists of a 14-item Likert scale and is validated to be used with parents of two to four-year old children (Simkiss et al., 2013). The MORS (Child) is psychometrically sound with high internal consistency of $\alpha > 0.7$ (Simkiss et al., 2013). The completion time is approximately five minutes.

As the content of the questionnaire focuses on aspects of child behaviour, social desirability response bias is therefore minimized. Each item was derived from earlier research which considered mother's accounts of their perceptions of infant's feelings, cognitions, and behaviours (Oates, 1998). The MORS (Child) has two scales, firstly a child's emotional "warmth" (e.g., "My child is affectionate towards me") as perceived by the mother and secondly, a child's perceived "invasiveness" (e.g. "My child wants too much attention") (Davies et al., 2008). As the MORS (Child) has two orthogonal subscales, the study therefore had two separate outcome variables – warmth and invasiveness which were considered equally with regard to strength of MB.

Post Traumatic Growth Inventory (Tedeschi & Calhoun, 1996)

The Post Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996; Appendix K) is a 21-item Likert scale questionnaire measuring the five subscales of

PTG, namely New Possibilities, Relating to Others, Personal Strength, Spiritual Change and Appreciation of Life. Participants were asked to indicate to what extent each particular change measured occurred in their life as a result of their PND with their two to four-year-old child(ren). This measure is reported to be the most accurate measure of PTG (Tedeschi & Calhoun, 1996). It has good validity and high internal consistency of $\alpha = 0.94$, test-retest reliabilities for the subscales ranged from $r = 0.37$ to $r = 0.74$ (Tedeschi & Calhoun, 1996). Completion time for the PTGI is approximately five to ten minutes.

Multi-Dimensional Scale of Perceived Social Support (Osman et al., 2014)

The Multi-Dimensional Scale of Perceived Social Support (MSPSS; Appendix M) is a 12-item inventory measuring perceived social support from family, friends and partner (Osman et al., 2014). The MSPSS has high internal consistency ($\alpha = 0.91$), good construct and external validity and test-retest reliability (Osman et al., 2014). This measure takes approximately five minutes to complete.

Patient Health Questionnaire 8-Item Scale (Kroenke et al., 2009)

The Patient Health Questionnaire 8-Item Scale (PHQ-8; Appendix N) was used to measure current depression. The Edinburgh Postnatal Depression scale which is a measure of PND validated for use in women with children under the age of three years old (Santos et al., 2016) was considered, however, in order to complete the survey, participants have to have overcome PND at least two months prior. The PHQ-8 is widely used in research with high test-retest reliability ($r = 0.84$), high internal consistency ($\alpha = 0.89$) and good construct and external validity (Kroenke et al., 2009). Completion time for this measure is under five minutes.

Modification to Measures

Within the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), the phrase “as a result of my crisis” was changed to “as a result of my PND” to ensure that participants were considering Postnatal Depression (PND) as opposed to other crises which may have arisen since the birth of their youngest or only child. The phrase “Please consider your *youngest or only child* when answering the questions below” was added at the start of the MORS (Child; Simkiss et al., 2013) to ensure that participants were answering the questionnaire accurately. The MSPSS (Osman et al., 2014) was used in its original form with two alterations. Firstly, the words “since the birth of your youngest or only child/ren” were added to the end of the instructions to ensure that participants were considering their perceived social support in the time period of interest. Secondly, the tense of the MSPSS was changed from present tense to past tense to include all the time since the birth of the youngest or only child.

Participant Procedure

Participants could click on the link on www.netmums.com or www.connectedbaby.net where they were able to view an introduction with background information and a brief summary of the research (Appendix F) to help them to decide whether they wished to find out more about the study and complete the survey. Similarly, on Facebook and Twitter, participants would see the same introductory text but this would automatically appear on their social media feeds via the media interface. If they wished to continue, all potential participants would then be directed to the participant information sheet (Appendix G) where they were asked to enter their initials in the boxes on the consent form (Appendix H) to confirm that they had read it, that they understood that they could withdraw from the study by not submitting their answers and that they agreed to take part in the study thereby giving consent to

participate. The boxes on the consent form required initials to be entered before participants were able to access the rest of the survey. After clicking submit, their data would be irretrievable as it was anonymous. Once consented, participants would be directed to screening questions (Appendix I). We were only recruiting adult mothers who had been diagnosed with and had overcome PND with their youngest or only child(ren) who were between the ages of two and four years old. Participants were therefore asked to confirm that they were over 18 years old and were asked whether they were diagnosed with PND with their youngest or only child(ren) by their GP or other healthcare professional such as their Health Visitor or Mental Health Practitioner. In addition, participants were asked whether or not they believed they had overcome PND with their youngest or only child(ren) and were asked to confirm that their youngest or only child(ren) were between the ages of two and four years old. If participants did not meet the inclusion criteria, they were directed to a final page thanking them for the interest in the study and signposting them to optional sources of support (Appendix I). If participants met the inclusion criteria, they were asked to complete the demographic questions (Appendix J) and the measures (Appendices K to N). Once participants had completed all the measures they were directed to a debrief page (Appendix O). Here participants were informed that they could view the results of the survey on the “Survey Results” page on www.netmums.com or follow a link posted on www.connectbaby.net and social media sites following analysis of the study findings.

Chapter 6:
Additional Results and Discussion

Chapter 6: Additional Results and Discussion

Overview of the Chapter

Additional explorative analyses were performed on data from the quantitative research study to consider the strength of the relationship between all additional variables as well as the potential impact of a positive response on the trauma question.

Additional Results

Correlations in Table 9 were consulted to explore additional relationships between the variables. Investigation revealed that there is a significant negative correlation between MB-I and MB-W ($r(98) = .27, p < .05$). There is a significant negative correlation between current depression and perceived social support ($r(98) = -.21, p < .05$) and a significant positive correlation between perceived social support and PTG ($r(98) = .29, p < .05$). There was a non-significant relationship between current depression and PTG ($r(98) = -.01, p > .05$).

There were no significant differences between women who answered yes or no to the trauma question on demographic, child-related and postnatal PND information as well as on levels of PTG, current depression, perceived social support, MB-W or MB-I.

Additional Discussion

There was a weak significant correlation between perceived social support and PTG. This is consistent with studies that have found a significant positive relationship between PTG and social support (Kinsinger et al., 2006; Park et al., 1996; Tedeschi & Calhoun, 1995) but is in contrast to Sawyer and Ayers (2009) study which found no correlation between support during childbirth and PTG. It may be that support after the event is more important in facilitating PTG than support during the event.

PTG was not associated with the participants' experience of traumatic events since falling pregnant with their youngest or only child, which is in agreement with

some previous studies (Sawyer & Ayers, 2009; Cordova et al., 2001; Park et al., 1996; Tedeschi & Calhoun, 1996). This therefore suggests that it is possible for women to experience PTG following PND independently of traumatic experiences. These findings support Tedeschi and Calhoun's (1995, 2004) argument that a certain amount of distress in the form of difficult life experiences is a sufficient precondition for growth. However, it is important to consider that despite no significant differences found in PTG scores between those who had and those who had not experienced a traumatic event since falling pregnant with their youngest or only child, it is possible that a proportion of these women may have experienced a traumatic childbirth which is a risk factor in the development of PND (O'Hara, 2009).

Investigation revealed that there is a negative correlation between MB-I and MB-W ($r(98) = .27, p < .05$) which, based on the correlation identified by Simkiss et al. (2013), is as expected. This confirms that although the subscales of the MORS (Child) are related, they are measuring two separate constructs.

Previous studies such as Palmer, Graca and Occhietti (2016) found there to be a negative linear relationship between depression symptoms and PTG and numerous other studies have found no relationship between depressive symptoms and PTG (Cobb, Tedeschi, Calhoun, & Cann, 2006; Sattler et al., 2006; Kleim and Ehlers, 2009). The present study found a non-significant relationship between current depression and PTG. This may, however, be due to the sample falling within a non-clinical category for depression.

Chapter 7:
Overall Discussion and Critical Appraisal

Chapter 7: Overall Discussion and Critical Appraisal

Overview of the Chapter

The findings from both the systematic review and the empirical paper will be considered together and critically evaluated whilst considering their position within the context of the wider literature.

Main Findings

The current research aimed to explore the factors that may have an association with the strength of the mother-infant (M-I) relationship, parenting or maternal bond (MB). This was done firstly by systematically reviewing the available literature, evaluating the strength of the evidence and investigating the effects of treating Postnatal Depression (PND) on the M-I relationship and parenting and secondly by conducting research to explore whether the presence of PTG following PND contributes to the MB whilst controlling for social support and current depression.

It became clear from the systematic review that there are some consistent findings suggesting the positive impact of treating PND on both M-I relationship and parenting. However, to date, the focus of most interventions remains on improving symptoms of PND alone. Only seven studies (eight papers) were found that measured child related outcomes, i.e. M-I relationship or parenting in addition to PND symptoms. None of these papers considered whether there was an association between an improvement in maternal outcomes and child outcomes. From the results of the review, there did not appear to be stronger evidence for either CBT or Psychotherapy. For both modalities, some studies reported significant changes and some reported non-significant findings

With regard to M-I relationship in particular, the review showed that treatment interventions in mothers with PND seem to have some benefits on the M-I relationship

in the short-term. Follow-up therapeutic sessions may be of benefit to help to maintain positive effects of therapy. Although there was consistency with content of interventions as well as the delivery method, there was much heterogeneity in terms of sample sizes, outcome measures and the way in which outcomes were measured, i.e. self-report and observational. With regard to parenting, it was not possible to draw any firm conclusions as to how much this was impacted by the treatment of PND as half of the studies reported significant findings and the other half reported non-significant findings. Some studies included mothers and infants, mothers and partners or mothers only. In addition, all outcome measures measured parental adjustment to parenting rather than outcomes in children per se.

The status of research exploring the potential indirect impact of treating PND on the M-I relationship and parenting suggests that there is no clear consensus on what form of intervention and delivery method is of most benefit. Accordingly, further research into the association between maternal and child outcomes using both self-report and observation measures, would be beneficial.

Analysis of results of the empirical study revealed inconclusive support for the research question and hypotheses. $N=98$ participants took part in an online survey. They provided their demographic data and answered questionnaires measuring the MB (mothers' sense of their child/ren's warmth (MB-W) and invasiveness (MB-I) towards them), PTG, symptoms of current depression and perceived social support. The sample was over-representative of White British, highly educated and financially well-off women. In addition, just over half of the sample stated that they felt they had experienced a traumatic event since falling pregnant with their youngest or only child. Due to this high percentage and the fact that trauma was not further measured, all results in this study should be interpreted accordingly with caution.

Statistical analyses revealed three main findings. Firstly, the study has revealed that it is possible for mothers to experience PTG following PND. Secondly, despite the sample being representative of a non-clinical sample for current depression, this variable was the only one to have an association with both MB subscales and was the strongest predictor of a higher level of MB-I. Thirdly, there is a weak but significant association between PTG and MB-W suggesting that the experience of PTG following PND may contribute to a stronger MB.

The results of this study must, however, be interpreted with some methodological issues in mind. There were a number of significant differences in terms of demographic variables which may evidence a response bias meaning caution should be taken in generalising results to the wider population.

In addition, attached to the use of self-report measures is the possibility of a social desirability response bias. The need for further research to explore PTG following PND as well as its association with MB has been highlighted. The study would have benefitted from a PTSD measure and further questions around whether the mother experienced the birth of her baby as traumatic. This would have allowed for a more accurate interpretation of the results.

M-I relationship, parenting and MB are all important in promoting adaptive development in children and in building solid foundations which allow for social and emotional development to occur (Tsivos, Calam, Sanders & Wittkowski, 2015). When considering the results of the systematic review and empirical paper together, a clearer picture on how these three concepts (M-I relationship, MB and Parenting) are associated with PND is revealed. The systematic review showed that psychological treatment of PND had an indirect positive impact on M-I relationship and potentially had an impact on parenting too. Results of the empirical paper showed that PTG was

possible following PND and also that PTG was positively associated with MB-W. Therefore, psychological treatment of PND and PTG following PND both have a significant relationship with the strength of the MB. It is possible therefore that if mothers receive psychological input for their PND and experience PTG as a result of the PND, they will have a stronger MB.

Critical Evaluation

This thesis portfolio aimed to explore the contribution of various factors on aspects of the mother-child relationship and some significant findings were observed. In order to best interpret these results, strengths and limitations need to be considered within this project.

Due to the current comparable search strategy and inclusion and exclusion criteria between this review and that of Poobalan et al. (2007), it provides a continuation of the latter systematic review. It has also provided an overview of the current evidence for not only M-I relationship but also for parenting. An additional strength of this review is that five of the eight papers included were rated as “strong” in quality with the remaining three papers rated as “moderate.”

This review is limited by the fact that only published studies were included and they were limited to papers written in English. By excluding ‘grey’ literature, there may be publication bias which may decrease the generalizability of the findings of the systematic review (Hopewell, McDonald, Clarke, & Egger, 2007). Parekh-Bhurke et al. (2011) report that systematic reviews often have the limitation of publication bias, however the current study did include some papers that were rated as high in quality which reported non-significant findings. An additional limitation is that the

inclusion/exclusion criteria, which attempted to reduce heterogeneity and increase ability to compare papers, may have excluded potentially informative research papers.

One of the inclusion criteria for both the systematic review paper and the empirical paper was that participants had to have been diagnosed with PND. Although this ensured that the populations under consideration in both papers were comparable in terms of their diagnosis, this inclusion criteria may have missed those who believed they had had PND but were not officially diagnosed with it.

In the empirical study, all the measures used have been previously validated in clinical and non-clinical populations and therefore the findings of these measures in this study should be generalisable as participants were recruited from a non-clinical population. It is important to bear in mind, however, that as the measures were slightly modified for this study, generalising the results to a wider population must be considered with caution. In addition, some researchers have suggested that some of the questions on the PHQ8, particularly items four, “feeling tired or having little energy” and six, “feeling bad about yourself – or that you are a failure or have let yourself or your family down,” are common symptoms experienced as a result of having young children rather than necessarily representative of emotional distress and can lead to a false positive response (De Lima, Osorio, Mendes, Crippa & Loureiro, 2009).

Similarly, it is important to consider mothers’ responses to the PTGI, that it is possible that becoming a mother or being a mother to other children too, may in itself bring about changes similar to that which constitutes PTG. Various items in the PTGI such as items one, “I changed my priorities about what was important in life” and seven, “I established a new path for my life” are likely to change for mothers after having children. Although mothers were asked to answer questions in the PTGI whilst holding in mind their PND, it may have been difficult for mothers to separate becoming

a mother and their PND. Interpretation of their answers on the PTGI therefore needs to be done with caution.

There are other factors beyond the scope of this thesis that may have been interesting and important to consider in this study. Factors such sociodemographic variables, the impact of the father's bond with the child, a difficult or unexpected pregnancy, an unwell child or complications with the birth would all play an important role in the formation of the MB, current depression and the potential for PND and PTG to occur.

The research paper has a large sample which can be considered as both a strength and a potential limitation. 67 participants were needed to ensure the study was powered, and 98 participants were obtained. Zamboni (2017) reported that large sample sizes allow researchers to determine the average values of their data more accurately and are also helpful in avoiding errors from testing a small number of possibly uncharacteristic samples. However, it is possible for studies with a large sample to still not be representative of the population to which the results will be generalised (Kaplan, Chambers & Glasgow, 2014). When considering the sample size as well as the demographic information obtained in the present study, it is important to bear in mind that although the sample is large, the sample is not representative of the general population due to a large percentage of participants who obtained a postgraduate qualification or has a high household income. This may be due to the characteristics of mothers who came across the adverts, those who have joined mothers' groups on social media or due to their interest in participating in research (Cook et al., 2000). Alternatively, Wilson and Laskey (2003) stated that there are skewed attributes of the internet population. They state that until recently, users of the internet were not truly representative of the general population. In 2002, Fricker and Schonlau however

stated that the differential between offline and online populations was quickly closing and may be insignificant in the near future. More recently, Baltar and Brunet (2012) stated that internet access still varies widely, and certain populations are less likely to have internet access and to respond to online questionnaires.

Of the total number of participants who started the survey, only 44.95% went on to complete it. 72.5% of those that did not complete the study were not able to continue with it as they were ineligible and the remaining 27.5% chose not to continue with the survey at various points. This is in agreement with literature which states that online respondents can get distracted or lose interest and discontinue their participation in the study (Maronick, 2009). Other research such as that by Ilieva et al. (2002) is in disagreement and stated that online surveys have a much higher item completion rate than mail surveys.

A strength of the empirical study is that the survey only took an average of approximately 10 minutes to complete. In addition, participants could answer the questions at their own pace at a time that suited them. Participants were able to answer all questions anonymously online; Evans and Mathur (2005) stated that respondents may be more willing to share personal information because they do not have to disclose it directly to another person. In addition, as there is no interaction with the experimenter, there are no experimenter demand effects (Evans and Mathur, 2005). Additional benefits of online surveys such as that used in the empirical study include the fact that the survey was programmed with skip patterns and logic as well as requiring that respondents provided only one response to single-choice questions, this eliminated item non-response and the necessity to discard answers that may have been entered incorrectly.

A graphical progress indicator was used which informed respondents of how many more pages of questions they would be required to answer, this reduces the participants perceiving there to be endless questions (Evans & Mathur, 2005). The survey was designed in a manner which ensured all questions were answered in order and did not allow the participant to look ahead to later question which reduced survey bias.

Although the results of the empirical study showed that women who have had PND experience PTG, a comparison group of mothers who had not experienced PND was not recruited. It is therefore difficult to tell if PTG is unique to mothers who have experienced PND or if all mothers might respond in the same way based on similar difficulties associated with raising children.

Future Implications for Research and Clinical Practice

The findings from this thesis portfolio have identified future directions for research and potential developments that could contribute to clinical practice. By improving our knowledge of the various aspects of the mother-child relationship (interaction, parenting and MB) and how different factors are associated with it, we may be better able to develop more effective treatment programmes and interventions for individuals who have PND. The need for more research exploring the treatment of both PND and MB together has been highlighted by the present research. In addition, it has demonstrated the potentially interesting new dimension of PTG following PND. The current research suggests the need for further studies to explore this possible relationship between PTG following PND and MB. Larger samples would ensure that sufficient power is obtained for the appropriate analyses and the use of a control group would allow for between groups comparison and reduce bias. Through a richer

understanding of the impact of PTG following PND, we will be in a better position to consider how to develop more effective interventions.

Overall Conclusions

As highlighted throughout this discussion, future research should consider the methodological weaknesses of the present research by perhaps employing a matched control group to help with the comparison of PND across two groups with fewer potentially confounding variables. In consideration of both the empirical paper and the systematic review, it would appear that there are already some effective treatments of PND in place. However, these treatments are not necessarily always effective and appear to be lacking in identifying whether there is an association between mother and child outcomes. In addition, this study has shown there to be an association between PTG following PND and MB, though the nature of this association is not yet fully understood. Future studies may benefit from investigating mother and child outcomes together and to compare the MB in mothers who have had PTG following PND with those that have not experienced PND. By further understanding how much of a role PTG has in the strength of the MB, we will be in a better position to provide more effective and more idiosyncratic treatment to the PND population.

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Appendix A: Author Guidelines for the Infant Mental Health Journal





Infant Mental Health Journal

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ISI Journal Citation Reports © Ranking: 2016: 40/70 (Psychology Developmental)

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The *Infant Mental Health Journal* (IMHJ) is the official publication of the World Association for Infant Mental Health (WAIMH) and is copyrighted by the Michigan Association for Infant Mental Health.

Information for Contributors

Reflecting the interdisciplinary nature of the field, its international focus, and its commitment to clinical science, the IMHJ publishes research articles, literature reviews, program descriptions/evaluations, clinical studies, and book reviews on infant social-emotional development, caregiver-infant interactions, and contextual and cultural influences on infant and family development. The Journal is organized into three sections: Research, Clinical Perspectives, and Book Reviews. Research focuses on empirical research. Clinical Perspectives allows for more diversity in types of submissions and is designed to advance infant mental health practice and scholarship. Requests for book reviews should be sent by the author or publisher to the Editor In Chief. Please do not send a copy of the book until the request is approved.

The Journal welcomes a broad perspective and scope of inquiry in infant mental health and has an interdisciplinary and international group of associate editors, consulting editors, and reviewers who participate in the peer review process. In addition to regular submissions to the Journal, proposals for special issues or sections are also welcome. These should be discussed with the Editor In Chief prior to submission.

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6. The Title Page should include a discussion of any conflicts of interest, human subjects approvals, and funding. Acknowledgements may also appear here. The *Infant Mental Health Journal* complies with all relevant recommendations from the International Committee of Medical Journal Editors in these areas.
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Additional questions with regard to style and submission of manuscripts should be directed to the Editor: Paul Spicer, PhD, at paul.spicer@ou.edu



Appendix B: Ethical Approval Confirmation Letter

Faculty of Medicine and Health Sciences Research Ethics Committee



Sherilyn Ayres
MED

Research & Enterprise Services
Floor 1, The Registry
University of East Anglia
Norwich Research Park
Norwich, NR4 7TJ

Telephone: +44 (0) 1603 591490
Email: fmh.ethics@uea.ac.uk

Web: www.uea.ac.uk/researchandenterprise

31 August 2017

Dear Sherilyn,

Title: An exploration of the contributions of Posttraumatic Growth following Postnatal Depression, perceived social support and current depression on the strength of the Maternal Bond
Reference: 201617 68

The amendments to your above proposal have been considered and I can confirm that your proposal has been approved.

Please could you ensure that any further amendments to either the protocol or documents submitted are notified to us in advance and also that any adverse events which occur during your project are reported to the Committee. Please could you also arrange to send us a report once your project is completed.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'M J Wilkinson', is written over a horizontal line.

Professor M J Wilkinson
Chair
FMH Research Ethics Committee

cc. Kiki Mastroyannopoulou

Appendix C: Confirmation Letter of Minor Amendment

Faculty of Medicine and Health Sciences Research Ethics Committee



Sherilyn Jarvis
MED

Research & Innovation Services
Floor 1, The Registry
University of East Anglia
Norwich Research Park
Norwich, NR4 7TJ

Telephone: +44 (0) 1603 591490
Email: fmh.ethics@uea.ac.uk

Web: www.uea.ac.uk/researchandenterprise

15/11/17

Dear Sherilyn,

Title: An exploration of the contributions of Posttraumatic Growth following Postnatal Depression, perceived social support and current depression on the strength of the Maternal Bond
Reference: 201617 68

The amendments to your above proposal have been considered and I can confirm that your proposal has been approved.

Please could you ensure that any further amendments to either the protocol or documents submitted are notified to us in advance and also that any adverse events which occur during your project are reported to the Committee. Please could you also arrange to send us a report once your project is completed.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'M J Wilkinson', followed by a horizontal line.

Professor M J Wilkinson
Chair
FMH Research Ethics Committee

cc. Kiki Mastroyannopoulou

Appendix D: Ethical Considerations as Seen in the Ethics Application and Proposal

Consent

In accordance with BPS guidelines (2010), care was taken to ensure that potential participants understood that consent was voluntary. This was stated on the informed consent sheet. Participants were informed on both the information sheet and the informed consent sheet that they were able to withdraw from the study up until the point that they had submitted the survey. This was due to the data being anonymous and therefore irretrievable once submitted. In completing all aspects of the survey online, the participant was deemed to have consented to the study.

Data Storage and Sharing

The study included the collection of anonymous sensitive personal data, which was handled in accordance with the Data Protection Act (Office of Public Sector Information, 1998). Data collected electronically were stored on an encrypted memory stick and a password-protected anonymised electronic database was compiled. The encrypted memory stick was stored securely in a lockable draw. Access to data was restricted to academic staff at UEA to facilitate data analysis, and conformed to the Data Protection Act (Office of Public Sector Information, 1998). The data collected may be used to support other research in the future and may be shared anonymously with other researchers. The results have also been written into articles and may potentially be published in academic journals so that others can learn from the findings. Research data will be kept for 10 years, and will be the responsibility of the University of East Anglia. Following this time, it will be destroyed. Participants were informed of data storage and sharing in the participant information sheet.

Confidentiality

No personally identifiable data were collected during this study as participants completed the survey anonymously. There was no direct contact made with the researcher or the named supervisor, however, if there had been this would have been stored, accessed and restricted to UEA staff to conform to the Data Protection Act (Office of Public Sector Information, 1998). It was clearly stated on the information sheet and consent form that contact with the researcher or the named supervisor may breach anonymity if the participant disclosed their personal details.

Coercion and Deception

This was not applicable in this study.

Distress

Jorm, Kelly and Morgan (2007) state that there is low risk of participating in mental health research and that positive responses to participation are more commonly reported than negative reactions. In addition, there is no evidence to indicate long-term harm (Jorm, Kelly & Morgan, 2007). Whilst not intended, there was a possibility that participants may have experienced distress when answering the survey due to personal and difficult experiences being brought up. This was clearly stated on both the information sheet and the informed consent sheet. Details for the Samaritans (an organisation that can offer support to that individual) and for www.pni.org.uk (an organisation that offers support to women with postnatal illnesses) were provided and participants were encouraged to contact their GP if they felt distressed. The information sheet and informed consent sheet also reminded participants that they could stop the survey at any point.

Debriefing

Participants were made aware on the information sheet that they were able to contact the chief investigator or the primary supervisor if they wished to. They were advised that the results of the study would be posted on www.netmums.com and a link to the results would be posted on www.connectedbaby.net and social media sites on completion of the study. Once they had completed the survey, all participants were taken to the debrief page.

Appendix E: Initial Procedure on Social Media Sites

Message sent to “admins” of Mum’s Groups on social media:

Hi there,

My name is Sheri Jarvis. I am writing to you in the hopes that you may be happy to share a link for my research with your Mum’s Group?

The research is exploring the bonds that mums have with their children and factors that might affect the bond.

I am passionate about this topic and believe that my research may offer valuable information that can contribute to this area. It is an online survey that takes approximately 20 minutes to complete. The research is a doctoral project in Clinical Psychology and has received ethical approval from the University of East Anglia (UEA).

Please feel free to click on the link and there you will find all the details for the research. If you do have any other questions, please do not hesitate to contact me.

If you are happy to share the link in your Mum’s Group, please could you post the wording below with it?

Thank you in advance,

Sheri Jarvis

Trainee Clinical Psychologist, University of East Anglia

Wording to post with link:

“Hi Mums,

Please do my survey to contribute to highly important research!

I am exploring bonds that mums have with their children and factors that might affect the bond. I am passionate about this topic and believe that my research may offer valuable information that can contribute to this area. It is an online survey that takes approximately 20 minutes to complete.

I want to invite mums who were diagnosed with Postnatal Depression with their last or only child, whose last or only child is between the ages of 2 and 4 years old, who have overcome Postnatal Depression at least 2 months ago and who are over the age of 18 years old to complete the survey.

Please use the link below to find out more and to participate. Please forward or share the link with anyone who you think might be interested. Thank you for your help!

<https://www.surveymonkey.co.uk/r/PNDresearch>”

This message to mums was then seen on social media sites by potential participants and automatically appeared in their news feeds. After clicking on the link for the survey, participants were taken through the rest of the survey (Appendices G-O).

Appendix F: Initial Procedure on www.netmums.com and www.connectedbaby.net

The following link appeared on www.netmums.com and www.connectedbaby.net:

“Clinical Psychology research into mothers’ current relationships with their 2 to 4-year-old children following overcoming Postnatal Depression”

After clicking on the above link, participants recruited through www.netmums.com and www.connectedbaby.net saw the text below.

Hi Mums,

Please do my survey to contribute to highly important research!

I am exploring bonds that mums have with their children and factors that might affect the bond. I am passionate about this topic and believe that my research may offer valuable information that can contribute to this area. It is an online survey that takes approximately 20 minutes to complete.

I want to invite mums who were diagnosed with Postnatal Depression with their last or only child, whose last or only child is between the ages of 2 and 4 years old, who have overcome Postnatal Depression at least 2 months ago and who are over the age of 18 years old to complete the survey.

Please use the link below to find out more and to participate. Please forward or share the link with anyone who you think might be interested. Thank you for your help!

<https://www.surveymonkey.co.uk/r/PNDresearch>

After clicking on the link for the survey, participants were taken through the rest of the survey (Appendices G-O).

Appendix G: Participant Information Sheet



Clinical Psychology research into mothers' current relationships with their 2 to 4-year-old child/ren following overcoming Postnatal Depression

Participant Information Sheet

What is this study about?

Postnatal Depression is a form of depression which affects 10 – 20% of mothers within a year of giving birth. Postnatal Depression can make it difficult for a mother to bond with her baby.

Posttraumatic Growth is a term used to describe positive changes that can result from difficult situations (such as Postnatal Depression).

This study aims to:

- explore whether mothers feel that they have made some positive changes in their lives due to having and overcoming Postnatal Depression
- investigate whether these positive changes have helped mothers to bond more with their children
- consider whether social support from partners, family and friends impacts on mothers' bonds with their children
- explore whether any potential current low mood impacts on mothers' bonds with their children

You are invited to participate in this study if:

- you are 18 years or older
- have experienced Postnatal Depression for which you were offered some form of support or treatment by a healthcare professional
- you overcame your PND at least two months ago and
- your youngest or only child (children in the case of twins etc.) is aged between two and four years old.

This information sheet tells you about the research study. Knowing what is involved will help you decide if you want to take part in the study. Please read this sheet carefully and contact us to ask questions about anything that you don't understand or want to know more about.

By giving consent to take part in this study you are telling us that you:

- Understand what you have read
- Agree to take part in the research study as outlined below

Who is running the study?

The study is being carried out by Sherilyn Ayres (Trainee Clinical Psychologist) in partial fulfillment of a Doctorate in Clinical Psychology at UEA.

What will the study involve for me?

The study is carried out over the internet, after consenting to participate in the study, there will be five screens of questions to complete. These questions will be asking you:

- for your demographic information (such as age, number of children, occupation etc.)
- about positive changes (such as feeling more able to cope with difficult situations)
- about your relationship with your child(ren)
- about your support network (people around you that you feel able to rely on) and
- general questions on depression.

For all the questions you can select an answer from options available and do not have to write your own answers. All your answers remain confidential and it will not be possible to identify you by your answers.

How much of my time will the study take?

The study should take approximately 20 minutes to complete. This needs to be completed all in one go as unfortunately it is not possible to return to the questionnaire once you have closed the page (by clicking the "X" in the top right-hand corner of the screen).

Do I have to be in the study? Can I withdraw from the study once I've started?

Being in this study is completely voluntary. If you decide to take part in the study and then change your mind, you are free to withdraw at any time before you have submitted the questionnaire. At this point, all of your data will automatically be deleted. Your information will not be saved until you click on "submit" at the end. Once you have clicked "submit", your responses cannot be withdrawn because they are anonymous and therefore we will not be able to tell which one is yours.

Are there any risks or costs associated with being in the study?

The topics of Post Natal Depression and the mother-child relationship may bring up strong emotions and feelings. If this happens and you feel you need some additional support, please consider contacting the healthcare professional that treated you for your PND or your GP. Alternatively, you could use helplines such as the Samaritans (www.samaritans.org - the Samaritans are a national charity that offer free emotional support to anyone who may be struggling with difficult emotions and can also be called on 116 123).

Are there any benefits associated with being in the study?

The results of the study may help other mothers with Postnatal Depression and potential difficulties bonding with their babies. The results may also help in the future design of treatment for Postnatal Depression.

What will happen to information about me that is collected during the study?

By providing your consent, you are agreeing to us collecting anonymous information about you for the purpose of research. Your information will only be used for the purposes outlined in this Participant Information Sheet. Data management and confidentiality will strictly follow established procedure. The study will be completed and submitted to the UEA in March 2018. It is usual practice for researchers to publish their findings in professional journals so that research can be shared within the profession. Additionally, anonymous data provided may be used in further related research projects.

What if I would like further information about the study?

If you would like to know more at any stage during the study, or have any questions prior to participating please feel free to contact Sherilyn Ayres (Chief Investigator) via Sherilyn.Ayres@uea.ac.uk, or the Primary Research Supervisor, Kiki Mastroyannopoulou, via K.Mastroyannopoulou@uea.ac.uk.

Will I be told the results of the study?

We would be pleased to share the results of the study with you; once the study has been completed, the results will be posted on the www.netmums.com "Survey Results" page and a link to the results will be posted on www.connectedbaby.net between May and July 2018.

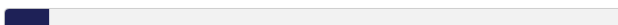
What if I have a complaint or any concerns about the study?

Research involving people in the UK is reviewed by an independent group of people called a Research Ethics Committee (REC). The ethical aspects of this study have been approved under the regulations of the University of East Anglia's Faculty of Medicine and Health Sciences.

However, if there is a problem, please do let us know. You can contact myself via the University at the above email addresses. If you are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact Ken Laidlaw (Head of Clinical Psychology Doctorate Programme) on Ken.Laidlaw@uea.ac.uk.


OK, I want to take part – what do I do next?

Click on the link below and you will be directed to the Consent Form.



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Appendix H: Consent Form



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PARTICIPANT CONSENT FORM

In giving my consent I state that:

(Please enter your initials into the boxes below and then click "Next" below)

- * I understand the purpose of the study, what I will be asked to do, and any risks/benefits involved

Initials:

- * I have read the Participant Information Sheet on the previous page and have been able to discuss my involvement in the study with the researchers if I wished to do so

Initials:

- * If relevant, the researchers have answered any questions that I had about the study and I am happy with the answers

Initials:

- * I understand that my participation is completely voluntary and that I am free to stop the survey at any point should I wish to do so

Initials:

- * I understand that if I stop the survey prior to submitting it, my answers will not be saved

Initials:

- * I understand that as I am completing an anonymous questionnaire I cannot withdraw my data after submission and that the researchers will not be able to contact me again

Initials:

- * I understand that the anonymous information collected about me may be used to support other research in the future, and may be shared anonymously with other researchers

Initials:

- * I understand that the survey results will be summarised and shared on www.netmums.com and www.connectedbaby.net

Initials:

- * I agree to take part in the above study


Initials:

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Appendix I: Screening Questions and Disqualification Pages

Screening Questions:



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* This study is investigating experiences of mothers who have been diagnosed with Postnatal Depression (mother's depression developing in the first year of child's life).

Were you diagnosed with Postnatal Depression with your youngest or only child(ren) by your GP or other healthcare professional (eg. Health Visitor, Mental Health Practitioner etc.)?

☐ Yes
☐ No

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* Do you feel that you have overcome your Postnatal Depression and have not had any symptoms of it in the past two months?

☐ Yes
☐ No

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If participants answered “No” to either one of the above questions, they were taken to the following disqualification page:



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Thank you for your interest in this study and for taking the time to find out more about it. This study is investigating the experiences of mothers who have been diagnosed with and overcome Postnatal Depression with their youngest or only child(ren). Since you answered that you were not diagnosed with Postnatal Depression with your youngest or only child(ren) or still have symptoms of Postnatal Depression, we cannot include your answers on this occasion.

If taking part in this study has caused you to become upset in any way, we encourage you to contact either:

- the Samaritans directly on 116 123
- visit www.pni.org.uk
- or to speak to your GP.

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Further screening questions:



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* Are you over the age of 18 years old?

- ☐ Yes
- ☐ No

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* Is your youngest or only child(ren) between the ages of 2 and 4 years old?

- ☐ Yes
- ☐ No

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If participants answered “No” to either one of the above questions, they were taken to a final page:



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Thank you for your interest in this study and for taking the time to find out more about it. This study is investigating the experiences of mothers over the age of 18 years old who have been diagnosed with Postnatal Depression with their youngest or only child(ren) who is (are) aged between 2 and 4 years old. Since you answered either that you are under 18 years old or that your youngest or only child(ren) is (are) not aged between 2 and 4 years old, we cannot include your answers on this occasion.


If taking part in this study has caused you to become upset in any way, we encourage you to contact either:

- the Samaritans directly on 116 123
- or to speak to your GP.

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Appendix J: Demographic Questions



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Please select the appropriate responses from the options below:

* Your age:

* Ethnicity:

* Marital status:

* How many other children do you have?

* How old is your youngest or only child(ren)?

* Is your 2 - 4 year old child/ren...
(Example for twins etc.: Sally has a 7-year-old, a 5-year-old and twin two-year olds. She would select her twins as third born)

* How long did your Postnatal Depression last for?

☐ Up to 3 months
☐ Up to 6 months
☐ Up to 9 months
☐ Up to 1 year
☐ Over 1 year

How long have you been free from symptoms of Postnatal Depression?

☐ 2 - 6 months
☐ 6 months - 1 year
☐ 1 year - 2 years
☐ More than 2 years

* Education:

* Employment status:


* Housing:

* Household income (or equivalent):

* Have you experienced any events that you've experienced as traumatic since you became pregnant with your last child(ren)?

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Appendix K: Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996)



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* Listed below are 21 areas that are sometimes reported to have changed after difficult life events. Please indicate for each of the statements below the degree to which you feel each change occurred in your life as a result of Postnatal Depression (PND) with your *youngest or only child(ren)*:

	<i>I did not experience this change as a result of my PND</i>	<i>I experienced this change to a very small degree as a result of my PND</i>	<i>I experienced this change to a small degree as a result of my PND</i>	<i>I experienced this change to a moderate degree as a result of my PND</i>	<i>I experienced this change to a great degree as a result of my PND</i>	<i>I experienced this change to a very great degree as a result of my PND</i>
I changed my priorities about what is important in life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a greater appreciation for the value of my own life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I developed new interests	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a greater feeling of self-reliance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a better understanding of spiritual matters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I more clearly see that I can count on people in times of trouble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I established a new path for my life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a greater sense of closeness with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more willing to express my emotions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know better that I can handle difficulties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to do better things with my life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am better able to accept the way things work out	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can better appreciate each day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New opportunities are available which wouldn't have been otherwise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have more compassion for others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I put more effort into my relationships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more likely to try to change things which need changing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a stronger religious faith	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I discovered that I'm stronger than I thought I was	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I learned a great deal about how wonderful people are	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I better accept needing others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Appendix L: Mothers Object Relations Scale (Child; Simkiss et al., 2013)

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* Please consider your *youngest or only child/ren* when answering the questions below.

Using the scale below, indicate the appropriate answer for each item. There are no 'right' or 'wrong' answers, many of these are true of all children at times.

	Never	Rarely	Sometimes	Quite often	Very often	Always
My child/ren smiles at me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren annoys me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren likes doing things with me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren talks to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren irritates me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren likes me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren wants too much attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren laughs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren gets moody	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren dominates me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren likes to please me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren cries for no obvious reason	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren is affectionate towards me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child/ren winds me up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Appendix M: Multi-Dimensional Scale of Perceived Social Support (Osman et al., 2014)



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* We are interested in how you feel about the following statements. Please indicate how you feel about each statement since the birth of your *youngest or only child/ren*.

	Very strongly disagree	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree	Very strongly agree
Has there been a special person who has been around when you have been in need?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Has there been a special person with whom you have been able to share your joys and sorrows?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Has your family really tried to help you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you received the emotional help and support you have needed from your family?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you had a special person who has been a real source of comfort to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have your friends really tried to help you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you been able to count on your friends when things have gone wrong?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you been able to talk about your problems with your family?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you had friends with whom you could share your joys and sorrows?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Has there been a special person in your life who has cared about your feelings?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have your family been willing to help you make decisions?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you been able to talk about your problems with your friends?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Appendix N: Patient Health Questionnaire 8-Item Scale (Kroenke et al., 2009)



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* Over the past two weeks, how often have you been bothered by any of the following symptoms?

	Not at all	Several days	More than half the days	Nearly every day
Little interest or pleasure in doing things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling down, depressed, or hopeless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trouble falling or staying asleep, or sleeping too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling tired or having little energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poor appetite or overeating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feeling bad about yourself — or that you are a failure or have let yourself or your family down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trouble concentrating on things, such as reading the newspaper or watching television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Appendix O: Debrief Page



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Survey successfully completed - Thank You!

**To submit your answers,
PLEASE CLICK "SUBMIT" BELOW**

Thank you for taking the time to fill in this survey.

If you have any questions or would like to tell us how you found the study, please feel free to contact me - Sherilyn Ayres (Sherilyn.Ayres@uea.ac.uk), Trainee Clinical Psychologist Department of Clinical Psychology, Elizabeth Fry Building, University of East Anglia, Norwich, NR4 7IJ.

If there was something about the study that you were not happy with and would like to tell someone else about it, please contact: Dr Ken Laidlaw via email (K.Laidlaw@uea.ac.uk) or at the same address as above. If taking part in this study has caused you to become upset in any way, we encourage you to contact either:

- the Samaritans directly on 116 123
- or to speak to your GP.

If you are interested in finding out the results of the study, a link will be posted between May and July 2018 on www.connectedbaby.net and results will also be posted on www.netmums.com when the study is complete.

Thank you for your time and taking part!



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SUBMIT

Appendix P: Holm's Method

Post hoc comparisons were conducted on results that reached statistical significance in order to reduce the possibility of Type I errors associated with multiple comparisons. Although the Bonferroni method is commonly used it is argued that it can be overly conservative (Tabachnick & Fidell, 2001; Cabral, 2008). Holm's adjustment of the p -value (Holm, 1979) was utilised as it maintains the experimentwise error rate at α (Wright, 1992). In this method, firstly, the p -values (p_i) are ordered from smallest to largest and are numbered (i). The Holm adjusted p -value (p_{Holm}) can then be calculated using the Holm-Bonferroni sequential correction calculator (Gaetano, 2013). Adjusted p -values and original p -values are then compared, and if p_i is less than p_{Holm} , the null hypothesis can be rejected and the experimental hypothesis can be accepted.