DOCTORATE IN CLINICAL PSYCHOLOGY

The Impact of Maternal Reflective Functioning on Parenting Outcomes in the Antenatal and Postnatal Period

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January 2018

Submitted in partial fulfilment of the degree of Doctorate in Clinical Psychology at the Division of Clinical Psychology, School of Psychology, University of Liverpool

Acknowledgements

There are so many people I would like to thank for helping me to complete this thesis. Firstly, thank you to all of the women who participated in this research, and to all of the midwives and service managers for being so cooperative. To my supervisors, Julie and David, for your continued support and guidance throughout this process. Thank you to Lisa Marsland for sharing your expertise with me and to Rachel Hagan for offering so much of your time to assist me with recruitment. To the wider staff team on the Liverpool Doctorate in Clinical Psychology Programme for your continual support and for allowing flexibility with the course to enable me to complete the research at my own pace. Particular thanks to Andrea Flood, whose generosity, compassion and endless support has been invaluable, and also to Steven Gillespie for your responsiveness to my queries and for kindly offering feedback on my drafts. Thank you to my wonderful cohort, '*Class of 2014'*, for being along side me every step of the way during this intense experience. And mostly, thanks to Damien, whose constant encouragement, patience, and understanding has given me the strength to keep going, despite everything that has come our way!

Table of Contents

List of Tables

Chapter One

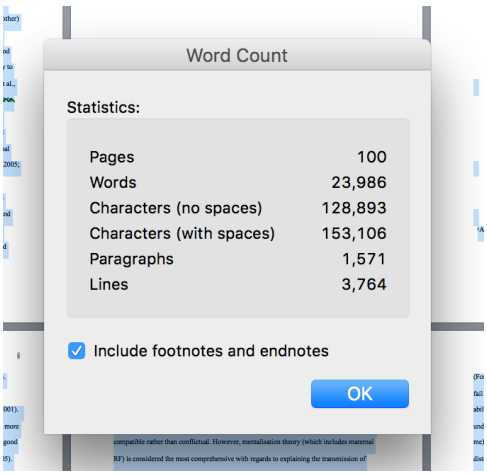
Chapter Two

List of Figures

Chapter 1

List of Appendices

Word Count = 23,986 words (including appendices and excluding references)



Introductory Chapter: Thesis Overview

A child's early experiences are thought to influence their outcomes for the rest of their life (Slade, Grienenberger, Bernbach, Levy, & Locker, 2005). In fact, the term '*1001 critical days*' is used to describe the period from conception to the first two years of life, as this period is considered to be a critical time for shaping a child's future emotional, physical and developmental outcomes (Leadsom, Field, Burstow, & Lucus, 2013). During pregnancy, a mother is responsible for caring for her child in a way that will promote healthy development, making physiological and psychological adaptations to prepare for her baby (Markin, 2013). Although it is important to consider the role of the parental unit as a whole, acknowledging the role of a father has on child developmental outcomes, the area of paternal attachment remains a far less researched area as previous literature has tended to focus on maternal processes.

According to attachment and mentalisation theories, it has been proposed that a mother's representation of caregiving (i.e. what it means to be a mother) is often based on her own experiences of being parented (Huth-Bocks, Muzik, Beeghly, Earls, & Stacks, 2014; Slade, Belsky, Aber, & Phelps, 1999). Mothers who have had good early experiences of caregivers, and have developed a secure attachment, are more likely to parent their own child in a way that promotes a secure attachment in their child (Slade et al., 2005). This 'transmission gap' between adult attachment and child attachment is thought to be explained by the mother's *reflective functioning*, or mentalising, capacity (Fonagy & Target, 2005). This describes a mother's ability to consider her child's mental states that underlie their behaviour, and enables her to respond appropriately to her child's emotional needs, leaving them with a sense of safety and security (Grienenberger, Kelly, & Slade, 2005; Slade et al., 2005).

This thesis explores the relationship between maternal reflective functioning and maternal parenting. Chapter one is a systematic review which aims to critically review and synthesise the available literature regarding maternal reflective functioning and parental caregiving. The quality of the current research and the study outcomes are discussed, and directions for future research and clinical implications are proposed. Chapter two is an empirical paper exploring the relationship between maternal reflective functioning and health practices in pregnancy. This study uses a novel, quantitative measure, the Prenatal Parental Reflective Functioning Questionnaire (P-PRFQ: Pajulo et al., 2015) to assess maternal reflective functioning. This measure was used as it has the potential to be more clinically applicable to measuring maternal reflective functioning in pregnancy than traditional semi-structured interview methods. The findings from this paper contribute to the current literature on antenatal attachment, and future clinical and research implications are discussed.

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Chapter One: Literature Review

Maternal Reflective Functioning and Parental Caregiving: A Systematic Review[1]

Word Count: 8,873

(exc. references)

[1]Article prepared for submission to the Infant Mental Health Journal. See Appendix A for a copy of the journal guidelines for authors.

Abstract

The aim of this systematic review was to assess the quality of the research into maternal reflective functioning (RF) and parental caregiving, to identify the range of measures used to assess maternal RF, and to identify which aspects of parenting have been explored in relation to maternal RF. Four databases were searched (PsycINFO, CINAHL Plus, SCOPUS, MEDLINE) using relevant search terms. Empirical studies were included if they used a measure of maternal RF, used a measure of parenting behaviour (e.g. sensitivity, hostility, tolerance of distress), and used statistical analysis to assess the relationship between maternal RF and parenting behaviour. Studies were eligible during both the antenatal and postnatal period, and the upper age limit of the child was 18 years old. Eighteen papers met the eligibility criteria and, following a quality assessment process, a narrative synthesis of the studies was conducted. Overall, there was evidence to suggest that maternal reflective functioning is associated with various aspects of parenting, such as sensitivity, communication, intrusiveness, and distress tolerance. This review supports the use of interventions aimed at improving maternal RF in order to improve maternal caregiving. Areas for further research are identified, proposing the use of more studies using clinical samples, quantitative measures of maternal RF and more studies in the antenatal period.

Keywords: maternal, reflective functioning, mentalising, parenting, caregiving.

Introduction

A parent's ability to recognise and appropriately respond to their child's emotional experience is considered to be a fundamental role of parenting (Sharp & Fonagy, 2008). Slade and colleagues (Slade, Grienenberger, Bernbach, Levy, & Locker, 2005) developed the construct '*parental reflective functioning'* which describes the ability of a parent to mentalise about their child, that is, to consider their child's mental states (e.g. feelings, beliefs, desires) or hold their "mind in mind" (Slade, 2005, p.273). Through this process of considering what might be going on in their child's mind a parent is better able to understand motivations behind their child's behaviour (e.g. my child might be ignoring me because he or she is feeling frustrated with me) (Fonagy, Steele, Moran, Steele, & Higgitt, 1991a). It also involves a parent being curious about their own mental states and how they are impacting on their child (e.g. I am feeling stressed today which is why I am being more short-tempered with my child) (Fonagy, Gergely, Jurist, & Target, 2002). Parental RF is considered to be important to enable the parent to respond appropriately to her child's needs and behavioural cues (Slade, 2005).

Influenced by attachment, psychoanalytic and cognitive psychology theories, Fonagy and colleagues (Fonagy et al., 1991a; Fonagy, Steele, & Steele, 1991b) originally developed the construct of reflective functioning (RF), or mentalising, when they began to explore the factors that contribute to an infant's attachment style. According to attachment theory, children are born to instinctively form an attachment with their mother, or primary caregiver (Bowlby, 1969). During times of fear or distress, a child will seek proximity to their attachment figure in order to gain a sense of safety, security and protection (Bowlby, 1969). Children are not born with the ability to regulate their emotions, therefore, they rely on their mother to do this for them (Allen, Fonagy, & Bateman, 2008). If done successfully, the child

learns over time that their needs will be met, that their feelings are manageable and that the world is a safe place, i.e. the child develops a secure attachment (Fonagy et al., 1991b). A child's attachment security is thought to develop over the course of the first year of their life (Fonagy, 2001), therefore this early relationship with the mother can be important for future outcomes for the child. Furthermore, it is through a mother mentalising with her child that the child develops his or her own capacity to mentalise, i.e. to understand of the minds of self and others (Fonagy, 2001; Slade, 2005). Therefore, if a child is not exposed to these conditions they can develop longer-term problems such as poor emotional regulation and interpersonal difficulties (Kochanska, 2001).

It has been suggested that mothers who have a secure attachment themselves are more likely to have good RF capacity (Fonagy & Target, 2005). Furthermore, mothers with a good RF capacity are more likely to have children who are securely attached (Slade et al., 2005). Hence, a mother's RF capacity is thought to be the psychological mechanism that affects her child's attachment security as it enables her to provide the right conditions for a secure attachment to develop (Grienenberger, Kelly, & Slade, 2005; Slade et al., 2005). This is known in the literature as the 'transmission gap', whereby attachment security can pass from mother to infant, and get repeated through generations (Fonagy et al., 1995). Related to this, attachment research suggests that mothers who have experienced significant trauma and deprivation in their early childhood can have impaired RF abilities (Suchman, DeCoste, McMahon, Rounsaville, & Mayes, 2011). These mothers are also more likely to have children with an insecure attachment style (Berthelot et al., 2015; Fonagy et al., 1991b). However, those with a similar history but have later experienced corrective relationships that have increased their RF capacity are more likely to have children with a secure attachment (Fonagy et al., 1991b). Therefore, maternal RF is an important factor contributing to the quality of mother-infant relationships.

Maternal Sensitivity and Mind-Mindedness

Maternal RF is not the only concept that examines a mother's abilities to consider her child's mind. The concept of '*maternal sensitivity*', developed by Ainsworth and colleagues (Ainsworth, Blehar, Waters, & Wall, 1978), describes a mother's ability to perceive things from her child's perspective and respond to her child's cues in an appropriate and timely manner. Following on from the work by Ainsworth et al. (1978), Meins (1997) coined the term '*maternal mind-mindedness'*. This refers to a mother's capacity to think about her child as a separate individual, with his or her own mind. Fonagy and colleagues (Fonagy et al., 2002) acknowledge these concepts as being closely related to maternal RF, and sees them as compatible rather than conflictual. However, not only does maternal RF describe the dynamic relationship between mental states and behaviour (as do mind-mindedness and maternal sensitivity), but it also considers the interaction between mental states of the child and mental states of the mother (Sharp & Fonagy, 2008). Hence, maternal RF is considered a more comprehensive construct in regards to explaining the transmission of attachment style between generations.

Maternal Reflective Functioning and Parenting

The quality of reflective functioning (RF) capacity can vary between individuals (Fonagy, Bateman, & Luyten, 2012). Although a mother may have a typical RF capacity, it is normal for RF to fluctuate, particularly in times of high emotional arousal (e.g. high levels of stress) or within the context of certain relationships (e.g. someone may be able to have good RF with a friend, but poor RF when with a family member) (Slade, 2005). Normal stresses within the mother-child relationship, such as tantrums, aggression and separation, may evoke intense, negative emotions in the mother. As a consequence the mother's RF ability may temporarily go 'offline', making it more difficult for her to attend to her child's needs (Allen,

Fonagy, & Bateman, 2008; Schechter et al., 2005). However, a mother who has a typically good RF capacity will be more readily able to regain her mentalising ability, being able to regulate her own emotions, and reflect on how her own mental states are contributing to the situation (e.g. my child might be clingy because she can sense that I am feeling stressed) (Fonagy et al., 1991b). By doing this, a highly reflective mother will be able to hold her child's affect in mind and be more flexible and curious about the intentional mental states that underlie her child's behaviour (e.g. my child might be screaming because he is feeling frustrated). This process allows a mother to understand and respond to her child in an appropriate manner and to modify her own behaviour accordingly (Fonagy et al., 1991a).

Given the complexity of the task, it is unsurprising that some mothers fail to mentalise with their children in certain circumstances. A mother with poorer RF abilities may ignore or misattribute mental states and therefore find it hard to consider the underlying motivations behind their child's behaviour (e.g. my child is crying just to annoy me). Those with poorer RF may jump to conclusions, not consider alternatives, and may distort assumptions about what is going on for their child (e.g. my child didn't want to hug me which means he doesn't love me anymore) (Fonagy, Gergely, Jurist, & Target, 2002). This in turn may lead to a less responsive parenting style, in that a mother will be less able to attend to her child's needs when she herself is feeling distressed (Fonagy et al., 1991b). For a mother with an experience of abusive or neglectful early caregivers, being faced with her own child's attachment needs can trigger her own, often highly distressing, feelings of not having her needs met as a child. In the attachment literature, this process is known as 'ghosts in the nursery' (Fraiberg, Adelson, & Shapiro, 1975). During these times, the mother's mentalising may become impaired, in that she may (unconsciously) block out her child's mental state in an attempt to create some distance from the painful feelings that have been evoked in her (Schechter et al., 2008). Whilst in this non-mentalising state, the mother is at risk of maladaptive parenting

behaviours, for example withdrawal and hostility, as she is unable to focus on their child's emotional experience (Grienenberger et al., 2005; Schechter et al., 2005).

Increasingly, parenting interventions are becoming more attachment-focused, acknowledging that unless a mother is able to recognise and respond appropriately to her child's emotional cues, the traditional behaviourally-focused parenting programs may not be successful (Suchman et al., 2011). Therefore, interventions are being developed to target mothers at risk of low RF. For example, an intervention for mothers with substance-use problems, the 'Mothers and Toddlers Programme' (Suchman, DeCoste, Castiglioni, Legow, & Mayes, 2008), found that mothers' RF abilities improved after a 12-week intervention. Improvements in maternal RF were also associated with more optimal parenting (e.g. improved sensitivity and responsiveness) (Suchman et al., 2008).

However, other studies have shown that maternal RF has no association with sensitive parenting (e.g. Pajulo et al., 2008). Therefore, in order to understand the relationship between maternal RF and parenting, a comprehensive review of the current literature is needed. In spite of several recent review papers concerning RF (Camoirano, 2017; Katznelson, 2014; Ordway, Sadler, Dixon, & Slade, 2014), various methodological issues limit the findings, such as a restrictive inclusion criteria and non-systematic methodology. Therefore, an updated, comprehensive review of the available literature exploring the association between maternal RF and parenting is needed.

Measuring Maternal Reflective Functioning

Maternal RF has traditionally been measured using semi-structured interviews, such as the Parent Development Interview (PDI: Aber, Slade, Berger, Bresgi, & Kaplan, 1985; Slade, Aber, Berger, Bresgi, & Kaplan, 2003, 2010), the Working Model of the Child Interview (WMCI: Zeanah & Benoit, 1995) and the Pregnancy Interview (PI: Slade,

Grunebaum, Huganir, & Reeves, 1987; Slade, 2007). These interviews are scored using manuals designed to measure parental RF (Slade, Bernbach, Grienenberger, Levy, & Locker, 2002, 2005; Slade, Patterson, & Miller, 2005, 2007). However, a problem with the use of semi-structured interviews is that they require specialist training in order to administer, code and interpret the data.

In the last few years, self-report measures of maternal RF have been developed, such as the Parental Reflective Functioning Questionnaire (PRFQ: Luyten, Mayes, Nijssens, & Fonagy, 2017) and the Prenatal Parental Reflective Functioning Questionnaire (P-PRFQ: Pajulo et al., 2015). These quantitative measures were developed as a way to improve the access to assessment of maternal RF within research and clinical settings.

Aims

The aim of this systematic review is to provide an updated synthesis and critical evaluation of the research on maternal reflective functioning and parental caregiving behaviours. More specifically, this review aims to assess the quality of the studies, to identify the range of measures used to assess maternal RF, and to identify which aspects of parenting have been explored in relation to maternal RF. In line with the current literature, the term 'parenting behaviours' will be used to refer to the parent-child relationship, parent-child communication, parental communication style, and parenting practices, such as aggressive or overprotective parenting behaviours. Given the progressive nature of this research area, it is important to continually review the findings of current empirical research. In order to address the methodological limitations in previous reviews, the highly regarded methodology of a systematic review is required to locate and synthesise all of the available evidence (Boland, Cherry, & Dickson, 2014).

Method

A review protocol was developed to guide completion of this process (Appendix B). In addition, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA: Moher, Liberati, Tetzlaff, & Altman, 2009) checklist was referred to for guidance on items to be included in the reporting of this systematic review. However, as PRISMA was originally developed for reporting randomised trials, only items applicable to this study were included.

Eligibility Criteria

This review focused on maternal reflective functioning and parenting behaviour. Empirical studies were included if they met the following criteria: a) used a measure assessing maternal reflective functioning; b) used a measure of parenting behaviour (e.g. sensitivity, hostility, tolerance of distress); c) age of child was below 18 years; d) used quantitative methodology and statistical analysis to assess the relationship between maternal reflective functioning and parenting behaviour. No restrictions were made on the mother's age. Studies were excluded from the review if: a) reflective functioning did not relate to the mother-child relationship; b) it was not possible to separate out the data of mothers from other parents/caregivers (e.g. adoptive/foster carers/surrogates/fathers); c) papers were not published in a peer reviewed journal (e.g. dissertations, book chapters); d) studies were not quantitative methodology (e.g. expert opinion commentaries, individual case studies, qualitative studies); e) studies focused on children with specific disabilities or conditions (e.g. ADHD, learning disabilities); f) full-text article was not available; g) not published in English.

Search Strategy

The electronic databases PsycINFO, CINAHL Plus, MEDLINE and SCOPUS were systematically searched in December 2017. These databases were chosen as they generated the greatest number of results during an initial scoping search. No restrictions were set on the earliest publication date. The following search terms were entered in each database: ("reflective function*" OR "reflective capacit*" OR mentaliz* OR mentalis*) AND (mother OR maternal OR car* OR parent*) AND (bab* OR infan* OR child* OR toddler OR famil* OR boy OR girl OR daughter OR son) AND (behav* OR parent*).

Study Selection

All articles generated from the search were exported into a reference management program (Mendeley). An initial screening stage was performed to remove duplicates. Next, the titles and abstracts of all studies were screened against the eligibility criteria. Following this, the full-text articles were screened using the same process. In addition, the reference lists were checked to identify additional relevant studies. Studies that met all of the eligibility criteria were included in the review.

Quality Assessment

The quality of the studies was assessed using the Quality Assessment Tool for Studies of Diverse Design (QATSDD; Sirriyeh, Lawton, Gardner, & Armitage, 2012). This is a standardised measure that has good face validity and inter-rater reliability (k = .71) (Sirriyeh et al., 2012). The QATSDD was chosen for this review as it can be applied to studies of varied methodological design. It consists of 14 domains (for quantitative articles) which are rated on a 4-point Likert scale, from 0 “no mention at all’, 1 “very slightly”, 2 “moderately”, and 3 “complete”. Each score is accompanied by a descriptor of what would meet each

category to increase reliability and validity. A second researcher (LH) independently assessed the quality of six out of the eighteen papers. The inter-rater reliability between the two reviewers was considered to be an acceptable level (k = .74). Any discrepancies between the reviewers were discussed and adjusted accordingly. The quality ratings were not used as a basis for excluding the studies from the review process, rather, they were used to highlight the strengths and limitations of the studies.

Data Extraction and Data Synthesis

A data extraction form was designed for this review in order to summarise relevant information about the included studies (Table 1). Following this process, the findings of the included studies were synthesised using a narrative approach. This method was deemed most appropriate as the studies included in the review used a variety of study designs and outcome measures, therefore a meta-analysis was not possible to undertake (Boland et al., 2014). In order to provide a critical analysis of the studies the narrative synthesis focused on the results reported in the studies, as opposed to the study authors' interpretations of the findings.

Results

A total of 1,546 records were obtained from the database searches. After the removal of 597 duplicates, the titles and abstracts of 949 were screened against the eligibility criteria. This initial process resulted in 46 articles, which were then assessed for eligibility through review of their full-text article. One additional study was identified by searching the reference lists of these articles. Two of the papers used data from the same study. Therefore, 18 papers were found to be eligible for inclusion in the narrative synthesis, based on 17

studies. Figure 1 displays a flow diagram of the data selection process, in line with the PRISMA guidelines (Moher et al., 2009).

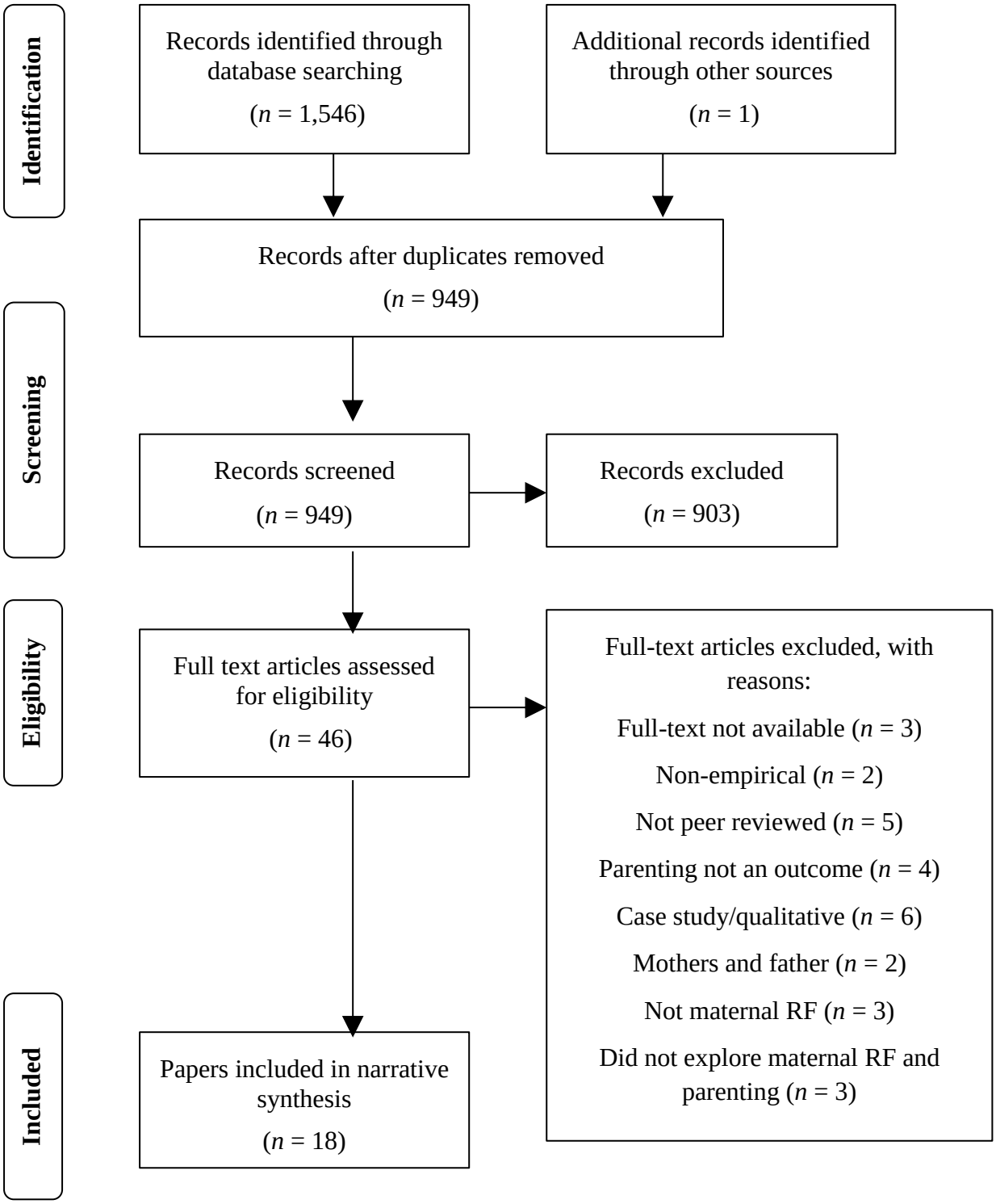

Figure 1. PRISMA flow diagram of study selection process

Study Characteristics

Characteristics of the included studies are reported in Table 1. The date of publication ranged from 2005 to 2018. Studies were conducted in various countries: United States of America (11), Netherlands (2), Finland (2), United Kingdom (1), Sweden (1), and Australia (1). Eight of the studies used a cross-sectional design, seven longitudinal and three randomised controlled trials. Total sample sizes ranged from 14 to 163, predominantly using mother-child dyads, with the exception of two studies that used a baby simulator (Rutherford, Booth, Luyten, Bridgett, & Mayes, 2015; Rutherford, Goldberg, Luyten, Bridgett, & Mayes, 2013). Eight studies used non-clinical samples, and eleven studies used clinical samples, including mothers with substance-use problems (8), a history of abuse (1), a history of violent trauma (1), and in prison (1). Most studies used samples with children under 36 months, whereas Möller et al. (2017) included older children (3 to 10 years old) in their sample.

Maternal RF was measured primarily using a version of the Parent Development Interview (PDI). Other measures included the Pregnancy Interview (PI), Working Model of the Child Interview (WMCI) and the Parental Reflective Functioning Questionnaire (PRFQ). Five studies assessed maternal RF in pregnancy, whereas the others used various time points after the child was born. A range of measures were used to assess different aspects of parenting: Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE: Bronfman, Parsons, & Lyons-Ruth, 1999), Care-index (Crittenden, 2003), Coding Interactive Behaviour (CIB: Feldman, 1998), Emotional Availability Scales (EAS: Biringen, Robinson, & Emde, 1998; Biringen, 2008), MACY Infant-Parent Coding System (MIPCS; Earls, Muzik, & Beeghly, 2009), Mother-Infant Coding System (MICS; Miller, McDonough, Rosenblum, & Sameroff, 2002) and Nursing Child Assessment Satellite Training (NCAST: Barnard & Eyres, 1979). Table 2 describes the dimensions of parenting that each measure assessed.

Table 1

Study Characteristics and Outcomes

Author(s), (year), country	**Study design**	**Sample (*N*)**	**Mother characteristics: Mean age (*SD*, range) Clinical/non-clinical**	**Child characteristics: Mean age (*SD*, range)**	**Measure of maternal RF**	**Measure of parenting**	**Main outcome**	**Quality score (%)**
Alvarez-Monjarás et al. (2017), USA	Cross-sectional	142 mother-child dyads	29.8 years (*5.85*, 19-45 years) Clinical: Substance-users	24 months (*15.15*, 1-71 months)	PDI-R2-S modified	NCAST	Maternal RF was positively correlated with maternal sensitivity to child's cues (r = .39, p < .01).	33/42 (79%)
Grienenberger et al. (2005), USA	Longitudinal T1 –10 months postpartum T2 –14 months postpartum	45 mother-infant dyads	31 years (25-40 years) Non clinical	10-14 months	PDI with RF-PDI at T1	AMBIANCE at T2	Maternal RF was negatively associated with affective communication (r = -.481, p = .00). Maternal RF predicted affective communication (d = 1.1).	24/42 (57%)
Möller et al. (2017), Sweden	Cross-sectional	40 mother-child dyads	36.3 years (*4.7*, 26-45 years) Non clinical	5.7 years (*2.0*, 3-10 years)	PDI-R2-S	EAS (3rd Edition)	Maternal RF was positively associated with sensitivity (r = .38, p < .05) and non-intrusiveness (r = .36, p < .05) in play. Higher maternal RF was not significantly associated to structuring or non-hostility.	25/42 (60%)
Pajulo et al. (2008), Finland	Longitudinal T1 – during pregnancy T2 – 4 months postpartum	18 mother-infant dyads	25 years (*5.9*, 17-37 years) Clinical: Substance-users	4 months	PI with RF-PI at T1; PDI-R with RF-PDI at T2	Care-Index at T2	Maternal RF (pre and post natal) was not significantly associated with maternal sensitivity.	22/42 (52%)
Pajulo et al. (2012), Finland	Longitudinal T1 – during pregnancy T2 – 4 months postpartum	34 mother-infant dyads	25 years (*5.8*, 16-38 years) Clinical: Substance-users	4 months	PI with RF-PI at T1; PDI-R with RF-PDI at T2	Care-Index at T2	Maternal RF (pre and post natal) was not significantly associated with maternal sensitivity.	31/42 (74%)

Perry et al. (2015), Australia	Longitudinal T1 – third trimester T2 – 3-6 months postpartum	25 mother-infant dyads	29 years (*4.5*) Clinical: substance-users (*n* = 11) Non clinical (*n* = 14)	20.4 months, (*14.3*, 3-6 months)	PI with RF-PI at T1; PDI-R2-S with RF-PDI at T2	EAS (4th Edition) at T2	Pre and postnatal maternal RF was not significantly associated with sensitivity or intrusiveness for either group. No significant differences in RF or parenting in between clinical/non clinical group.	28/42 (67%)
Rosenblum et al. (2008), USA	Cross-sectional	95 mother-infant dyads	29.3 years (*5.2*, 20 – 42 years) Non clinical	7 months	WMCI with RF (modified)	Not validated	Maternal RF was positively associated with mind-minded comments (r = .39, p < .01) and sensitivity (r = .41, p < .01), and negatively associated with intrusiveness (r = -.43, p < .01), rejection/anger (r = -.34, p < .01) and anxiety (r = -.29, p < .01). No significant association between maternal RF and positive affect.	27/42 (64%)
Rutherford et al. (2013), USA	Cross-sectional	21 mothers	30 years (*6.0*, 19 – 42 years) Non clinical	Child under 2 years	PRFQ	BSIM	Maternal RF (Interest and Curiosity in Mental States subscale) positively correlated with distress tolerance persistence times (r = .51, p = .02). Maternal RF (Pre-mentalizing subscale) not significantly correlated with distress tolerance persistence times.	26/42 (62%)
Rutherford et al. (2015), USA	Cross-sectional	59 mothers	27 years (*6.0*) Non clinical	5 months (*1.0*)	PRFQ	BSIM	Maternal RF (Pre-mentalizing subscale) was negatively correlated with distress tolerance persistence times (r = -.31, p < .05). No significant associations between PRFQ 'Interest and Curiosity in Mental States' or 'Certainty of mental states' subscales and distress tolerance.	25/42 (60%)
Schechter et al. (2008), USA	Cross-sectional	41 mother-child dyads	29 years (18 – 45 years) Clinical: History of violent trauma	32 months (8 – 50 months)	WMCI with RF-PDI	AMBIANCE	Maternal RF not significantly associated with disrupted communication.	34/42 (81%)

Sleed et al. (2013), UK	RCT T1 = Baseline T2 = End of treatment (5 weeks)	163 mother-infant dyads	*Intervention* (n = 88): 26.2 years, (*6.4*, 18-42 years) *Control* (n = 75): 27.6 years (*5.6*, 18-42 years) Clinical: Prison population	*Intervention*: 4.4 months (*4.6*, 0.1-18.5 months) *Control*: 4.9 months (*4.5*, 0.2 – 23 months)	PDI-R2-S at T1 and T2	CIB at T1 and T2	Maternal RF was positively associated with maternal positive engagement in the parent-infant interactions (r = .23, p < .05) at T1 but not at T2.	35/42 (83%)
Smaling et al. (2016), Netherlands	Longitudinal T1 – pregnancy (27 weeks gestation) T2 – 6 months postpartum	133 mother-infant dyads	22.9 years (*2.17*) Non-clinical	6.02 months (*0.41*)	PI (modified) with RF-PI at T1	MICS at T2	Maternal RF (antenatal) was positively associated with sensitivity and positive engagement during free play and teaching, Maternal RF (antenatal) was negatively associated with intrusiveness and internalizing-helplessness tasks, only during more challenging tasks (teaching and SFP reengagement).	35/42 (83%)
Smaling et al. (2017), Netherlands	Longitudinal T1 – pregnancy (27 weeks gestation) T2 – 6 months postpartum	96 mother-child dyads	22.6 years (*2.13*) Non-clinical	5.96 months (*0.41*)	PI (modified) with RF-PI at T1	MICS at T2	Maternal RF (antenatal) was positively associated with maternal sensitivity (r = .23, p < .05). There was a negative trend observed between maternal RF (antenatal) and intrusiveness (r = -.15, p = .068) although not significantly associated.	36/42 (86%)
Stacks et al. (2014), USA	Cross sectional	83 mother-infant dyads	30 years (20 – 45 years) Clinical: History of abuse/neglect	16 months	PDI-R2-S with RF-PDI	MIPCS	Maternal RF was positively associated with maternal sensitivity (r = .28, p < .05) and negatively associated with maternal negativity (r = -.35, p < .01).	35/42 (83%)
Suchman et al. (2008), USA	Longitudinal T1 – Baseline T2 – End of treatment (12 weeks)	8 mother-child dyads	32 years (*6.4*, 21 – 43 years) Clinical: Substance-users	26.4 months (*8.02*, 12 – 36 months)	PDI with RF-PDI at T1 and T2	NCAST at T1 and T2	Improvement in maternal RF was positively associated with optimal maternal behaviour (e.g. more sensitivity, responsiveness, and growth-fostering behaviour) with a large effect size (R^2 = .36, β = .60).	35/42 (83%)

Suchman et al. (2010a), USA *	RCT T1 – Baseline T2 – End of treatment (12 weeks)	47 mother-child dyads	*Intervention (n* = 23) *Control (n* = 24) 30 years (19 – 42 years) Clinical: Substance-users	17.7 months (1-36 months)	PDI with RF-PDI at T1 and T2	NCAST at T1 and T2	Improvement in maternal RF was positively associated with caregiving behaviour, with a medium effect size (R^2 = .04, β = .20).	30/42 (71%)
Suchman et al. (2010b), USA *	Cross-sectional	47 mother-child dyads	30 years (19 – 42 years) Clinical: Substance-users	17.7 months (1-36 months)	PDI-R2-S with RF-PDI	NCAST	Maternal RF (self-focused) was positively associated with sensitivity to cues (R^2 = .01, p <.05, β = *.37*), socio-emotional growth fostering (R^2 = .08, p <.05, β = *.33*) and cognitive growth fostering (R^2 = .08, p <.05, β = *.34*) but was not associated with overall response to distress. Maternal RF (child-focused) was not significantly associated with caregiving behaviour.	30/42 (71%)
Suchman et al. (2018), USA	RCT T1 – Baseline T2 – End of treatment T3 – 3 month follow up	62 mother-child dyads	*Intervention* (*n* = 27) *Control* (*n* = 35) 29.9 years (*5.29*) Clinical: Substance-users	27.9 months (*14.88*)	PDI-R2-S (modified) with RF-PDI T1, T2, T3	CIB at T1, T2, T3	Improvement in maternal RF (self-and child-focused) was positively associated with maternal sensitivity (R^2 = .08, β > .05).	32/42 (76%)

Note. Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE: Bronfman et al., 1999); Baby Simulator Paradigm (BSIM); Care-index (Crittenden, 2003); Coding Interactive Behaviour (CIB: Feldman, 1998); Emotional Availability Scales (EAS: Biringen et al., 1998; Biringen, 2008); MACY Infant-Parent Coding System (MIPCS; Earls et al., 2009); Mother-Infant Coding System (MICS; Miller et al., 2002); Nursing Child Assessment Satellite Training (NCAST; Barnard & Eyres, 1979); Parent Development Interview (PDI: Aber et al., 1985); PDI – Revised: Short Form (PDI-R2-S: Slade et al., 2003, 2010); Parental Reflective Functioning Questionnaire (PRFQ: Luyten et al., 2017); Pregnancy Interview (PI: Slade, 2007); Reflective Functioning scale (RF: Fonagy et al., 1998); RCT – Randomized controlled trial; RF Scoring manual – PDI (RF-PDI: Slade et al., 2002, 2005); RF Scoring manual – PI (RF-PI: Slade et al., 2005, 2007); Working Model of the Child Interview (WMCI: Zeanah & Benoit, 1995);

*One sample used in two publications

Table 2

Parenting Measures

Measure	Outcome assessed	Studies
Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE)	a) Affective communication errors; b) role or boundary confusion; c) fearful, disoriented, dissociative, or disorganized behaviour; d) intrusiveness or negativity; e) withdrawal.	Grienenberger et al. (2005); Schechter et al. (2008)
Baby Simulator Paradigm (BSIM)	Distress tolerance	Rutherford et al. (2013, 2015)
Care-index	Sensitivity: a) Facial expression; b) verbal expression; c) position and body contact; d) affection; e) turn-taking contingencies; f) control; g) choice of activity.	Pajulo et al. (2008, 2012).
Coding Interactive Behaviour (CIB)	a) Dyadic attunement; b) parent positive engagement; c) child involvement	Sleed et al. (2013); Suchman et al. (2018)
Emotional Availability Scales (EAS)	a) Sensitivity; b) structuring; c) non-intrusiveness; d) non-hostility.	Möller et al. (2017); Perry et al. (2015)
MACY Infant-Parent Coding System (MIPCS)	a) Parenting sensitivity (behavioural sensitivity and affective sensitivity); b) parenting negativity (maternal negativity and over-controlling/ intrusiveness)	Stacks et al. (2014);
Mother-Infant Coding System (MICS)	a) Positive engagement; b) sensitivity; c) intrusiveness; d) internalizing-helplessness behaviour	Smaling et al. (2016, 2017)
Nursing Child Assessment Satellite Training (NCAST)	a) Sensitivity to cues; b) response to distress; c) social-Emotional growth fostering; d) cognitive growth fostering	Alvarez-Monjarás et al. (2017); Suchman et al. (2008, 2010a, 2010b)

Study Quality

The studies were assessed for their risk of bias using the QATSDD (Sirriyeh et al., 2012). The details of the quality assessment scoring are displayed in Appendix C. The studies varied in quality, ranging from 52% to 86% of the maximum quality score. There were numerous studies that demonstrated higher quality (above 80%) and could be used as exemplars of good practice for each study design: for longitudinal studies Smaling et al. (2017) scored 86%, Smaling et al. (2016) and Suchman et al. (2008) scored 83%; for randomized controlled trials Sleed et al. (2013) scored 83%; and for cross-sectional studies Stacks et al. (2014) scored 83% and Schechter et al. (2008) scored 81%.

Overall, the studies had clear theoretical rationales and the studies' aims were explicitly stated. None of the studies provided evidence of conducting a power analysis to determine required sample size, however, three studies adjusted the data analyses to account for their small sample sizes. There was variation across the studies regarding description of the recruitment procedure, with some providing no details. This limits the ability to assess how representative the sample is. The procedure of data collection was generally well described, although in some studies further specificity regarding time points of data collection would have been preferable. For example, Pajulo et al. (2008, 2012) assessed maternal RF *during pregnancy*, which is a broad time frame and limits replicability. The majority of studies assessed maternal RF using well-validated semi-structured interviews, although several studies modified existing measures of maternal RF, which is likely to affect the validity and reliability of the scale. All studies used appropriate analyses in order to address the research question. No studies mentioned the use of service user involvement in the design of the study.

Study Findings

The relationship between maternal RF and parenting behaviour was assessed in all studies. Parenting behaviour was grouped into the following categories:

Sensitivity.

The majority of studies in this review assessed the relationship between maternal RF and maternal sensitivity. Sensitivity refers to the observation of timely and appropriate behaviours that are attuned to the child's needs. Rosenblum, McDonough, Sameroff, and Muzik (2008) used a cross-sectional design with a low-risk, non-clinical sample of mothers, observing interactions with their 7-month old child during a free-play and teaching task. Mothers with higher levels of maternal RF were found to display more sensitivity in their interactions with their child. Smaling et al. (2016, 2017) found similar results using a younger sample of mothers (mean age = 22 years). In this study they assessed maternal RF during pregnancy (27 weeks), finding that mothers who had a higher capacity to mentalise about their baby in pregnancy displayed more sensitive behaviour when interacting with their children at 6-months old. The studies by Smaling et al. (2016, 2017) are considered to be good quality, as they use a longitudinal deign, validated measures and a large sample size, which strengthens the validity of the findings. Möller et al. (2017) used a sample of older children (between 3-10 years old), and observed more sensitive interactions from mothers with higher RF scores during a problem solving task and free-play. Finally, Perry, Newman, Hunter, and Dunlop (2015) did not find a significant relationship between maternal RF and sensitivity using a non-clinical sample of mothers, however, this study used a small sample size (n = 14), which limits the quality of this evidence.

Maternal sensitivity was investigated in a series of studies using clinical samples. Suchman, DeCoste, Castiglioni, Legow and Mayes (2008), Suchman et al. (2010a) and Suchman, DeCoste, Borelli, and McMahon (2018) conducted studies using an intervention

called the '*Mothers and Toddlers Program'* (MTP), which is a 12-week attachment-based parenting intervention for substance-abusing mothers. In Suchman et al. (2008, 2010a), sensitivity of interaction was assessed through observations of mothers interacting with their children during a teaching task. Through linear regression analyses, Suchman et al. (2008) found that improved maternal RF was associated with increased sensitivity (e.g. helping the child adjust their position in order to reach the teaching materials), with a large effect size. In a subsequent study, Suchman et al. (2010a) used a RCT design with a larger sample, and found a similar association between maternal RF and sensitivity, with a medium effect size. Finally, in Suchman et al. (2018) sensitivity of interaction was assessed through observing mothers in interactive play sessions with their toddlers. As found previously, improvements in maternal RF were associated with improvement in maternal sensitivity, although a small effect size was observed in this study. Alvarez-Monjarás, McMahon, and Suchman (2017) replicated these results in a much larger sample of mothers who had attended the MTP (n = 142), which strengthens the validity of the findings. Furthermore, Suchman, DeCoste, Leigh, and Borelli (2010b) explored whether maternal RF (as measured by the PDI-RF) could be conceptualised as two distinct dimensions: self-mentalisation (i.e. mother reflecting on own mental states) and child-mentalisation (i.e. mother reflecting on child's mental states). Interestingly, when using the two dimensions, Suchman et al. (2010b) found that only self-mentalisation was associated with maternal sensitivity, whereas child-mentalisation was not. This suggests that it may be more important for a mother with substance-use problems to understand her own mental states in order to respond appropriately to her child's needs.

Conversely, two studies by Pajulo et al. (2008, 2012) did not find a significant relationship between maternal RF and sensitivity. In both studies, they used a sample of mothers with substance-use problems, and assessed maternal sensitivity through observing playful interaction between the mother and her 4-month-old child. They used a much

younger sample of infants (4 months old) compared to the samples used in the Suchman et al. (2008, 2010a, 2018) studies (17 to 27 months old), which may have accounted for some differences in findings. Similarly, Perry et al. (2015) did not find a significant association between the variables when using a sample of mothers with substance-use problems, although, as before, the small sample used in this study (n = 11) limits the quality of this evidence. Using other clinical populations, Stacks et al. (2014) found a positive association between maternal RF and sensitive caregiving in a sample of mothers with a history of childhood neglect. Furthermore, Sleed, Baradon, and Fonagy (2013) found a similar relationship in a sample of mothers from a prison population. Overall, the findings for maternal RF and sensitivity are more consistent within a non-clinical population, and more mixed within a clinical population.

Communication.

Three studies assessed the relationship between maternal RF and maternal communication. Using a non-clinical sample of mothers, Grienenberger et al. (2005) found that mothers with impaired maternal RF were more likely to display disrupted affective communication (e.g. failing to offer comfort when their child falls) with their 14-month old child during the Strange Situation (Ainsworth et al., 1978). Similarly, Rosenblum et al. (2008) found that mothers with higher maternal RF made more mind-minded comments towards their 7-month old child, (e.g. "You *want* that toy"). However, when Schechter et al. (2008) used a clinical sample of mothers who had been exposed to violence and traumatic events in childhood, they did not find a significant association between maternal RF and maternal communication when observing interactions with their 32-month old child. Based on the current evidence, it appears that maternal RF is associated with communication, but only in non-clinical samples. However, given the small number of studies exploring this

relationship, this conclusion needs to be interpreted with caution.

Distress tolerance.

Two studies by Rutherford et al. (2013, 2015) explored the association between maternal RF and infant distress tolerance using non-clinical samples of mothers. Using a Baby Simulation Paradigm (BSIM), they tested persistence times on a task in which they were asked to sooth a 'distressed' simulated baby. Maternal RF was assessed using the PRFQ (Luyten et al., 2017), a self-report questionnaire measuring three aspects of maternal RF. Rutherford et al. (2013) found a significant relationship between persistence times and the 'Interest and Curiosity in mental states' subscale (e.g. "I like to think about the reasons behind the way my child behaves and feels). This suggests that mothers who are more interested in their child's mental states are more likely to persist in trying to sooth the distressed baby stimulator. In their second study, Rutherford et al. (2015) found a negative association with persistence times and the 'Pre-mentalising' subscale, which refers to non-mentalising modes (e.g. "My child sometimes gets sick to keep me from doing what I want to do"). This indicates that mothers who are less able to mentalise about their child are less likely to persist with soothing and therefore less able to tolerate distress. However, Suchman et al. (2010b) did not find a significant association between maternal RF and overall response to distress (i.e. her ability to effectively relieve her child's distress) when using a clinical sample of substance using mothers interacting with their 17-month old infants. Therefore, although there appears to be a consistent relationship of maternal RF with distress tolerance in non-clinical samples, further research needs to be conducted in clinical samples before conclusions can be made.

Intrusiveness.

Six studies explored the relationship between maternal RF and intrusiveness, which refers to a mother's tendency to be controlling or over-stimulating towards her child. In a non-clinical sample of mothers, Rosenblum et al. (2008) and Möller et al. (2017) found that mothers with higher RF displayed less intrusive interactions with their child. Similarly, Smaling et al. (2016) found a significant negative association between maternal RF (measured in pregnancy) and intrusiveness, but only during more challenging tasks (teaching and SFP reengagement). In their subsequent study (Smaling et al., 2017), although they found a negative trend between maternal RF (antenatal) and intrusiveness, it was not a significant association. Stacks et al. (2014) found a significant association in a sample of mothers with a history of abuse/neglect when interacting with their 16-month old child in the Strange Situation. However, Perry et al. (2015) did not find a significant association between maternal RF and intrusiveness, in either a non-clinical or clinical sample of mothers with substance-use problems. Although as mentioned previously, this study used small samples which limits the findings. Overall, there is evidence to suggest that higher maternal RF is associated with less intrusiveness in non-clinical samples, and indications that this relationship may also be applicable in clinical samples, although further studies would need to be replicate these findings in order to make robust conclusions.

Maternal negativity.

In a non-clinical sample, Rosenblum et al. (2008) found a negative association between maternal RF and rejection/anger, which refers to a mother rejecting her infant's cues or making negative comments directed at her child. Furthermore, Stacks et al. (2014) found a significant negative association between maternal RF and maternal negativity in a sample of mothers with a history of abuse/neglect. This refers to the mother's expression of

negative or hostile behaviour, such as verbal restrictions, threats, negative facial expressions or language. This implies that mothers who have higher RF are less likely to display negativity towards their child. However, due to the small number of studies exploring this relationship in both clinical and non-clinical samples, further research is needed to support these findings.

Other.

Rosenblum et al. (2008) found a negative association between maternal RF and maternal anxiety (e.g. fidgeting, appearing agitated, or using a high-pitched tone of voice), although no significant association between maternal RF and positive affect. Suchman et al. (2010a) found a significant association of maternal RF with socio-emotional growth fostering, which refers to mother's ability to provide appropriate social interactions and reinforcement to the child (e.g. smiling at the child during interaction), and with cognitive growth fostering, referring to the mother's ability to provide appropriate stimulation at a level that her child will be able to understand (e.g. explaining concepts during teaching task). Again, due to the small number of studies exploring these aspects of parenting, no firm conclusions can be made.

Discussion

The aim of this review was to examine the quality of the research on the relationship between maternal RF and parental caregiving. The studies included in the review were of variable quality, and identified numerous aspects of parenting that were associated with maternal RF. Of the studies that were included, 14 studies used clinical samples, and 15 used

non-clinical samples. Results were most consistent in studies using non-clinical samples, where higher maternal RF was associated with increased sensitivity, communication, distress tolerance and reduced intrusiveness. Studies using clinical samples displayed more inconsistent results (e.g. for sensitivity and intrusiveness), and did not replicate some significant associations found in non-clinical samples (e.g. with communication and distress tolerance). However, these findings need to be interpreted with caution, based in the small number of studies investigating some of these relationships.

Firstly, there was good evidence to suggest that higher maternal RF was associated with greater maternal sensitivity. In line with current literature, one possible explanation for this relationship could be that mothers who have higher RF are more able to conceptualise themselves are being separate from their child, allowing them to distinguish between their own needs and their child's needs (Fonagy et al., 1991a). By doing this, mothers with high RF are more likely to be able to perceive their child's mental states and experiences during a task and respond to in a sensitive way. The majority of studies used a clinical population (e.g. mothers with substance-use problems, history of childhood trauma/violence), as these mothers are considered to be at risk of poor mentalising and therefore most in need of intervention. Of these, three studies (Pajulo et al., 2008, 2012; Perry et al., 2015) did not find a significant relationship between the variables. The sample of infants used in the Pajulo et al. (2008, 2012) studies who were much younger (4 months) than the infants used in the Alvarez-Monjarás et al. (2017) and Suchman et al. (2008, 2010a, 2018) studies (18 – 28 months), in which significant relationships were found. Given the differences in developmental stages between those two groups of children, it may be that sensitivity of interactions is less apparent with the younger infants. However, further research is needed to explore this. Furthermore, the Perry et al. (2015) study used a small sample, which limits the findings.

Using a sample of substance-using mothers, Suchman et al. (2010b) found differences between particular aspects of maternal RF, as measured by the PDI. Interestingly, only self-mentalising was significantly associated with maternal sensitivity, whereas child-mentalising was not significantly associated with maternal sensitivity. This suggests that it is the mother's ability to mentalise about her own mental state in the context of her relationship with her child that is most important at influencing her parenting. More specifically, improving a mother's capacity to regulate her own emotions enables her to be more prepared to engage with her child (Suchman et al., 2011). As this is the only study exploring this relationship further research would be needed to replicate this finding in order to draw firm conclusions. It is, however, an important area to explore as it has the potential to influence more targeted intervention.

There were fewer studies using communication as an outcome, with mixed findings. Two studies using a non-clinical sample found that mothers with higher maternal RF were more able to communicate effectively (Grienenberger et al., 2005; Rosenblum et al., 2008). These findings are supported by the literature suggesting that the process of mentalising involves not only the mother showing understanding of the child's affect but also communicating this to the child (Fonagy & Target, 2005). Mothers can vary with their ability to do these elements. Some mothers focus more on their child's affect yet do not display consistent or calm behaviour that would be necessary to provide containment for the child. For other mothers, there is an inability to recognise their child's affect yet they can demonstrate a stable parental role through their actions. Finally, some mothers lack the ability to recognise affect *or* to behave appropriately, leaving the child with no sense of coherence. As a result, the child is left with little acknowledgement of his or her state of mind, and is left with an internalised model that their parent is unpredictable and unavailable (Schechter & Willheim, 2009). However, when a clinical sample of mothers with a history

of violent trauma was used the relationship between maternal RF and communication was not found (Schechter et al., 2008). This implies that the association between maternal RF and communication is not applicable to a clinical sample, although further research is needed to support this conclusion.

Using non-clinical samples, Rutherford et al. (2013, 2015) found that certain aspects of maternal RF were associated with greater tolerance of distress. These two studies used the Parental Reflective Functioning Questionnaires (PRFQ: Luyten et al., 2017) which allowed different aspects of maternal RF to be measured. The finding that the pre-mentalising subscale was negatively associated with distress tolerance supports previous findings that mothers who are less able to consider their child's mental states, or are less curious about their own, may be less likely to accept and manage their child's signals of distress (Fonagy et al., 1991a). Ultimately, these mothers may find it more difficult to assist their child with regulating their distress. These findings highlight the importance of mentalisation-based interventions to help mothers increase their RF capacity in order to improve responsive parenting and improve self-regulation (Slade, 2006). However, these studies had some methodological limitations, in that they did not describe the recruitment process, (e.g. attrition rates), which could mean that a biased sample was used. Additionally, they were both laboratory based studies using a baby simulator instead of the mothers' own children, which limits the ecological validity. It would be important to explore this association between maternal RF and distress tolerance in a more naturalistic setting. When Suchman et al. (2010b) used a clinical sample of mothers with substance-use problems they did not find a significant association between maternal RF and response to infant distress when engaged in a teaching task with their infants. Due to the small amount of studies assessing the relationship between maternal RF and infant distress, further research needs to be done in this area, both in non-clinical samples using mother-infant dyads, and in clinical samples.

The studies on intrusiveness predominately found that mothers with higher maternal RF were less intrusive in their interactions with their child. Using non-clinical samples, a significant relationship was found in three studies (Möller et al., 2017; Rosenblum et al., 2008; Smaling et al., 2016), and although a negative trend was found in the study by Smaling et al. (2017), this was not statistically significant. Using a clinical sample, a significant relationship was found by Stacks et al. (2014) although Perry et al. (2015) did not find a significant relationship. Furthermore, two studies found that mothers who had higher RF were less likely to display negativity towards their child (Rosenblum et al., 2008; Stacks et al., 2014). This is supported by previous research showing that in circumstances where a mother feels overwhelmed by her child's negative affect, she will often (unconsciously) block out her child's mental state, i.e. fail to mentalise, in order to reduce her arousal (Fonagy et al., 2002). In these circumstances, mothers may become psychologically disengaged (e.g. withdrawn) or display frightening behaviour (e.g. hostility), instead of soothing the child (Schechter et al., 2008). However, it is important to note that this relationship between maternal RF and negativity has only been studied once in a non-clinical population and once in a clinical population of mothers with a history of neglect. Therefore, further studies would be needed to replicate these findings. This also applies for the relationship with maternal RF and maternal anxiety, positive affect, socio-emotional growth fostering, and cognitive growth fostering, which are all areas needing further research.

Strengths and Limitations

Included studies.

The quality assessment process highlighted the strengths and limitations of each study. This needs to be considered in relation to the findings, as it affects the validity of the conclusions that are made. Studies of a high quality provided a comprehensive description of

the rationale, methodology, and analysis of the research. It is important for there to be adequate transparency in research designs in order for studies to be replicated and findings to be validated. Three of the studies used a RCT design, which is considered the 'gold standard' of research methodology. Of these, the Sleed et al. (2013) study was rated as the highest quality. Following this, many of the studies used a longitudinal design, of which the Smaling et al. (2016, 2017) and Suchman et al. (2008) studies were of high quality. Finally, the remaining studies used a cross-sectional design, of which Schechter et al. (2008) and Stacks et al. (2014) studies were of high quality. However, cross-sectional studies are limited as this design does not allow for temporal ordering of variables and therefore causality of relationships cannot be inferred (De Los Reyes, 2017). A major limitation of the included studies is the lack of a power calculation. As many of the studies used a small sample size it is likely that the studies were underpowered and therefore at risk of Type I error (i.e. a false positive finding). Adequate sample sizes are necessary in order for findings to be reproducible and to increase the validity of the conclusions (Munafò et al., 2017).

There was a wide range of measures to assess parenting (e.g. six different measures were used to assess sensitivity). Considering this, it is unclear whether the measures reliably assess the same construct, and therefore it leaves a lack of clarity over whether the findings are comparable. Two studies incorporated the newly developed quantitative measure of maternal RF, the PRFQ. This measure has been found to demonstrate good reliability and validity (Luyten et al., 2017) and as it is easier to administer, it has the potential to be used as an assessment tool. The other studies measured maternal RF using a validated, semi-structured interview, mainly the PDI. However, this measure has faced some criticism in the literature, with some researchers arguing that it relies too heavily on the ability to verbalise aspects of mentalising (Shai & Belsky, 2011). Shai & Belsky (2011) developed the concept of *parental embodied mentalising*, which describes a nonverbal interaction in which the

parent is able to mentalise about her child through observing his or her body movements, and thereby attuning their own body movements in response. However, this concept has faced criticism by Meins (2011) who challenges the idea that traditional forms of assessment are not able to assess more implicit, unconscious levels of mentalising. Furthermore, Meins (2011) suggests that it would be difficult to translate this type of assessment into empirical research, and therefore does not consider it a valid tool for assessing parental RF.

Review process.

The strengths of this review lie mainly in the standardised, systematic methodology that was used, as recommended by Boland et al. (2014). The use of the quality assessment tool allowed for a comprehensive evaluation of the quality of the studies. However, the tool was limited in that it did not allow for the different types of measure of RF to be given different scores. The addition of a second reviewer in screening the full-text articles for eligibility was a strength of the review, as it helped to increase confidence in the integrity of the rating process. Ideally, the second reviewer would have been involved in more of the stages of this review, such as the initial screening and data extraction.

Some limitations lie in the search strategy. Firstly, it was important to keep the search strategy for 'parenting' broad as it is a concept that can be conceptualised in many different ways. This strategy, however, yielded many irrelevant studies. Secondly, this study focused solely on maternal RF which meant that research into fathers' RF and parenting was not explored. This would be an important area for future research, as it would allow for the consideration of the parental unit as a whole. Thirdly, by excluding qualitative studies and those written in non-English language it is likely that some relevant articles were missed. Furthermore, there is a potential for publication bias as non-peer reviewed papers were excluded from the review which may have contained studies with non-significant findings.

Finally, it is important to consider that over half of the studies were published in the USA. It is always worth considering cultural differences when generalising findings, particularly with regards to culturally nuanced issues such as parenting (Lamm & Keller, 2007).

Research and Clinical Implications

Future research needs to address some of the methodological limitations found in these studies. Mainly, increased sample sizes need to be used in order to ensure that studies are adequately powered. Studies using clinical samples need to use more diversity in their sample, as currently the research is heavily weighted towards mothers with substance-use problems, and little focus on other clinical groups, such as mothers with a history of childhood trauma. In order to infer causality between variables it is important that studies use a longitudinal design to explore the predictive nature of variables. Further research is needed using the recently developed quantitative measures of maternal RF, as the PRFQ was only used in two of the studies in this review, and these studies used non-clinical sample of mothers interacting with a baby simulator. This measure has also been adapted for use in the antenatal period (P-PRFQ: Pajulo et al., 2015), although there is no currently published research that uses this measure to assess maternal RF in relation to parenting outcomes.

The finding that maternal RF predicts maternal sensitivity highlights the need for professionals working with mothers to assess their RF capacity. Several government policies within the United Kingdom have highlighted the need for more advanced perinatal services within the National Health Service (NHS). The *NHS Five Year Forward View* policy advises professionals to attend to the mother's psychological experience of being a parent, both antenatally and postnatally (NHS England, 2014, 2016, 2017). Furthermore, a cross-party government manifesto, *1001 Critical Days*, suggests an increased focus on improving the parent-infant attachment in order for all babies to receive sensitive and responsive care from

their caregivers (Leadsom, Field, Burstow, & Lucas, 2013). These policy documents recommend the need for evidence-based intervention to be available for mothers as early as possible, ideally during pregnancy, as a preventative measure. Previous research suggests that a child's attachment security develops over the first year of their life (Fonagy, 2001), and that a secure attachment can lead to more positive outcomes for the child, such as sense of belonging and the ability to self-regulate emotions (Fonagy et al., 1991a). Therefore, improving maternal RF as early as possible is recommended in order to increase the likelihood that the mother will be responsive to her child's emotional needs and provide the necessary environment in which the child can develop a secure attachment (Slade et al., 2005). This is supported by findings from this review which indicate that mothers (non-clinical) with poor maternal RF tend to be more intrusive and negative towards their child, as well as being less sensitive and less able to effectively communicate. However, due to the inconsistent findings in clinical samples, further research needs to be conducted to explore the impact of maternal RF on distress tolerance, communication and intrusiveness. Finally, the majority of these studies explored maternal RF in the postnatal period, therefore further research is needed to address the gap in the literature regarding antenatal maternal RF and parenting outcomes in order to make recommendations for clinical intervention.

Conclusion

In conclusion, this review found evidence to suggest that maternal RF contributes to the quality of parenting, particularly improved sensitivity and reduced intrusiveness. Nevertheless, it is a complex relationship, and particular aspects of parenting, (e.g. distress tolerance, communication and negativity), need further investigation in order to draw robust conclusions. The development of mentalisation-based interventions aimed at improving maternal RF are needed to reduce the risk of repeating the cycle of maladaptive parenting,

and improving future outcomes for the child. Intervening as early as possible, ideally during pregnancy, is recommended in order to prevent the onset of difficulties in the mother-child relationship.

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Chapter Two: Empirical Paper

Health Practices in Pregnancy: Investigating the Impact of Maternal Reflective Functioning on Engagement with Antenatal Health Practices[2]

Word Count: 7,986

(exc. references)

[2]Article prepared for submission to the Journal of Prenatal and Perinatal Psychology and Health. See Appendix D for a copy of the journal guidelines for authors.

Abstract

This study explored the association between maternal reflective functioning (RF), antenatal attachment (AA), and health practices in pregnancy. A cross-sectional questionnaire study design was used to recruit 71 women in their third trimester of pregnancy from community antenatal clinics. Findings indicate that maternal RF was positively associated with AA, and AA was positively associated with engagement with health practices. However, maternal RF was not found to be associated with health practices directly. The use of a novel measure of prenatal maternal RF (P-PRFQ: Pajulo et al., 2015) lacked internal consistency in this study, which may have limited the findings.

Keywords: Maternal, reflective functioning, mentalising, pregnancy, antenatal, attachment, caregiving

Introduction

Pregnancy is a time of adjustment and preparation for expectant mothers (Guardino & Schetter, 2014). Not only will a woman undergo physical changes to accommodate the growing foetus but she will also experience a process of psychological adjustment to prepare herself to be a mother (Allen, Fonagy, & Bateman, 2008; Markin, 2013; Raphael-Leff, 1982). For some women this process can be complicated by a number of risk factors, such as mental health difficulties, socioeconomic problems and poor social support (Slade, Cohen, Sadler, & Miller, 2009). Identifying risk factors that impact the various stages of pregnancy can help to inform interventions aimed at improving outcomes for the mother, the baby and their relationship. Parental reflective functioning, or mentalising, has been identified as an important factor contributing to parenting behaviours (Slade, Sadler, & Mayes, 2005; Suchman, DeCoste, McMahon, Rounsaville, & Mayes, 2011).

Maternal Mental Health

It is common for expectant mothers to experience a range of emotions during pregnancy, from joy and anticipation to stress and anxiety (Biaggi, Conroy, Pawlby, & Pariante, 2016; Bunevicius et al., 2009). Whilst it is generally accepted that some anxiety is normal during pregnancy (e.g. concerns about the health of the baby and the process of childbirth), some women develop mental health difficulties that reach the threshold of clinical significance (Lobel, Hamilton, & Cannella, 2008). The most commonly diagnosed perinatal mental health difficulties are anxiety and depression, with estimated prevalence rates of between 7-20% (Biaggi et al., 2016; Fairbrother, Young, Janssen, Antony, & Tucker, 2015). Multiple risk factors are associated with the onset of perinatal anxiety and/or depression including not being in a stable relationship or having adequate social support,

previous history of mental health difficulties, complications with the current or previous pregnancies, unplanned pregnancy, and previous pregnancy loss (Biaggi et al., 2016).

According to the foetal programming hypothesis a mother's physical and mental health during pregnancy can have a significant impact on the baby's development (Cardwell, 2013; Ellison, 2010). Although the underlying biological mechanisms are not fully understood, certain environments *in utero* (e.g. increased levels of cortisol) can have a detrimental effect on the developing foetus (Glover, 2014; Sandman & Davis, 2012). Higher levels of maternal stress and anxiety in pregnancy are associated with a shorter gestational length and lower birth weight (Rice et al., 2010). Studies of infants exposed to higher levels of maternal stress during pregnancy were found to have lower cognitive performance, increased fearfulness, and increased emotional and behavioural problems in later childhood (Bergman, Sarkar, O'Connor, Modi, & Glover, 2007; Glover, 2014; O'Connor, Heron, & Glover, 2002; Parcells, 2010; Van den Bergh, Mulder, Mennes, & Glover, 2005). Furthermore, high levels of antenatal depression can negatively impact upon the bonding process between mother and baby (Alhusen, 2008; Condon & Corkindale, 1997; Lindgren, 2001; Rubertsson, Pallant, Sydsjo, Haines, & Hildingsson, 2015) and can reduce engagement with positive health practices in pregnancy (Walker, Cooney & Riggs, 1999). Considering the long-term impacts for both mother and baby, perinatal mental health is regarded a major public health issue by the World Health Organization requiring early intervention (WHO, 2014).

Health Practices in Pregnancy

Health practices in pregnancy are "actions a woman takes during pregnancy that may affect maternal or foetal health or the outcome of the pregnancy" (Lindgren, 2001, p. 203). Positive health practices include maintaining a nutritious diet, getting enough rest, abstaining

from tobacco and alcohol, and attending antenatal appointments (Alhusen, Gross, Hayat, Woods, & Sharps, 2012). If mothers have poor engagement with health practices in pregnancy it can increase the chances of her baby being born prematurely and developing congenital anomalies (Lindgren, 2001), which can lead to long-term consequences such as delayed cognitive development, cardiovascular disease, obesity, and shortened lifespan (Goldenberg & Culhane, 2007). Women who display more positive health practices tend to have a higher socioeconomic status (SES) and education levels (Webb, Siega-Riz, & Dole, 2009), and increased social support (Savage, Anthony, Lee, Kappesser, & Rose, 2007). In addition, a strong antenatal attachment has been found to correlate to high-quality health practices (Alhusen et al., 2012; Lindgren, 2001, 2003) and has been found to mitigate the negative effects of depression on engagement with antenatal health practices (Lindgren, 2001). It has been suggested that strengthening the antenatal attachment may help to increase a mother's parental responsibility to the foetus and therefore help the mother to engage in more positive health practices (Laxton-Kane & Slade, 2002).

Antenatal Attachment

Antenatal attachment (AA) describes the emotional bond between a pregnant mother and her unborn child, whereby the mother seeks to protect her baby and engages in appropriate behaviours to meet the baby's needs (Brandon, Pitts, Denton, Stringer, & Evans, 2009). There is some debate as to whether the term 'attachment' is appropriate to describe the relationship between a mother and her unborn baby (Walsh, 2010), given Bowlby's original definition of attachment referring to the mother-infant relationship (Bowlby, 1958; 1969). Nonetheless, there has been extensive research into this relationship, referred to as 'maternal-fetal attachment' (Cranley, 1981) or 'antenatal attachment' (Condon, 1993), which has been found to increase in strength over the duration of pregnancy (Cannella, 2005; Doan

& Zimerman, 2007). Research suggests that an important factor contributing to the development of a secure attachment, both antenatally and postnatally, is a mother's reflective functioning capacity (Fonagy, Steele, & Steele, 1991a; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005).

Reflective Functioning

Maternal reflective functioning (RF) refers to the ability of a mother to reflect on her child's mental states, such as his or her feelings, desires and intentions, in order to interpret behaviour (Slade et al., 2005). It also involves a mother being able to reflect on her own mental states, to be curious about the impact she has on her child, and that her child has on her. For example, a mother with higher RF capacity will be more able to hold their child's affect in mind and be more flexible and curious about the intentional mental states that underlie their child's behaviour (e.g. my child might be screaming because he is feeling frustrated). A highly reflective mother would also be able to consider her child's mind as being separate and distinct from her own yet, at the same time, consider how her own mental states are contributing to the situation (e.g. my child might be clingy because she can sense that I am feeling stressed) (Fonagy et al., 1991b). This process allows a mother to understand and respond to her child in an appropriate manner and to modify her own behaviour accordingly (Fonagy et al., 1991a).

Research into maternal RF has found a positive association between RF and sensitive parental caregiving (Rosenblum, McDonough, Sameroff, & Muzik, 2008). Furthermore, mothers with a poorer RF capacity were found to display more atypical maternal caregiving behaviours, such as insensitive or emotionally unresponsive behaviour (e.g. laughing when the child is crying or failure to attempt to alleviate a child's distress) (Grienenberger, Kelly, & Slade, 2005). Interventions targeted at mothers considered at-risk of having a poor RF

capacity (e.g. women with substance-use problems) have demonstrated some beneficial results. For example, in the '*Mothers and Toddlers Programme'* (Suchman et al., 2010) mothers who received the 12-week attachment based individual therapy displayed improved maternal RF and caregiving behaviour (e.g. more responsive to distress/sensitive to cues) compared to controls. This implies that the capacity to be reflective helps a mother to modify her parenting behaviour to meet her child's needs.

Reflective Functioning in Pregnancy

The process of a mother mentalising about her baby can start in pregnancy (Markin, 2013; Pajulo et al., 2015; Slade, 2002). A mother with high RF capacity may be curious and interested in the developing baby, being able to think about him or her as a separate individual with his or her own mind, temperament and needs (Pajulo et al., 2015). Whilst mentalising, she might focus on herself and her role as a mother, making room in her mind for the child and considering the changes that will occur to her life as a result of having the child. A highly reflective mother would consider her emerging relationship with the baby and willing to consider the impact of her own actions and mental states on the baby (Pajulo, Suchman, Kalland, & Mayes, 2006; Slade, 2002). She may also spend time imagining what the child will be like after birth, for example, which parent he or she might resemble (Pajulo et al., 2006; Slade, 2002). For some mothers the capacity to mentalise about their unborn baby is significantly compromised unless they are provided with additional support in this domain (Suchman, Pajulo, Kalland, DeCoste & Mayes, 2012).

Slade and colleagues (Slade et al., 2004, 2005) developed an intervention, '*Minding the Baby'*, aimed at improving maternal RF capacity in 'high-risk' mothers (i.e. young, first-time mothers with a history of trauma). Starting in the third trimester of pregnancy and continuing until the child's second birthday, mothers were encouraged to explore their own

early attachment history in order to process traumatic experiences. In addition, mothers were encouraged to conceptualise their child's current mental states, making connections between their infant's cues and his or her internal mental world. Following intervention, mothers demonstrated improved RF capacity along with improved parenting behaviours (e.g. more up-to-date with their child's immunisations and paediatric check ups, and less likely to have a case open with child social services), compared to controls (Sadler et al., 2013). This highlights the importance of helping a mother to develop her RF capacity during pregnancy.

Measuring Maternal Reflective Functioning

Until recently, maternal RF has been measured through applying an adapted version of the Reflective Functioning scale (Fonagy, Target, Steele, & Steele, 1998) to semi-structured interviews, such as the Parent Development Interview (PDI: Aber, Slade, Berger, Bresgi, & Kaplan, 1985; Slade, Aber, Berger, Bresgi, & Kaplan, 2003, 2010), the Pregnancy Interview (PI: Slade, Grunebaum, Huganir, & Reeves, 1987; Slade, 2007), and the Working Model of the Child Interview (WMCI: Zeanah & Benoit, 1995). Although these methods allow for more exploration of the construct, they require specialist training in order to administer, code and interpret the data. As this is often costly and time-consuming it limits practicality and utility in clinical and research settings. Therefore, the Parental Reflective Functioning Questionnaire (PRFQ: Luyten, Mayes, Nijssens, & Fonagy, 2017) was developed to assess maternal RF through a brief self-report questionnaire, and has been adapted for use in the antenatal period (Prenatal-PRFQ; Pajulo et al., 2015). To date, the Pajulo et al. (2015) study is the only published study using this quantitative measure of prenatal maternal RF. As this measure is newly developed, including the P-PRFQ in the current study will contribute to the evidence base for this measure. Furthermore, this measure was developed in Finland and has not yet been validated with English speakers.

Therefore, this study is the first to use the English version of the questionnaire and provides opportunities to explore the psychometric properties and potential utility of the measure within a UK population.

Summary and Rationale for Current Research

Health practices in pregnancy could be considered the earliest form of parental caregiving, as they involve actions taken to protect or care for the foetus (Lindgren, 2005). There is evidence to suggest that antenatal health practices have a significant impact on the developmental trajectory of a baby (Alhusen et al., 2012), therefore finding ways to improve a mother's engagement with health practices is important. Previous research suggests that mothers with a strong AA to their baby are more likely to engage with positive health practices, even for mothers experiencing depression (Lindgren, 2001). Therefore, interventions targeted at improving AA could be one way to improve health practices in pregnancy.

The current interventions aimed at improving attachment, both antenatally and postnatally, involve increasing maternal RF (Fonagy et al., 1991a). Furthermore, improving maternal RF has been found to improve aspects of parental caregiving, such as responding sensitively to their child's distress and better engagement with paediatric health checks (Rosenblum et al., 2008; Sadler at al., 2013). Thus far, the relationship between maternal RF and parental caregiving has only been demonstrated postnatally, leaving a gap in the literature as to whether this relationship can be observed in the antenatal period. Therefore, this study will investigate this relationship, using health practices as a measure of antenatal parental caregiving. If maternal RF was found to be related to health practices in pregnancy, it would potentially provide further support for the need for interventions aimed at increasing maternal RF in pregnancy. The clinical implications of this would be to improve physical

and psychological health outcomes for both mother and child.

Aims and Hypotheses

The primary aim of this study is to explore whether maternal RF is associated with health practices in pregnancy. The study will initially seek to replicate established relationships in the literature. Firstly, that maternal RF will be positively correlated to AA (Hypothesis 1). Secondly, that AA will be positively correlated to health practices (Hypothesis 2). The study will then explore new relationships between maternal RF and health practices, predicting a positive correlation between the two variables (Hypothesis 3). Finally, the study will investigate whether maternal RF contributes to health practices over and above the influence of AA, whilst controlling for depression and demographic risk factors.

Method

Design

A cross-sectional study design was implemented using paper-based and online survey methods. Ethical approval was obtained in October 2016 from the Health Research Authority and the Research and Development department within the recruiting NHS Trust (Sponsor Ref: UoL001188, REC reference: 16/NW/0413; Appendix E).

Recruitment

Recruitment took place primarily within community antenatal clinics held at various sites in an urban area within the North West of England. These clinics were run by midwives

from an NHS Trust which delivered antenatal and postnatal services, and all women attending the clinics were registered with this Trust. Midwives and site managers from multiple locations within this region were approached about the study with the aim of recruiting participants from a range of socioeconomic areas. Five sites agreed to take part, including three Children's Centres and two medical centres. All clinics offered routine antenatal appointments at various time-points throughout the duration of a woman's pregnancy. Any woman who was identified by their midwife as having a 'high-risk' pregnancy (e.g. medical complications with mother and/or baby, drug or alcohol dependency or active psychotic symptoms) was excluded from participating. Participants needed adequate English language skills to be able to complete the study measures. Two researchers were responsible for recruitment (lead author and a research assistant), attending the clinics independently of each other.

Participants

A total of 71 pregnant women completed the study between October 2016 and April 2017. To be eligible to participate women needed to be; a) aged 18 years or older, b) between 28-36 weeks pregnant. The mean age of participants was 29.4 years (*SD* = 4.97; range 18-42) and the mean gestational age was 31.6 weeks (*SD* = 2.83, range 28-36). Table 1 displays further participant characteristics.

Table 1

Participant Characteristics

Variable	*N*	*%*
Ethnicity		
White	68	95.8
Mixed/Multiple ethnic groups	1	1.4
Asian	0	0
Black	1	1.4
Other	1	1.4
Relationship status		
Single	4	5.6
In a relationship	37	52.1
Married or civil partnership	27	38.0
Widowed	0	0
Divorced or separated	0	0
Missing	3	4.2
Employment status		
Paid or self-employment	57	80.3
Voluntary employment	0	0
Unemployed	5	7.0
Housewife	5	7.0
Student	1	1.4
Long term sick or disabled	0	0
Other	1	1.4
Missing	2	2.8
Highest educational qualification		
No formal qualifications	0	0
High school qualifications	12	16.9
Professional/vocational diploma	9	12.7
A-Levels (or equivalent)	18	25.4
University degree	29	40.8
Other	1	1.4
Missing	2	2.8

Times being pregnant		
0	4	5.6
1	29	40.8
2	19	26.8
3	13	18.3
4	6	8.5
Pregnancies reached full term		
0	7	9.9
1	17	23.9
2	8	11.3
3	5	7.0
N/A	34	47.9
Current pregnancy expected/planned		
Yes	47	66.2
No	21	29.6
Other	1	1.4
Missing	2	2.8

Procedure

The researchers liaised with the midwives within each clinic to determine which participants met the inclusion criteria. All participants who were approached were given a short verbal description of the study and invited to read an information sheet detailing further information (Appendix F). Mothers who agreed to participate were given the option of either commencing the study immediately, to take a paper copy of the questionnaire pack and return this to the researcher in a prepaid envelope, or complete an online version of the study. The online version was created using the secure software package Qualtrics (2016). A link to this site (http://socsi.in/bQaU1) was also advertised on Facebook and Twitter pages of the NHS Trust sites to maximise accessibility.

The questionnaire pack consisted of a consent form (Appendix G), demographic questionnaire and four self-administered questionnaires (Appendix H). The measures took

between 15 and 25 minutes to complete. At the end of every pack was an information sheet signposting relevant sources of support (e.g. speaking to their midwife, a list of helplines and support services) (Appendix I). Participants were offered a £5 gift voucher as reimbursement for their time, and given the option of receiving a summary of the study findings following study completion. Of the studies completed, 70.4% of participants completed a paper version within the clinic, 18.3% completed the online version and 11.3% returned a paper version through the post. A unique identifier code was assigned to each completed set of questionnaires to anonymise the data and retain participant confidentiality.

Measures

Demographic questionnaire. A brief questionnaire was designed for this study containing questions related to the participants' age, ethnicity, relationship status, employment status, and level of education. Questions related to their pregnancy included their current gestation, number of previous pregnancies, number of full term pregnancies, and whether their current pregnancy was planned/expected.

Health Practices in Pregnancy Questionnaire – II (HPQ-II; Lindgren, 2005). The HPQ-II is a 34-item self-report questionnaire assessing health practices in pregnancy such as the balance of rest/exercise, nutrition, avoiding use of harmful substances, and obtaining information about pregnancy and childbirth. Each item has five response options from 1 (*never*) to 5 (*always*). A total score is calculated with a potential scale range of 34 – 170, with higher scores indicating higher quality health practices. The HPQ-II has good internal consistency (α .81) (Lindgren, 2005). In the current study, the Cronbach's α was .82.

Prenatal Parental Reflective Functioning Questionnaire (P-PRFQ; Pajulo et al., 2015). The P-PRFQ a 14-item self-report questionnaire designed to assess parental RF capacity in the antenatal period. Participants are asked to rate their agreement with each

statement on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). A total score is calculated, ranging from 14 – 98, with higher scores indicating higher RF capacity. The measure can also be scored as three subscales: Factor 1 - Opacity of mental states (e.g. "I think I will always be able to predict what my baby/child will do next"); Factor 2 - Reflecting on the foetus-child (e.g. "I often wonder what the baby expects and needs from me now while I am pregnant"); Factor 3 - The dynamic nature of mental states (e.g. "Nowadays I often try to imagine which moments will be most difficult for me with the baby after he/she is born"). Acceptable internal consistency was found by Pajulo and colleagues (Pajulo et al., 2015) for total score (α .77), Factor 1 (α .77), Factor 2 (α .74), and Factor 3 (α .69). Findings in the present study suggested a lower internal consistency of the measure, for total score (α .52), Factor 1 (α .43), Factor 2 (α .52), and Factor 3 (α .60). This measure was translated to English by the authors of the measure, using forward-backward translation (Pajulo et al., 2015).

Maternal Antenatal Attachment Scale (MAAS; Condon, 1993). The MAAS is a 19-item self-report questionnaire assessing the quality and intensity of antenatal attachment between the mother and foetus. Questions relate to feelings, attitudes and behaviours towards the unborn baby (e.g. "Over the past two weeks I have found myself talking to my baby when I am alone"). Items are rated on a 5-point scale. A total attachment score is calculated, ranging from 19 – 95 where higher scores represent stronger attachment. The MAAS has acceptable levels of internal consistency (α .79) and a test-retest reliability (.70) as reported by Condon & Corkindale (1998). Cronbach's α in the present study was .78.

Hospital Anxiety Depression Scale (HADS; Zigmond & Snaith, 1983). The HADS is a 14-item self-report questionnaire assessing symptoms of anxiety and depression. Items are rated on a 4-point scale, the measure can be scored as two subscales (anxiety and depression: range 0 – 21), and a total distress score (range 0 – 42), where higher scores

represent greater distress. Both the anxiety and depression subscales have good internal consistency (α .80 and .76, respectively) reported by Mykletun, Stordal, and Dahl (2001). Only the total score and depression subscale will be analysed in this study as these variables relate to the hypotheses. In the present study, Cronbach's *α* were*:* total score (*α* .87) and depression subscale (*α* .76).

Power Calculation

A priori power calculation using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) indicated that a sample size of at least 68 participants would be required to achieve 80% power at the $p < .05$ significance level. A medium effect size ($f^2 = 0.15$) was used, as recommended in guidelines by Cohen (1992).

Data Analysis

Data analysis was performed using the Statistical Package for Social Sciences (SPSS, v24; IBM, 2016). Preliminary checks were conducted on the data, assessing for data completion, normality of distribution and outliers. Through these checks, it was identified that four participants answered '0' to the 'number of pregnancies' question. To address this, this variable was dichotomised to 'first pregnancy: yes/ no'. Responses that were either '0' or '1' were coded as 'yes' and any responses of '2' or above were coded as 'no'. In addition, the following demographic variables were dichotomised: a) pregnancy expected/planned computed to 'pregnancy planned – yes = 0; no = 1'; b) relationship status computed to 'in a relationship: no = 0; yes = 1'. Level of education was coded as: no formal qualifications = 1; high school qualifications = 2; professional/vocational diploma = 3; A levels (or equivalent) = 4; University degree = 5.

Missing value analysis revealed that overall 1.57% of all values were missing.

Thirty-three participants (46.48%) had at least one answer missing from their questionnaire data. Little's Missing Completely at Random (MCAR) test was used to assess the pattern of the missing data (Tabachnick & Fidell, 2013). The test was non-significant, $\chi^2(1623) = 1424.62$, $p = 1.00$, which suggests the data was missing at random. In cases where participants had completed at least 60% of a measure a total scale score was calculated using the mean score of the answered questions to replace the missing data. This method is used widely in other validated measures to deal with missing data (e.g. Strengths and Difficulties Questionnaire; Goodman, 1997). This resulted in 70 participants having a scale score for each of the four variables (one participant had not completed two of the measures, and was therefore excluded from analysis).

Normality assumptions were assessed for all variables using the Kolmogorov-Smirnov statistic and visual inspection of histograms (Pallant, 2013). As the P-PRFQ and HADS were not normally distributed, a square root transformation was applied to all variables. A Mahalanobis Distance calculation identified that there were no multivariate outliers that would affect subsequent analysis (Field, 2009). Univariate outliers ($n = 5$) were changed to less extreme values by replacing the outlier score with one unit larger or smaller than the next most extreme score, depending on whether the outlier was higher or lower than the distribution (Tabachnick & Fidell, 2013).

Preliminary analyses were conducted to test the confounding effects of demographic variables on health practices and identify those that would be used as covariates in hypothesis testing. To test hypotheses one to three, Pearson's correlations analysis were performed. The final analysis used a hierarchical multiple regression to assess whether maternal RF contributes to health practices over and above the influence of AA, whilst controlling for covariates. The assumptions of multiple regression were checked (normality, linearity, multicollinearity and homeoscedasticity) and none were violated (Pallant, 2013).

The independent variables were entered in steps so that the contribution of each variable could be explored (Pallant, 2013). The confounding variables were entered into the model first. AA was then entered into the model, as there is an established link between AA and health practices in the literature (Lindgren, 2001). Finally, maternal RF was added to the model.

Results

Descriptive Statistics

The descriptive statistics for each measure are presented in Table 2.

Table 2

Mean, Standard Deviation, Range and Comparative Mean for the Study Variables

Variable	Mean *(SD)*	Range	Comparative mean *(SD)*
HPQ-II Total Score	138.58 (*12.46*)	105 - 162	138.49 (*12.42*)[1]
MAAS Total Score	82.92 (*6.63*)	64 – 95	75.5 (*9.0*)[2]
P-PRFQ Total Score	5.15 (*0.57*)	49 - 94	4.14 (*0.88*)[3]
Factor 1	4.80 (*1.16*)	10-28	3.58 (*1.49*)
Factor 2	5.41 (*0.82*)	14-35	4.47 (*1.20*)
Factor 3	5.17 (*0.86*)	16-35	4.25 (*1.04*)
HADS Total Score	9.90 (*6.40*)	0 – 27	14.10 (*6.14)*[4]
Depression subscale	3.89 (*0.38*)	0-13	6.08 (*3.10)*

Note. HADS: Hospital Anxiety and Depression Scale; HPQ-II: Health Practices Questionnaire; MAAS: Maternal Antenatal Attachment Scale; P-PRFQ: Prenatal Parental Reflective Functioning Questionnaire; P-PRFQ Factor 1: Opacity of mental states; P-PRFQ Factor 2: Reflecting on the foetus-child; P-PRFQ Factor 3: The dynamic nature of mental states. [1]Lindgren (2005); [2]Condon & Corkindale (1997); [3]Pajulo et al., (2015); [4]Karimova & Martin (2003)

Confounding Variables

The associations between the demographic variables and health practices scores were examined to identify potential confounding variables. The majority of demographic variables

assessed (i.e. maternal age, gestational age, ethnicity, relationship status) were not significantly associated with health practices. However, women who had planned their pregnancy had higher health practices scores (r_{pb} = -.276, p < .05) than those who said the pregnancy was unplanned or unexpected. Also, women with higher educational qualifications had higher health practices scores (r_{pb} = .416, p < .01). Finally, women for whom this was their first pregnancy had higher health practices scores (r_{pb} = -.330, p < .01) than women who had previously been pregnant. There was a negative correlation between depressive symptoms and health practices (r = -.42, p <.01), indicating that mothers with more depressive symptoms were less likely to engage in positive health practices. Therefore, level of education, number of pregnancies, whether the pregnancy was planned/expected, and depression were used as covariates in subsequent analysis.

Hypothesis Testing

The correlation coefficients for the associations tested in hypothesis one, two and three are presented in Table 3. Hypothesis one predicted a positive relationship between maternal RF and AA. A Pearson's correlation coefficient found a significant positive correlation between the two variables, with a medium effect size (Cohen, 1988). Hypothesis two predicted a positive relationship between AA and health practices. A Pearson's correlation coefficient found a significant positive correlation between AA and health practices, with a small to medium effect size. Hypothesis three predicted a positive relationship between maternal RF and health practices. There was no significant relationship between overall maternal RF (P-PRFQ Total score) and health practices. However, there was a significant positive relationship between 'Factor 2 - Reflecting on the foetus-child' and health practices, with a small to medium effect size.

Table 3

Correlation Coefficients Between the Study Variables

Variable	1	2	3	4	5	6	7	8
1. HPQ-II	-							
2. MAAS – Total score	.24*	-						
3. P-PRFQ – Total score	.19	.33**	-					
4. P-PRFQ - Factor 1	-.02	-.26*	.35**	-				
5. P-PRFQ - Factor 2	.27*	.56**	.74**	-.23	-			
6. P-PRFQ - Factor 3	.14	.35**	.78**	-.18	.67**	-		
7. HADS - Total	-.39**	-.20	.03	.01	-.12	.14	-	
8. HADS – Depression subscale	-.42**	-.22	.02	0.10	-.15	.08	.90**	-

Note. HADS: Hospital Anxiety and Depression Scale; HPQ-II: Health Practices Questionnaire; MAAS: Maternal Antenatal Attachment Scale; P-PRFQ: Prenatal Parental Reflective Functioning Questionnaire; P-PRFQ Factor 1: Opacity of mental states; P-PRFQ Factor 2: Reflecting on the foetus-child; P-PRFQ Factor 3: The dynamic nature of mental states. *p<.05, ** p<.01

Hypothesis four explored whether maternal RF was able to explain any more of the variance in health practices than AA, after controlling for confounding variables. A hierarchical multiple regression was performed (Table 4), resulting in three models. Step 1 consisted of level of education, planning of pregnancy, number of pregnancies and depression. These confounding variables explained 31.1% of the variance in health practices. In this model, first pregnancy and depression significantly contributed to the model. At Step 2, AA was added to the model, and the total variance explained by the model as a whole increased to 35.4%, F (5, 62) = 6.79, $p < .001$. AA therefore made a statistically significant contribution to the model, explaining an additional 4% of the variance in health practices, after controlling for the covariates (F change (1, 62) = 4.11, $p = .047$). In this model, the variables that added a statistically significant contribution were level of education, depression and AA. Maternal RF was added in the final step (Step 3), and the total variance explained by the model as a whole was 36.0%, F (6, 61) = 5.73, $p < .001$. The addition of maternal RF was not statistically significant and did not improve the model over and beyond what was explained by AA (F change (1, 61) = .639, $p = .427$). In this final model, the variables that added a statistically significant contribution were level of education and depression, whereas neither RF nor AA was significant.

Table 4

Hierarchical Multiple Regression Models For Health Practices

	β	***SE***	***p***	**R^2**	**ΔR^2**
M1				.311	-
Pregnancy planned	-.10	.14	.41		
First Pregnancy	-.23	.12	.04*		
Education	.21	.06	.11		
HADS-D	-.29	.07	.01**		
M2				.354	.043*
Pregnancy planned	-.09	.14	.55		
First Pregnancy	-.18	.12	.07		
Education	.28	.06	.03*		
HADS-D	-.24	.07	.05*		
MAAS	.19	.17	.05*		
M3				.360	.007
Pregnancy planned	-.09	.14	.46		
First Pregnancy	-.18	.12	.12		
Education	.28	.06	.04*		
HADS-D	-.24	.07	.04*		
MAAS	.19	.17	.12		
P-PRFQ	.09	.13	.43		

Note. HADS-D: Hospital Anxiety and Depression Scale: Depression subscale; MAAS: Maternal Antenatal Attachment Scale; P-PRFQ: Prenatal Parental Reflective Functioning Questionnaire. ** $p < .01$, * $p < .05$

Discussion

Health practices in pregnancy can impact the developmental trajectory of a baby, including physical and psychological outcomes (Alhusen et al., 2012). Therefore, identifying factors that improve a mother's engagement with health practices is paramount. Previous literature has suggested that antenatal attachment is associated with engagement with positive

health practices (Lindgren, 2001). Furthermore, improving maternal RF has been found to improve parental caregiving, such as responding more sensitively to their child's distress and better engagement with paediatric health checks (Rosenblum et al., 2008; Sadler at al., 2013). However, this relationship between maternal RF and parental caregiving has only been demonstrated in the postnatal literature. This study aimed to build on existing literature in antenatal attachment and health practices, and to explore whether maternal RF was associated with health practices in pregnancy.

The hypothesis that mothers with a higher maternal RF would have a stronger attachment to their baby was supported. The hypothesis that mothers who had a stronger attachment to their baby would engage in more positive health practices was also supported. There was partial support for hypothesis three, exploring the association between maternal RF and health practices. There was no significant association between overall maternal RF and health practices in pregnancy, however, the 'Factor 2 – Reflecting on the foetus-child' subscale was significantly associated with health practices in pregnancy.

The finding that the more a mother feels an emotional bond with her baby the more likely she is to take actions to improve the health of her baby supports previous research (Alhusen et al., 2012; Lindgren, 2001, 2003). The mothers in this sample scored highly for engagement with positive health practices during pregnancy, which was comparable to findings in previous research (e.g. Lindgren, 2005). In particular, high scores were found in women who had a higher level of education, were first time mothers and had planned their pregnancy, which supports previous research (Lindgren, 2001). It may be that these women are more motivated and/or able to engage in health practices as it is their first pregnancy, and this baby is something they had hoped and planned for. The mean scores for AA and maternal RF were higher than scores reported by other studies (e.g. Condon & Corkindale, 1997; Pajulo et al., 2015, respectively), whereas the depression subscale mean score was lower than the

mean score found in other studies (e.g. Karimova & Martin, 2003). This could be due to bias in the sample as a result of limitations with the recruitment strategy, which will be discussed later. These findings add to the evidence-base as many of the current studies assessing antenatal health practices using the HPQ-II have previously been conducted in the United States of America (USA), where health care is privatised. Therefore, this finding provides evidence that the relationship remains present when applying the Health Practices in Pregnancy Questionnaire - II (HPQ-II; Lindgren, 2005) within the National Health Service (NHS) in the United Kingdom, where health care is free at the point of access.

Contrary to expectations, when the total maternal RF score was used there was no significant association with health practices. Interestingly, however, when the subscales were considered separately there was a significant positive association between 'Factor 2 - Reflecting on the foetus-child' and health practices. The full description of Factor 2 is 'Considering mental states and relationship with the baby in the current moment and phase of pregnancy' (Pajulo et al., 2015). An example question from Factor 2 is, "I often wonder what the baby expects and needs from me now while I am pregnant". This suggests that this particular aspect of maternal RF, of being able to reflect on the current needs of their baby, is important for engaging with health practices that will be beneficial for the mother and the baby. The other two factors did not have a significant association with health practices. Factor 1 refers to 'Recognising the opacity of mental states', which relates to a more general maternal RF capacity, for example "I think I will always be able to predict what my baby/child will do next". Factor 3 describes 'The dynamic nature of considering mental states: showing flexibility in considering mental states in different persons and moving in time; past, present and future'. An example from Factor 3 is, "Nowadays I often think about how I felt when I was a little child". Therefore, it seems that mothers who are most able to reflect on the current

needs of their baby are more likely to engage in health practices. This may provide some preliminary findings as to the aspect of maternal RF that interventions need to focus on.

Nevertheless, the total maternal RF score was not found to be associated with health practices. This indicates that a mother's general maternal RF capacity does not affect her ability to engage in positive health practices. As the findings from the postnatal literature refer to the relationship between overall maternal RF and parental caregiving (Suchman et al., 2010; Sadler et al., 2013), this study did not replicate these findings in the antenatal period. The regression analysis subsequently found that maternal RF did not make a significant contribution to the model predicting health practices above that of AA. One explanation for this finding could be that, in contrast to the caregiving behaviours measured postnatally, health practices in pregnancy are not only concerned with caregiving towards the baby, but also to the mother herself, which may or may not be a more indirect measure of caring for the baby. However, the HPQ-II was used as it attempts to capture sensitive caregiving to the foetus, and is designed to elicit information about observable, measurable behaviours in the same way that research focused on the postnatal period attempts to elicit information about parental behaviour towards the infant. The measure is validated and commonly used to assess health practices in pregnancy (e.g. Çapik & Pasinlioğlu, 2014**)**, therefore was the most suitable measure currently available. A more likely explanation for this finding is the limitation with the measure of maternal RF, which will be discussed in more detail.

In summary, the results support existing research that a strong AA is associated with positive health practices, but there is not sufficient evidence to support the hypothesised relationship between maternal RF and health practices in pregnancy.

Strengths and Limitations

This study used a cross-sectional design as this methodology was considered the most pragmatic given the limited time and resources available for this study. However, this limits the ability to infer causality of the relationships. A strength of this study was the use of validated measures to assess the constructs, which allows for the results to be compared to previous research. The measures were selected as they were quick to administer therefore reduced participant burden. However, the measures have some limitations which may have affected the findings. Firstly, it is widely accepted that the constructs of AA and maternal RF are complex, thus more rigorous testing using semi-structured interviews would have allowed for greater exploration. However, the cost, availability and time that would be needed to be trained in this methodology mean that this option was not feasible for this study. Instead, this study utilised a newly developed quantitative measure to assess maternal RF in pregnancy (P-PRFQ: Pajulo et al., 2015). However, a major limitation was that the internal consistency found in this study (α .52) was below what would be considered 'acceptable' in the wider literature ($\alpha > 0.7$) (Pallant, 2013), and below that found in the original testing of the measure (α .77) (Pajulo et al., 2015). Furthermore, the internal consistency scores for the other measures in this study were all in the acceptable range, indicating that there was only an issue with the P-PRFQ. One explanation could be that the original measure of the P-PRFQ was developed and tested in the Finnish language, whereas this study used the English language version of the questionnaire. The low internal consistency of this English language version indicates that the questionnaire was not accurately measuring maternal RF, which may account for some of the inconclusive findings and limits the conclusions that can be made. In addition, a Finnish sample of pregnant women was used, and although the demographics of the sample appear similar (e.g. White, highly educated, first time mothers), there may be

subtle cultural differences that make the measure not transferable to the British sample used in this study.

Measuring maternal RF via self-report quantitative questionnaires is a relatively new concept and needs further development, as this was the first study to use the P-PRFQ with a UK sample. The authors of the measure acknowledge that the questions may be unfamiliar or difficult to figure out (Pajulo et al., 2015), particularly items where the optimal answer is in the middle of the Likert scale (e.g. "I will always be able to know why my baby acts the way he/she does"). Pajulo and colleagues deliberately designed the questions to be ambiguous, as the construct of RF encourages a curious stance, where 'not-knowing' is a position that would be considered a quality of high reflective capacity. However, the idea of taking a 'not-knowing' stance may feel uncomfortable, particularly for new mothers, and may come into conflict with a perceived expectation of appearing competent as a mother. A common limitation of self-report questionnaires is the risk of social desirability bias, whereby a person responds based on what they think will be viewed favourably by others (Fisher, 1993). This may be even more apparent in this study where a mother may want to appear in the best possible light, for fear of the implications if she reveals she does not feel positively towards her baby.

Secondly, the HADS was chosen to assess depressive symptoms as it does not refer to physiological symptoms (e.g. fatigue), which can often be found in pregnancy. It is also a measure that is commonly used as a routine mental health screening tool in the UK (Mykletun, Stordal, & Dahl, 2001), which aids ecological validity as it reflects its common usage in health services and can be repeatedly administered over time both pre- and postnatally. However, the mothers in this sample scored lower on depressive symptoms than in previous studies, and it has been suggested in previous research that the HADS is not a suitable measure to use with pregnant women as it lacks the internal consistency requirements in this population (Karimova

& Martin, 2003). Therefore, it may have been more appropriate to use a pregnancy-specific measure such as the Edinburgh Depression Scale (Bergink et al., 2011), as this may have more accurately captured psychological distress during this period.

Thirdly, the measure used to capture health practices in pregnancy (HPQ-II) was developed in the USA. Although certain words were anglicised to aid comprehension (e.g. fiber changed to fibre, truck changed to van), no other alterations were made as this may have affected the questionnaire's validity. There was one term, 'douching', that appeared unfamiliar to some of the participants. In addition, the question "Since becoming pregnant, I take actions that reduce my risk for getting sexually transmitted diseases [for example, I have used condoms or avoided intercourse]", was occasionally answered as "N/A" or left blank as it did not apply to a majority of the participants in a stable relationship. Further development of this measure and validation within a UK population would help to address this problem.

Finally, one of the pregnancy-related questions on the demographic questionnaire could have been phrased more clearly, as it is apparent from the responses that the meaning may have been misinterpreted. For example, four people answered "0" to "How many times have you been pregnant?", indicating that they had not included their current pregnancy within their answer. As first pregnancy was a confounding variable in this study, it is possible that categorising certain participants as 'first-time' could have been inaccurate. Therefore, conducting a small pilot study prior to undertaking the full study may have identified these problems and allowed for refinement of the questions.

Further limitations may lie in the recruitment strategy. Firstly, a convenience sampling method was used which is subject to bias. As attending antenatal appointments is considered a health practice itself, recruiting within antenatal clinics may have meant that women who were approached to participate in the study were already more inclined to engage in health practices. Furthermore, of those who were approached, it may be that those who chose to

participate in the research were more likely to engage in more positive health practices. However, careful consideration was taken during the study design involving consultation with the lead midwives about the recruitment options. It was decided that recruitment within community antenatal clinics was most appropriate as these appointments are offered to all women during pregnancy, allowing access to a broader range of women with differing histories and demographics. Online recruitment was also utilised in order to widen access to potential participants. Furthermore, given the exploratory nature of the study and the use of new measures, it was deemed appropriate to access a diverse participant group at this stage, rather than target a potentially more biased sample (e.g. National Childbirth Trust (NCT) antenatal classes). Although the sites chosen for recruitment were selected to have a varied SES, several demographics of the participants were not equivalent to figures reported by the Office for National Statistics (2011). For example, in this sample the ethnicity was predominately White (95.8% *v.* 86% nationally), employed (80.3% *v.* 70% nationally), and from a higher education level (66.2% *v.* 39% nationally). Therefore, the sample may not be representative of the general population in the UK and cannot be generalised. Pajulo and colleagues (Pajulo et al., 2015) reported a greater drop-out rate from women with lower education levels, higher depressive symptoms and more previous pregnancies, which may reflect a difficulty in recruiting mothers with these demographics. Previous research highlights a common difficulty engaging people from a lower SES in research (Braveman et al., 2005). As this group tend to have greater exposure to psychosocial risk factors (Hudson, 2005), it is important that researchers continue attempts to engage these populations in research so that findings can be more widely generalised.

Clinical Implications

The finding that a stronger AA was associated with engagement with more positive health practices implies that mothers with a poor AA may be at risk of poor engagement with recommended health practices. Therefore, identifying mothers most at need of additional support and providing intervention as early as possible is important for future outcomes of the baby. Over recent years, there has been increased recognition for services to focus on the attachment between mother and baby, as highlighted in the '*1001 Critical Days'* cross-party manifesto (Leadsom, Field, Burstow, & Lucas, 2013). Due to the complexity of attachment, these services should be led by skilled, appropriately trained professionals, such as clinical psychologists. Clinical psychologists are well placed to provide training and supervision to other professionals, such as midwives, health visitors and Children's Centre workers as these professionals tend to see mothers at multiple points during and after their pregnancy and therefore play a key role in identifying mothers most in need of additional support. For more complex cases, such as mothers with a history of trauma, clinical psychologists are equipped to provide comprehensive assessment, formulation and intervention for mothers who display significant difficulties in forming an attachment to their baby. A weak AA may be serving as a function of self-protection as it may not feel safe for a mother to become too emotionally attached to her baby, for example, if there are complications with the baby or if she has a history of miscarriage (Bicking Kinsey, Baptiste-Roberts, Zhu, & Kjerulff, 2015). Therefore, these interventions need to be approached with caution and led by highly trained professionals with an understanding of both individual and systemic ways of working. Furthermore, clinical psychologists could use their skills in research, service evaluation and funding applications to develop services that meet the needs of these mothers.

Although most participants in this study did not meet the threshold for clinical caseness for depression, some scored in the mild to moderate clinical range. It is not known

whether these women were accessing psychological support for these issues since that information was not requested. Nonetheless, it highlights the need for screening of mental health difficulties in pregnancy, as recommended by National Institute for Clinical Health and Excellence (NICE, 2014). These guidelines suggest that screening should take place during routine antenatal appointments at various time-points throughout pregnancy, and support offered early where necessary. Perinatal mental health difficulties often go undetected, as the emphasis has historically been on the physical health of baby and mother during pregnancy (Bowen & Muhajarine, 2006). Furthermore, emotional complaints can be misattributed to hormonal changes occurring naturally during pregnancy, or women may conceal their difficulties due to the stigma associated with depression (Marcus, 2009). More recently, perinatal mental health has been an area identified as requiring additional funding according to the *Five Year Forward View* publication (NHS England, 2014, 2017). From this, 20 new or expanded specialist perinatal mental health teams, and four new Mother and Baby units have/are being developed nationally (NHS England, 2016), which is expected to provide evidence-based treatment to 30,000 more women each year by 2020/21.

Future Research

Firstly, given the limitations with the P-PRFQ identified in this study, further work needs to be done to increase the validity of this measure in the UK population. As it stands, this measure was not able to accurately measure maternal RF in the sample used in this study, as indicated by a low internal consistency, and therefore the conclusions made in relation to these findings are compromised. Once the internal consistency has improved the P-PRFQ has the potential to be a useful tool for assessing maternal RF in clinical practice. Secondly, in order to establish the causality of the relationships found in this study it is important to conduct longitudinal studies. For example, although it could be hypothesised that as a mother

feels more attached to her baby the more likely she is to engage in health practices, it could be the converse relationship in that through engaging in health practices she becomes more attached to her baby. Therefore, exploring the relationship between AA and health practices at different time points would be important to identify the best time for intervention. Given the need to identify women in need of intervention as early as possible, it may have been preferable to recruit women in their first or second trimester. However, this may be more problematic for measuring maternal RF as the P-PRFQ was developed with women during their third trimester and hence may not be sensitive enough to assess maternal RF earlier in pregnancy (Pajulo et al., 2015). Finally, using a sample with greater diversity would enable findings to be more widely generalised. Recruiting a broader demographic, particularly in relation to ethnicity and SES, is important as level of education was associated with health practices. Furthermore, due to its exploratory nature, this study recruited women with a low-risk pregnancy. However, recruiting mothers who are considered a high-risk pregnancy would help to identify whether the findings still apply. In particular, it is recognised in the literature that maternal RF capacity can fluctuate naturally under times of stress (Slade, 2005). Therefore, identifying mothers experiencing high levels of stress, either due to her pregnancy or to external circumstances, would help to identify those in need of additional support to mentalise about the needs of their baby. In addition, including fathers in perinatal mental health research is important, as it takes into account the parental unit as a whole and could identify additional areas for intervention.

Conclusion

In summary, the results suggest that a mother's emotional attachment to her baby during pregnancy is associated with her engagement with recommended health practices. The capacity to be reflective about her baby is associated with the strength of her attachment,

which contributes to the growing evidence base for the importance of exploring and understanding the interplay between attachment and RF in the antenatal period. Although overall maternal RF did not appear to influence health practices, 'Factor 2 - Reflecting on the foetus-child' subscale was associated with health practices. However, the findings in this study are compromised due to the lack of adequate internal consistency of the measure of maternal RF (the P-PRFQ). The validity and test-retest reliability of the P-PRFQ in a UK population needs to be established in order for the measure to be more widely used. More research in this area would be beneficial to explore this relationship further, using a more valid measure of maternal RF and a larger, more diverse sample of parents. The development of a strong attachment between a mother and her baby, formed antenatally and continued postnatally, is considered to be an integral factor influencing long-term outcomes for the child (Alhusen, 2008). Given the importance of early intervention and prevention, continued exploration and understanding of the relationships between attachment, RF, health practices and mental health in the antenatal period is warranted.

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Appendices

Appendix A

Author Guidelines for the Infant Mental Health Journal

Author Guidelines

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.

MANUSCRIPTS for submission to the *Infant Mental Health Journal* should be forwarded to the Editor as follows:

1. Go to your Internet browser (e.g., Netscape, Internet Explorer).
2. Go to the URL http://mc.manuscriptcentral.com/imhj
3. Register (if you have not done so already).
4. Go to the Author Center and follow the instructions to submit your paper.
5. Please upload the following as separate documents: the title page (with identifying information) and all remaining files without any identifying information, including the body of your manuscript, and each table and figure. Please note that the cover letter is uploaded directly into a field in the on-line submission platform.
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.

7. Your abstract should be uploaded into the appropriate field at the submission website and should also be included in the main text of the manuscript. The abstract in the manuscript must include 3-5 key words listed at the end of the text.
8. Please note that this journal's workflow is double-blinded. Authors must prepare and submit files for the body of the manuscript and any accompanying files that are anonymous for review (containing no name or institutional information that may reveal author identity).
9. All related files will be concatenated automatically into a single .PDF file by the system during upload. This is the file that will be used for review. Please scan your files for viruses before you send them, and keep a copy of what you send in a safe place in case any of the files need to be replaced.
10. Style must conform to that described by the American Psychological Association *Publication Manual* , Sixth Edition, 2009 (American Psychological Association, 750 First Street, N.E., Washington, D.C. 20002-4242). Authors are responsible for final preparation of manuscripts to conform to the APA style.

Manuscripts generally do not exceed 10,000 words and will be assigned for peer review by the Editor or Associate Editor(s) and reviewed by members of the Editorial Board and invited reviewers with special knowledge of the topic addressed in the manuscript. The Editor retains the right to reject articles that do not meet conventional clinical or scientific ethical standards. Normally, the review process is completed in 3 months. Nearly all manuscripts accepted for publication require some degree of revision. There is no charge for publication of papers in the *Infant Mental Health Journal*. The publisher may levy additional charges for changes in proofs other than correction of printer's errors. Authors have the option to participate in Wiley's OnlineOpen program which allows authors of primary research articles to make their article available to non-subscribers on publication and archive the final version of their article. With OnlineOpen, the author, the author's funding agency, or the author's institution pays a fee to ensure that the article is made available to non-subscribers upon publication via Wiley Online Library, as well as deposited in the funding agency's preferred archive. For more information, please visit the OnlineOpen page. Proofs will be sent to the corresponding author and must be read carefully because final responsibility for accuracy rests with the author(s). Author(s) must return corrected proofs to the publisher in a timely manner. If the publisher does not receive corrected proofs from the author(s), publication will still proceed as scheduled.
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

Review Protocol

A Systematic Review of the Relationship Between Maternal Reflective Functioning and Parenting Behaviour

Research question
What is the relationship between maternal reflective functioning and parenting behaviours?

Background and Aims:
Maternal reflective functioning is the ability of a mother be reflective about her child, to hold both her own and her child's "mind in mind" in terms of internal mental states, such as feelings, desires and intentions (Fonagy & Target, 2005).. This process allows a mother to understand and respond to her child's emotions and behaviour appropriately (Fonagy, Steele, Moran, Steele, & Higgitt, 1991). The aim of this review is to assess the quality of the research focused on the relationship between maternal reflective functioning and parenting behaviours.

Search strategy

The following databases will be used to perform the searches: PsychINFO, SCOPUS, MEDLINE, CINAHL Plus. There will be no restrictions on the publication period.

The following search items will be used:

"reflective function*" OR mentaliz* OR mentalis* OR "reflective capacity"

AND

mother OR maternal* OR car* OR parent

AND

bab* OR infan* OR child* OR toddler OR famil* OR boy OR girl OR daughter OR son

AND

behav* OR parent*

Eligibility criteria

Inclusion criteria
The review will include quantitative studies meeting the following inclusion criteria:
1) The study reports on reflective functioning in relation to mothers;
2) The study reports on maternal parenting using a range of assessment methods (e.g. self-report questionnaires, interviews, observations);

Exclusion criteria
The review will not include studies if :

1) Reflective functioning does not relate to the parent-child relationship;
2) It is not possible to separate out the data of mothers from other parent/caregivers (e.g. adoptive/foster carers/surrogate/fathers);
3) They are expert opinion commentaries or individual case studies;
4) Where there is no full text available;
5) They are not published in English

Outcome(s)
The primary outcome is to establish the impact of reflective functioning on parenting behaviour

Data selection
Search results will be exported into a reference management program. An initial screening stage will be performed to remove duplicates. Next, the titles and abstracts of all studies will be screened against the inclusion/exclusion criteria. Full text copies will be obtained for all remaining articles which will be read in full and screened against the inclusion/exclusion criteria.

Quality assessment
All included papers will be assessed using a risk of bias assessment tool to determine the quality of the study - the Quality Assessment Tool for Studies with Diverse Designs (QATSDD; Sirriyeh, Lawton, Gardner, & Armitage, 2012). This stage will be conducted by two researchers. Any disagreements or uncertainties will be discussed to come to a consensus, and a third researcher will be consulted if consensus cannot be met. Authors of papers will be contacted where possible if there is any missing or unclear data.

Data synthesis
The data from the included papers will be summarized within a table and a narrative synthesis will be used to describe the findings. The data extraction procedure will be performed by the lead researcher, but will be checked for accuracy by a second reviewer. Any disagreement or uncertainty will be dealt with in the same way as before.

Conflict of Interest
None.

Sources of Financing
The research is being undertaken as part fulfilment of the Doctorate in Clinical Psychology training programme and is funded by the University of Liverpool.

Appendix C

Quality Assessment - QATSDD

Author(s), (year), country	Explicit theoretical framework	Statement of aims/objective in main body of report	Clear description of research setting	Evidence of sample size considered in terms of analysis	Representative sample of target group of a reasonable size	Description of procedure for data collection	Rationale for choice of data collection tool(s)	Detailed recruitment data	Statistical assessment of reliability and validity of measurement tool(s)	Fit between research question and method of data collection	Fit between research question and method of analysis	Good justification for analytical method selected	Evidence of user involvement in design	Strengths and limitations critically discussed	Total
Alvarez- Monjarás et al. (2017)	3	3	2	1	2	2	3	2	3	3	3	3	0	3	**33**
Grienenberger et al. (2005)	3	3	1	0	2	2	2	0	2	3	3	1	0	2	**24**
Möller et al. (2017)	3	3	1	0	2	3	2	0	3	2	3	1	0	2	**25**
Pajulo et al. (2008)	3	3	3	0	1	2	1	2	1	3	2	0	0	1	**22**
Pajulo et al. (2012)	3	3	3	0	2	3	2	2	3	3	3	2	0	2	**31**
Perry et al. (2015)	2	3	3	0	1	3	3	3	1	3	2	1	0	3	**28**
Rosenblum et al. (2008)	2	3	1	0	3	3	3	2	2	3	3	1	0	1	**27**
Rutherford et al. (2013)	3	3	1	0	2	2	3	0	1	3	3	3	0	2	**26**
Rutherford et al. (2015)	3	3	1	0	3	2	2	0	1	3	3	1	0	3	**25**
Schechter et al. (2008)	3	3	3	0	2	3	3	3	2	3	3	3	0	3	**34**
Sleed et al. (2013)	3	2	3	0	3	3	3	3	3	3	3	3	0	3	**35**
Smaling et al. (2016)	3	3	3	0	2	3	3	3	3	3	3	3	0	3	**35**
Smaling et al. (2017)	3	3	3	0	3	3	3	3	3	3	3	3	0	3	**36**
Stacks et al. (2014)	3	3	3	0	3	3	3	3	3	3	3	3	0	2	**35**
Suchman et al. (2008)	3	3	3	0	1	3	3	3	3	3	3	3	0	2	**33**
Suchman et al. (2010a)	3	2	3	0	2	3	3	1	1	3	3	2	0	2	**28**
Suchman et al. (2010b)	3	3	3	0	2	3	3	1	1	3	3	2	0	3	**30**
Suchman et al. (2018)	3	3	2	0	3	2	2	2	2	2	3	3	0	3	**30**

Appendix D

Author Guidelines for the Journal of Prenatal and Perinatal Psychology and Health

Guidelines for Contributing Authors Manuscripts

The Journal of Prenatal and Perinatal Psychology and Health accepts only original material that is not under consideration by any other publications. Articles should be word-processed and transmitted electronically to the Editor. The Editor reserves the right to edit manuscripts for length, clarity, and conformity with the journal's style. The author should retain his/her copy. American spelling should be used. The paper should be between 2,000 and 8,000 words with a 100–word abstract and at least three keywords. (See further guidelines for submitting a manuscript in the current APA Publication Manual (2009), specifically, "Author Responsibilities" (pp. 228-231)

The journal is interested in publishing theoretical and empirical articles utilizing data gained from clinical work, experimental research, case studies, and self-report.

Among the areas of special interest are:

- Psychological factors that affect conception, pregnancy, labor, delivery and the post-partum period;
- The reciprocal mechanisms of interaction between the pregnant mother and her unborn and sentient child and the mother and her newborn;
- The influence of the family, society, and the environment on the pregnant mother and her unborn child;
- Evidence-based measures that will improve the emotional well-being of mothers, fathers, and newborns;
- The psychological effects of medical technology during conception, pregnancy, labor, and delivery on all parties concerned;
- Methods of prevention and intervention/resolution of prenatal and perinatal traumas with children and adults;
- Interfaces between prenatal and perinatal psychology and medicine, genetics, developmental psychology, anthropology, ethics, and the law.

Illustrations, Figures and Tables

- All illustrations and tables should be included separately from the manuscript (in a separate document) and should be clearly identified in Arabic numerals, showing which is the top of the illustration if this is not obvious. Legends for illustrations, which should

be referred to as “Figures,” should also be included with the figures. Tables must supplement the text without duplicating it. They should include an appropriate title.

- Lettering within an illustration, figure or table should be no smaller than 8 points and no larger than 10 points, and prepared at a resolution sufficient to produce a high-quality image, that is, using computer-generated, professional-level graphic software.
- Illustrations should either be black-and-white glossy photographs or India ink drawings. Color illustrations will only be shown on the digital version. They will be converted to black and white in the print version

APA Style

- Formatting and referencing must follow APA style. References should be limited to work cited in the article, rather than being a bibliography of the topic.

American Psychological Association (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

Email submissions to: journal.editor@birthpsychology.com

Note. For the purposes of this thesis, English spelling was used and figures and tables were embedded into the text, as recommended by the DClin Research Handbook.

Appendix E

Ethical Approval

NHS
Health Research Authority

[redacted]

Email: hra.approval@nhs.net

20 October 2016

Dear [redacted]

Letter of HRA Approval

Study title:	**Healthcare behaviours in pregnancy: Investigating the impact of maternal reflective functioning on engagement with antenatal healthcare behaviours**
IRAS project ID:	**195097**
Protocol number:	**UoL001188**
REC reference:	**16/NW/0413**
Sponsor	**University of Liverpool**

I am pleased to confirm that **HRA Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

Appendix B provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. **Please read *Appendix B* carefully**, in particular the following sections:

- *Participating NHS organisations in England* – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities
- *Confirmation of capacity and capability* - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.

IRAS project ID	195097

- *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.

It is critical that you involve both the research management function (e.g. R&D office) supporting each organisation and the local research team (where there is one) in setting up your study. Contact details and further information about working with the research management function for each organisation can be accessed from www.hra.nhs.uk/hra-approval.

Appendices

The HRA Approval letter contains the following appendices:

- A – List of documents reviewed during HRA assessment
- B – Summary of HRA assessment

After HRA Approval

The document *"After Ethical Review – guidance for sponsors and investigators"*, issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

In addition to the guidance in the above, please note the following:

- HRA Approval applies for the duration of your REC favourable opinion, unless otherwise notified in writing by the HRA.
- Substantial amendments should be submitted directly to the Research Ethics Committee, as detailed in the *After Ethical Review* document. Non-substantial amendments should be submitted for review by the HRA using the form provided on the HRA website, and emailed to hra.amendments@nhs.net.
- The HRA will categorise amendments (substantial and non-substantial) and issue confirmation of continued HRA Approval. Further details can be found on the HRA website.

Scope

HRA Approval provides an approval for research involving patients or staff in NHS organisations in England.

If your study involves NHS organisations in other countries in the UK, please contact the relevant national coordinating functions for support and advice. Further information can be found at http://www.hra.nhs.uk/resources/applying-for-reviews/nhs-hsc-rd-review/.

IRAS project ID	195097

If there are participating non-NHS organisations, local agreement should be obtained in accordance with the procedures of the local participating non-NHS organisation.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please email the HRA at hra.approval@nhs.net. Additionally, one of our staff would be happy to call and discuss your experience of HRA Approval.

HRA Training

We are pleased to welcome researchers and research management staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

Your IRAS project ID is **195097**. Please quote this on all correspondence.

Yours sincerely,

Emma Stoica
Senior Assessor Name

Email: hra.approval@nhs.net

Copy to:

Mr Alex Astor, sponsor contact: sponsor@liverpool.ac.uk
Ms Louise Hardman, lead NHS R&D contact: louise.hardman@lwh.nhs.uk

IRAS project ID	195097

Appendix A - List of Documents

The final document set assessed and approved by HRA Approval is listed below.

Document	*Version*	*Date*
Copies of advertisement materials for research participants [Study poster v2]	2.0	01 July 2016
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only)		02 August 2016
IRAS Application Form [IRAS_Form_03052016]		03 May 2016
Letter from sponsor [Sponsorship approval letter]	1.0	11 April 2016
Notice of Minor Amendment		
Other [demographic information]	3	9 September 2016
Research proposal	4	04 August 2016
Other [Schedule of Events]	1.0	27 April 2016
Other [Statement of Activities]	1.0	27 April 2016
Participant consent form [Consent form v2]	2.0	01 July 2016
Participant information sheet (PIS) [Sources of support sheet]	1.0	22 May 2016
Participant information sheet (PIS) [Participant Information Sheet v2]	2.0	01 July 2016
Referee's report or other scientific critique report [RRC Approval]	3	03 February 2016
Summary CV for Chief Investigator (CI) [Chief Investigator CV]	1.0	27 October 2015
Summary CV for student [Elizabeth Bickford-Smith CV]	1.0	23 May 2016
Validated questionnaire [HPQ-II]	1.0	21 April 2016
Validated questionnaire [MAAS]	1.0	21 April 2016
Validated questionnaire [P-PRFQ]	1.0	21 April 2016
Validated questionnaire [HADS]	1.0	21 April 2016
Validated questionnaire [HPQ-II v2]	2.0	01 July 2016

IRAS project ID	195097

Appendix B - Summary of HRA Assessment

This appendix provides assurance to you, the sponsor and the NHS in England that the study, as reviewed for HRA Approval, is compliant with relevant standards. It also provides information and clarification, where appropriate, to participating NHS organisations in England to assist in assessing and arranging capacity and capability.

For information on how the sponsor should be working with participating NHS organisations in England, please refer to the, *participating NHS organisations, capacity and capability* and *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* sections in this appendix.

The following person is the sponsor contact for the purpose of addressing participating organisation questions relating to the study:

Name: Mr Alex Astor
Tel: 01517948739
Email: sponsor@liverpool.ac.uk

HRA assessment criteria

Section	HRA Assessment Criteria	Compliant with Standards	Comments
1.1	IRAS application completed correctly	Yes	No comments
2.1	Participant information/consent documents and consent process	Yes	No comments
3.1	Protocol assessment	Yes	No comments
4.1	Allocation of responsibilities and rights are agreed and documented	Yes	A statement of Activities will form the agreement of the NHS organisation to participate.
4.2	Insurance/indemnity arrangements assessed	Yes	Where applicable, independent contractors (e.g. General Practitioners) should ensure that the professional indemnity provided by their medical defence organisation covers the activities expected of them for this

IRAS project ID	195097

Section	HRA Assessment Criteria	Compliant with Standards	Comments
			research study
4.3	Financial arrangements assessed	Yes	No application for external funding will be made. The sponsor will not provide any funding to the participating NHS organisation.
5.1	Compliance with the Data Protection Act and data security issues assessed	Yes	No comments
5.2	CTIMPS – Arrangements for compliance with the Clinical Trials Regulations assessed	Not Applicable	No comments
5.3	Compliance with any applicable laws or regulations	Yes	No comments
6.1	NHS Research Ethics Committee favourable opinion received for applicable studies	Yes	No comments
6.2	CTIMPS – Clinical Trials Authorisation (CTA) letter received	Not Applicable	No comments
6.3	Devices – MHRA notice of no objection received	Not Applicable	No comments
6.4	Other regulatory approvals and authorisations received	Not Applicable	No comments

Participating NHS Organisations in England

This provides detail on the types of participating NHS organisations in the study and a statement as to whether the activities at all organisations are the same or different.
There is one site-type of organisation participating in the study, and one site (Liverpool Women's NHS Foundation Trust). An amendment has been submitted following the initial application for REC and HRA approval to add GP practices and Children's Centres as research sites. The applicant clarified that, although these sites are under the Liverpool CCG, the clinics where the participants are recruited are run by the

IRAS project ID	195097

Liverpool Women's NHS Foundation Trust. As such the trust will have the duty of care for the participants and will therefore be the only participating NHS organisation.

The research activities undertaken are described in the Schedule of Events and Statement of Activities.

The Chief Investigator or sponsor should share relevant study documents with participating NHS organisations in England in order to put arrangements in place to deliver the study. The documents should be sent to both the local study team, where applicable, and the office providing the research management function at the participating organisation. For NIHR CRN Portfolio studies, the Local LCRN contact should also be copied into this correspondence. For further guidance on working with participating NHS organisations please see the HRA website.

If chief investigators, sponsors or principal investigators are asked to complete site level forms for participating NHS organisations in England which are not provided in IRAS or on the HRA website, the chief investigator, sponsor or principal investigator should notify the HRA immediately at hra.approval@nhs.net. The HRA will work with these organisations to achieve a consistent approach to information provision.

Confirmation of Capacity and Capability

This describes whether formal confirmation of capacity and capability is expected from participating NHS organisations in England.

The participating NHS organisation in England **will be expected to formally confirm their capacity and capability to host this research**.

- Following issue of this letter, participating NHS organisations in England may now confirm to the sponsor their capacity and capability to host this research, when ready to do so. How capacity and capacity will be confirmed is detailed in the *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* section of this appendix.
- The Assessing, Arranging, and Confirming document on the HRA website provides further information for the sponsor and NHS organisations on assessing, arranging and confirming capacity and capability.

Principal Investigator Suitability

This confirms whether the sponsor position on whether a PI, LC or neither should be in place is correct for each type of participating NHS organisation in England and the minimum expectations for education, training and experience that PIs should meet (where applicable).

A Principal Investigator has been identified and listed in IRAS form Part C.

GCP training is not a generic training expectation, in line with the HRA statement on training expectations.

IRAS project ID	195097

HR Good Practice Resource Pack Expectations

This confirms the HR Good Practice Resource Pack expectations for the study and the pre-engagement checks that should and should not be undertaken
Where arrangements are not already in place, staff undertaking research activities would be expected to obtain Letters of Access on the basis of a Research Passport (if university employed) or an NHS to NHS confirmation of pre-engagement checks letter (if NHS employed). Standard DBS checks and occupational health clearance would be appropriate.

Other Information to Aid Study Set-up

This details any other information that may be helpful to sponsors and participating NHS organisations in England to aid study set-up.
• The applicant has indicated that they do not intend to apply for inclusion on the NIHR CRN Portfolio. • It will be expected that a private room will be available within each site where clinics are held in order to provide privacy for participants when completing the study.

UNIVERSITY OF LIVERPOOL

[redacted]

Mr Alex Astor
Head of Research Support – Health and Life Sciences

University of Liverpool
Research Support Office
2nd Floor Block D Waterhouse Building
3 Brownlow Street
Liverpool
L69 3GL

Tel: 0151 794 8739
Email: sponsor@liv.ac.uk

26 October 2016

Sponsor Ref: UoL001188

Re: Sponsor Permission to Proceed notification

"Maternal Reflective Functioning: The impact on antenatal healthcare practices of pregnant women"

Dear [redacted]

All necessary documentation and regulatory approvals have now been received by the University of Liverpool Research Support Office in its capacity as Sponsor, and we are satisfied that all Clinical Research Governance requirements have been met. You may now proceed with any study specific procedures to open the study.

The following REC Approved documents have been received by the Research Support Office. Only these documents can be used in the recruitment of participants. If any amendments are required please contact the Research Support Office.

Document title	Version	Date
Protocol	3	2nd February 2016
Study poster	2	1st July 2016
Demographic questionnaire	2	1st July 2016
Consent Form	2	1st July 2016
Sources of Support Sheet	1	22nd May 2016
Participant Information Sheet	2	1st July 2016
MAAS (Questionnaire)	1	21st April 2016
P-PRFQ (Questionnaire)	1	21st April 2016
HADS (Questionnaire)	1	21st April 2016
HPQ-II (Questionnaire)	2	1st July 2016

Please note, under the terms of your Sponsorship you must;

1. Gain NHS Confirmation of Capacity and Capability from each participating site before recruitment begins at that site;

2. Ensure all required contracts are fully executed before recruitment begins at any site;

3. Inform the Research Support Office as soon as possible of any adverse events especially SUSARs and SAE's, Serious Breaches to protocol or relevant legislation or any concerns regarding research conduct;

4. Approval must be gained from the Research Support Office for any amendments to, or changes of status in the study **prior to** submission to REC and any other regulatory authorities;

5. It is a requirement that Annual Progress Reports are sent to the NHS Research Ethics Committee (REC) annually following the date of Favourable Ethical Approval. You must provide copies of any reports submitted to REC and other regulatory authorities to the Research Support Office

6. Maintain the study master file;

7. Make available for review any study documentation when requested by the sponsors and regulatory authorities for the purposes of audit or inspection;

8. Upon the completion of the study it is a requirement to submit an End of Study Declaration (within 90 days of the end of the study) and End of Study Report to REC (within 12 months of the end of the study). You must provide copies of this to the Research Support Office;

9. Ensure you and your study team are up to date with the current RSO SOPs throughout the duration of the study.

If you have any queries regarding the sponsorship of the study please do not hesitate to contact the Clinical Research Governance Team on 0151 794 8373 (email sponsor@liv.ac.uk).

Yours sincerely

pp Karen Wilding
Mr Alex Astor
Head of Research Support – Health and Life Sciences
Research Support Office

Appendix F

Participant Information Sheet

PARTICIPANT INFORMATION SHEET

Health Related Behaviours in Pregnancy

We invite you to take part in a research study

- This study is looking at whether your relationship with your baby influences your engagement with health related behaviours during pregnancy.
- You must be in your third trimester (28-36 weeks) to participate in this study.
- Before you decide whether to take part, it is important for you to understand what it will involve.

Important things you need to know

- You will be asked to complete a set of questionnaires that will be related to your mood, your relationship with your baby and your lifestyle. This should take around 30-40 minutes to complete.
- Your answers on the questionnaires will be kept confidential and will not be shared with health professionals involved in your care. However, if you disclose information that indicates a potential risk to yourself or others the researcher will be required to inform your midwife, which will be done with your consent where possible.
- Taking part in this study is voluntary - you can stop taking part at any time without having to give any reason.
- The questionnaires will be anonymised so that you cannot be identified when the data is being analysed. The data will be stored securely in accordance with Data Management policies at the University of Liverpool.
- This is a research study and you will not personally benefit from taking part in the study.
- This study has been granted ethical approval by the NHS Research Ethics Committee.

How to contact us

If there is anything in the above information that is not clear or if you would like more information, please contact the researcher:

[redacted]

This study is being conducted as part of a Doctoral thesis in Clinical Psychology at the University of Liverpool under the supervision of [redacted]

Appendix G

Consent Form

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CONSENT FORM

Health Related Behaviours in Pregnancy

Initial boxes

1. I confirm that I have read the information sheet (version 2.0) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. ☐

3. I understand that data collected during the study will be kept anonymously and stored securely under Data Management policies within the University of Liverpool. ☐

4. I understand that my questionnaire answers will remain confidential. However, if I inform the researcher of any information that raises concern of risk of harm to myself or risk of harm to others, including my baby, the researcher will discuss this with me where possible and inform my midwife of the concerns. ☐

5. I wish to receive a written summary of the results following the completion of the study ☐

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

Name of Participant	Date	Signature
Name of Researcher	Date	Signature

If you have requested to receive a written summary of the results following the completion of the study, please provide your email/postal address:

_____

Appendix H

Measures

DEMOGRAPHIC INFORMATION

Please answer the following questions related to demographic information and general questions about your pregnancy:

1. What age are you? …….

2. What is your ethnic group? Choose one option that best describes your ethnic group or background:

White
- ☐ English/Welsh/British/Scottish/Northern Irish
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Any other White background……..

Mixed/Multiple ethnic groups
- ☐ White and Black Caribbean
- ☐ White and Black African
- ☐ White and Asian
- ☐ Any other Mixed/multiple ethnic background

Asian/ Asian British
- ☐ Indian
- ☐ Pakistani
- ☐ Bangladeshi
- ☐ Chinese
- ☐ Any other Asian background…….

Black/ African/ Caribbean/ Black British
- ☐ African
- ☐ Caribbean
- ☐ Any other Black/ African/ Caribbean background…….

Other ethnic group
- ☐ Arab
- ☐ Any other ethnic group, please describe……..

3. What is your relationship status?
- ☐ Single
- ☐ In a relationship
- ☐ Married or civil partnership
- ☐ Widowed
- ☐ Divorced
- ☐ Other (please state) ……..

4. What is your employment status?
- ☐ Paid or self-employment
- ☐ Voluntary employment
- ☐ Unemployed
- ☐ Housewife/husband
- ☐ Student
- ☐ Long term sick or disabled
- ☐ Other …….

5. What your highest educational qualification?
   - ☐ No formal qualifications
   - ☐ High school qualification
   - ☐ Professional/vocational diploma
   - ☐ A-Levels (or equivalent)
   - ☐ University degree
   - ☐ Other (please state) ……..

Your pregnancy

6. How many weeks gestation are you currently? ……

7. How many times have you been pregnant? ……

8. How many of your pregnancies reached full term? ……

9. Was this pregnancy expected/planned? ……..

UNIVERSITY OF LIVERPOOL

HEALTH PRACTICES QUESTIONNAIRE (HPQ-II)

Circle the one answer that best describes your actions since you found out you were pregnant. I know that sometimes you are prevented from doing things the way you planned because of, for example, illness, nausea, or medical necessity. If these special circumstances apply to you, answer questions by thinking about what you did before the problem occurred that required you to change your actions.

1. Since becoming pregnant, I think I am practicing a healthy lifestyle:	never	rarely	sometimes	often	always
2. Since becoming pregnant, I have gotten at least 7 to 8 total hours of sleep a night:	never	rarely	sometimes	often	always
3. Since becoming pregnant, I have exercised regularly (for at least 20 minutes a day, at least 3 times a week):	never	rarely	sometimes	often	always
4. Since becoming pregnant, I have used seatbelts, when available, when driving in a car or van:	never	rarely	sometimes	often	always
5. Since becoming pregnant, I drink more than 2 caffeinated beverages (e.g. coffee, tea, Coca-Cola) in a day:	never	rarely	sometimes	often	always
6. Since becoming pregnant, I have used marijuana:	never	rarely	sometimes	often	always
7. Since becoming pregnant, I have used cocaine, crack cocaine, amphetamines or speed, LSD, heroin, or inhalants:	never	rarely	sometimes	often	always
8. Since becoming pregnant, my partner and/or I have had sex with other people:	never	rarely	sometimes	often	always
9. Since becoming pregnant, I take actions that reduce my risk for getting sexually transmitted diseases (for example, I have used condoms or avoided intercourse):	never	rarely	sometimes	often	always
10. When I have concerns about my health or the health of my baby I report them to my doctor or midwife:	never	rarely	sometimes	often	always
11. When I have questions about my pregnancy or there is something I don't understand I ask my doctor or midwife:	never	rarely	sometimes	often	always
12. Since becoming pregnant, I have taken herbal remedies other than those recommended to me by my doctor or midwife:	never	rarely	sometimes	often	always

13. Since becoming pregnant, I have read food labels to be sure I am buying an item that will be good for me and my baby (for example, not too high in salt or fat, avoiding artificial sweeteners, and good sources of vitamins): never rarely sometimes often always

14. Since becoming pregnant, I have douched: never rarely sometimes often always

15. Since becoming pregnant, I have avoided bathing or sitting in water that exceeds 100 degrees F: never rarely sometimes often always

16. Since becoming pregnant, I have limited or avoided exposure to toxic chemicals and other substances (for example, second-hand smoke, insecticides / pesticides, lead in drinking water): never rarely sometimes often always

17. Since becoming pregnant, I talk to my doctor or midwife before taking any medication or supplement: never rarely sometimes often always

18. Since becoming pregnant, I have taken my multivitamins or prenatal vitamins (if recommended by your doctor or midwife):
- ☐ never
- ☐ 1 to 2 times a week
- ☐ 3 to 4 times a week
- ☐ 5 to 6 times a week
- ☐ daily or not recommended

19. Since becoming pregnant, I take in adequate calcium (1200 mg/day), by eating dairy products or other calcium-rich foods, or taking supplements:
- ☐ never
- ☐ 1 to 2 times a week
- ☐ 3 to 4 times a week
- ☐ 5 to 6 times a week
- ☐ daily

20. Since becoming pregnant, I have eaten 5 servings of fruits and/or vegetables in a day:
- ☐ never
- ☐ 1 to 2 times a week
- ☐ 3 to 4 times a week
- ☐ 5 to 6 times a week
- ☐ daily

21. Since becoming pregnant, I have eaten enough fibre or roughage in my diet (whole grain breads, high fibre cereals, fruits and vegetables):
- ☐ never
- ☐ 1 to 2 times a week
- ☐ 3 to 4 times a week
- ☐ 5 to 6 times a week
- ☐ daily

22. Since becoming pregnant, I have smoked cigarettes:

- ☐ never smoke
- ☐ quit since finding out I was pregnant
- ☐ less than 10 cigarettes daily
- ☐ 11 to 20 cigarettes daily
- ☐ more than a pack a day

23. Since becoming pregnant, I have had alcoholic beverages (e.g. wine, beer, or spirits):

- ☐ no alcoholic drinks while pregnant
- ☐ before knowing I was pregnant
- ☐ less than 3 times a month
- ☐ 1 time a week
- ☐ more than 1 time a week

24. Since becoming pregnant, at one sitting I usually drink (a drink is equal to a bottle/half a pint of beer, small glass (125ml) of wine or a shot of spirit):

- ☐ no drinks while pregnant
- ☐ 1 drink
- ☐ 2 drinks
- ☐ 3 drinks
- ☐ more than 3 drinks

25. I began seeing my doctor or midwife for prenatal care:

- ☐ to plan a pregnancy before conception
- ☐ in the first 3 months of pregnancy
- ☐ before 5 months of pregnancy
- ☐ before 7 months of pregnancy
- ☐ before 9 months of pregnancy

26. Since becoming pregnant, I have: (Missed appointment means forgot to schedule or didn't show up for an appointment with my doctor or midwife):

- ☐ never missed an appointment
- ☐ missed one appointment
- ☐ missed 2 to 3 appointments
- ☐ missed 4 to 5 appointments
- ☐ missed more than 5 appointments

27. Since becoming pregnant, I have gotten regular dental care (professional cleaning every 6 months or dental work):

- ☐ I do not get regular dental care
- ☐ I have not been to the dentist even though I am due for dental care
- ☐ I do not know if I need dental care at this time
- ☐ I have visited a dentist and had some care but not everything I need
- ☐ I have visited a dentist and had all dental care done or I am not due for a visit to a dentist since I became pregnant

28. Since becoming pregnant, I have looked at books, pamphlets, videos, or the Internet to learn more about pregnancy and childbirth:
- ☐ never
- ☐ less than or one time a month
- ☐ 2 to 3 times a month
- ☐ 4 times a month (weekly)
- ☐ more than 4 times a month

29. Since becoming pregnant, I have talked with friends and family members to learn more about pregnancy and childbirth:
- ☐ never
- ☐ less than one time a week
- ☐ 1 to 2 times a week
- ☐ 3 to 5 times a week
- ☐ more than 5 times a week

30. Since becoming pregnant, I have taken time to do something relaxing for myself:
- ☐ never
- ☐ less than or one time a month
- ☐ 2 to 3 times a month
- ☐ 4 times a month (weekly)
- ☐ more than 4 times a month

31. Since becoming pregnant, I have gained the amount of weight recommended by my doctor or midwife for this time in pregnancy:
- ☐ I have lost weight
- ☐ I have gained too little or too much weight
- ☐ I have not gained or lost weight
- ☐ I do not know
- ☐ I have gained the right amount of weight

32. Since becoming pregnant, I drink water, fruit or vegetable juices, or other fluids without caffeine daily:
- ☐ less than 3 (8 oz.) glasses of fluid a day
- ☐ 3-4 (8 oz.) glasses of fluid a day
- ☐ 5-6 (8 oz.) glasses
- ☐ 7-8 (8 oz.) glasses of fluid a day
- ☐ more than 8 (8 oz.) of fluid a day glasses of fluid a day

33. Since becoming pregnant, I have minimized my chances of getting toxoplasmosis by avoiding cat feces and not eating raw or undercooked meat and by using gloves when working in the garden:
- ☐ always
- ☐ 5 days a week
- ☐ 3 days a week
- ☐ sometimes
- ☐ never

34. I have attended or plan to attend childbirth classes:
- ☐ definitely yes
- ☐ no, I have taken them before
- ☐ not sure
- ☐ probably not
- ☐ definitely no

Study Number: 195097 v1.0 Participant ID:

UNIVERSITY OF LIVERPOOL

PRENATAL – PARENTAL REFLECTIVE FUNCTIONING QUESTIONNAIRE (P-PRFQ)

Listed below are a number of statements concerning you and your unborn baby. Read each item and decide whether you agree or disagree and to what extent. Use the following rating scale, with 7 if you strongly agree, and 1 if you strongly disagree. The midpoint if you are neutral or undecided, is 4.

	Strongly disagree			Neutral/ Undecided			Strongly agree
1. I will always be able to know why my baby acts the way he/she does.	1	2	3	4	5	6	7
2. I believe there is no point yet in trying to guess what my baby feels.	1	2	3	4	5	6	7
3. Nowadays I often think about how I felt when I was a little child.	1	2	3	4	5	6	7
4. I will always know why I act as I do with my baby/child.	1	2	3	4	5	6	7
5. I often wonder what the baby expects and needs from me now while I am pregnant.	1	2	3	4	5	6	7
6. Nowadays I often try to imagine which moments will be most difficult for me with the baby after he/she is born.	1	2	3	4	5	6	7
7. I think I will always be able to predict what my baby/child will do next.	1	2	3	4	5	6	7
8. I feel that there is already a unique relationship between me and my baby.	1	2	3	4	5	6	7
9. Nowadays I often try to imagine which moments will be most enjoyable for me with the baby after he/she is born.	1	2	3	4	5	6	7
10. I find it very fascinating to search for signs that would tell me how my baby is doing right now, and I do it a lot.	1	2	3	4	5	6	7
11. Nowadays I think a lot about how the baby may be experiencing something I'm doing.	1	2	3	4	5	6	7
12. I think I will always know what my child wants.	1	2	3	4	5	6	7
13. I have been wondering if my baby may feel upset now during pregnancy when I feel upset myself.	1	2	3	4	5	6	7
14. I nowadays find myself often thinking of how it may have been for my mother when she was pregnant with me.	1	2	3	4	5	6	7

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MATERNAL ANTENATAL ATTACHMENT SCALE (MAAS)

Please select the response which is closest to your own feelings:

1. Over the past two weeks I have thought about, or been preoccupied with the baby inside me:
   - ☐ almost all the time
   - ☐ very frequently
   - ☐ frequently
   - ☐ occasionally
   - ☐ not at all

2. Over the past two weeks when I have spoken about, or thought about the baby inside me I got emotional feelings which were:
   - ☐ very weak or non-existent
   - ☐ fairly weak
   - ☐ in between weak and strong
   - ☐ fairly strong
   - ☐ very strong

3. Over the past two weeks my feelings about the baby inside me have been:
   - ☐ very positive
   - ☐ mainly positive
   - ☐ mixed positive and negative
   - ☐ mainly negative
   - ☐ very negative

4. Over the past two weeks I have had the desire to read about or get information about the developing baby. The desire is:
   - ☐ very weak or non-existent
   - ☐ fairly weak
   - ☐ in between weak and strong
   - ☐ fairly strong
   - ☐ very strong

5. Over the past two weeks I have been trying to picture in my head what the developing baby actually looks like in my womb:
   - ☐ almost all the time
   - ☐ very frequently
   - ☐ frequently
   - ☐ occasionally
   - ☐ not at all

6. Over the past two weeks I think about the developing baby mostly as:
   - ☐ a real little person inside me with special characteristics
   - ☐ a baby like any other baby
   - ☐ a human being
   - ☐ a living thing
   - ☐ a thing not yet really alive

7. Over the past two weeks I have felt the baby inside me is dependent on me for its well-being:
   - ☐ totally
   - ☐ a great deal
   - ☐ moderately
   - ☐ slightly
   - ☐ not at all

8. Over the past two weeks I have found myself talking to my baby when I am alone:
   - ☐ not at all
   - ☐ occasionally
   - ☐ frequently
   - ☐ very frequently
   - ☐ almost all the time I am alone

9. Over the past two weeks when I think about (or talk to) my baby inside me, my thoughts:
   - ☐ are always tender and loving
   - ☐ are mostly tender and loving
   - ☐ are a mixture of both tenderness and irritation
   - ☐ contain a fair bit of irritation
   - ☐ contain a lot of irritation

10. The picture in my mind of what the baby at this stage actually looks like inside the womb is:
    - ☐ very clear
    - ☐ fairly clear
    - ☐ fairly vague
    - ☐ very vague
    - ☐ I have no idea at all

11. Over the past two weeks when I think about the baby inside me I get feelings which are:
    - ☐ very sad
    - ☐ moderately sad
    - ☐ a mixture of happiness and sadness
    - ☐ moderately happy
    - ☐ very happy

12. Some pregnant women sometimes get so irritated by the baby inside them that they feel like they want to hurt it or punish it:
    - ☐ I couldn't imagine I would ever feel like this
    - ☐ I could imagine I might sometimes feel like this, but I never actually have
    - ☐ I have felt like this once or twice myself
    - ☐ I have occasionally felt like this myself
    - ☐ I have often felt like this myself

13. Over the past two weeks I have felt:
    - ☐ very emotionally distant from my baby
    - ☐ moderately emotionally distant from my baby
    - ☐ not particularly close to my baby
    - ☐ moderately close emotionally to my baby
    - ☐ very close emotionally to my baby

14. Over the past two weeks I have taken care with what I eat to make sure the baby gets a good diet:
    - ☐ not at all
    - ☐ once or twice when I ate
    - ☐ occasionally when I ate
    - ☐ quite often when I ate
    - ☐ every time I ate anything

15. When I first see my baby after the birth I expect I will feel:
    - ☐ intense affection
    - ☐ mostly affection
    - ☐ dislike about one or two aspects of the baby
    - ☐ dislike about quite a few aspects of the baby
    - ☐ mostly dislike

16. When my baby is born I would like to hold the baby:
    - ☐ immediately
    - ☐ after it has been wrapped in a blanket
    - ☐ after it has been washed
    - ☐ after I have had a rest for an hour or so
    - ☐ the next day

17. Over the past two weeks I have had dreams about the pregnancy or baby:
    - ☐ not at all
    - ☐ occasionally
    - ☐ frequently
    - ☐ very frequently
    - ☐ almost every night

18. Over the past two weeks I have found myself feeling or rubbing with my hand, the outside of the stomach where the baby is:
    - ☐ a lot of times each day
    - ☐ at least once per day
    - ☐ occasionally
    - ☐ once only
    - ☐ not at all

19. If the pregnancy was lost at this time (due to miscarriage or other accidental event) without any pain or injury to myself, I expect I would feel:
    - ☐ very pleased
    - ☐ moderately pleased
    - ☐ neutral (ie: neither sad nor pleased; or mixed feelings)
    - ☐ moderately sad
    - ☐ very sad

Hospital Anxiety and Depression Scale (HADS)

nferNelson
understanding potential

[redacted]

Appendix I

Sources of Support Information Sheet

SOURCES OF SUPPORT INFORMATION SHEET

In this study you answered some questions about your relationship with your baby and your current mood. Sometimes these things can draw attention to difficulties you may not have noticed before. This leaflet is given to all participants involved in studies that use these types of questions. It provides you with some potential sources of support, should you feel it would be helpful to talk to someone.

- **Your midwife**
  Your midwife is available to offer support to discuss any issues that are affecting you regarding your pregnancy.

- **Your General Practitioner (GP)** (contact details vary)
  Your GP will be able to offer support and advice on possible treatment options for any physical or mental health difficulties that you may be experiencing.

- **NHS Direct (England & Wales):** 111
  For health advice and reassurance, 24 hours a day, 365 days a year.

- **Talk Liverpool**
  Talk Liverpool is an Improving Access to Psychological Therapies (IAPT) service within the NHS. They provide psychological treatments, sometimes called talking therapies, to help people who have common mental health problems such as feeling stressed, feeling low in mood (depressed) or very nervous (anxiety). This service is accessible to you if you are registered with a GP within Merseyside. They are able to work with you on the telephone, face to face, on line and through offering a range of courses and workshops.

  Tel: 0151 228 2300; Email: talkliverpool@merseycare.nhs.uk; Website: http://www.talkliverpool.nhs.uk

- **Samaritans- trained listening:**
  Samaritans provides confidential emotional support, 24 hours a day for people who are experiencing feelings of distress or despair. They are there to listen if you're worried about something, feel upset or confused, or you just want to talk to someone.
  Tel: 08457 90 90 90, Email: Jo@Samaritans.org

- **MIND:**
  A mental health charity website, with lots of useful information and advice.
  Website www.mind.org.uk Tel: 0300 123 3393

- **Overcoming Depression: A self-help guide** (Paul Gilbert, 2009)
  A self-help manual full of step-by-step suggestions, case examples and practical ideas for taking control of depression and low mood based on Cognitive Behavioural Therapy (CBT) principles.

If you have any questions regarding your participation in the research, please contact the researcher:

[redacted]