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A Research Portfolio:

Distress during pregnancy, an exploration of protective factors and offspring outcomes.

By Fiona Ram
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D. Clin. Psychol. Declaration of own work

Name: Fiona Ram

Assessed work: Thesis

Title of work: A research portfolio: Distress during pregnancy, an exploration of outcomes and protective factors.

I confirm that all this work is my own except where indicated, and that I have:

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DEDICATION

This thesis is dedicated in loving memory to Grandpa Urquhart and Grandpa Ram. Whilst they were not able to see the completion of it, the encouragement given to me at start of this project has continued to motivate me to succeed.

ACKNOWLEDGEMENTS

I would first like to thank all of the participants who took the time and effort to complete questionnaire packs, it is extremely humbling. It is also with thanks to the Maternity Departments at both Dr Gray’s Hospital and Raigmore Hospital that this project was possible, so many thanks both of these dedicated teams.

Secondly, I would like to express sincere gratitude to my thesis supervisors, Dr Angus Macbeth and Professor Matthias Schwannuer for all of their support, guidance and encouragement throughout each stage of undertaking this work. Hannah Watkins deserves a special mention for all her help with reviewing articles for my systematic review, a true superstar.

As always, the support, encouragement and patience of Mum, Dad, Ali and my wider family have been invaluable throughout the past three years of my doctoral training. I also want to thank my friends for always appearing through the thesis haze with kind words of encouragement and laughter at just the right times.

Without the support from all of the above, this thesis would not have been possible.

WORD COUNT 20553 (Excluding Tables and Figures)
1. THESIS ABSTRACT

Background: Maternal mental health during pregnancy and its effects on offspring outcomes have received increased attention as a public health concern. This thesis aimed to examine and evaluate current research into the long term effects of maternal antenatal anxiety on offspring’s psychological development and markers of developmental psychopathology. This thesis also aimed to identify protective factors to parental distress during pregnancy. Self-compassion and adult attachment security have been found to be protective psychological factors for ameliorating stress in general adult samples. Therefore the empirical paper aimed to investigate the effect of these factors during the antenatal period.

Method: A systematic literature review of prospective studies examining the effects of maternal antenatal anxiety on child psychopathology and neurodevelopment literature identified 16 relevant prospective studies. The empirical study recruited a general population sample of women and their partners during their second trimester of pregnancy. They completed self-report assessments of self-compassion, adult attachment security, mood and antenatal attachment. Neonatal birth outcome data was collected as follow-up data.

Results: The systematic literature review results indicate that maternal antenatal anxiety can be measured and does have a negative impact on offspring development. The results also identified a broad risk phenotype, suggesting that interventions should not necessarily only be targeted at women reaching clinical caseness. The review highlighted a lack of specificity regarding possible psychological mechanisms of the relationship between maternal antenatal anxiety and offspring outcomes. The results of the empirical paper indicated that higher levels of self-compassion and attachment security were related to fewer self-reported symptoms of distress in mothers and their partners. Self-compassion was found to mediate the relationship between attachment security and distress in mothers. Neither antenatal attachment nor neonatal birth outcomes were significantly related to attachment security, self-compassion or levels of distress.

Conclusions: The results of the systematic review should broaden public health concern. A need for future research is identified in terms of understanding the process of maternal-foetal programming, protective mediating factors and effective interventions. The role of self-compassion as a protective mediating factor is discussed in relation to identification and treatment of distress during the antenatal period.
2. SYSTEMATIC REVIEW^{1,2}

2.1 TITLE PAGE

Title: A systematic review of the effects of maternal antenatal anxiety on child psychopathology and neurodevelopment

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This review was completed as part of a Doctorate in Clinical Psychology with the University of Edinburgh and NHS Grampian.

\footnote{\textsuperscript{1} Produced according to author submission guidelines for the journal "Clinical Psychology Review" (see appendix A). As such, Tables (Appendix B) and Figures (Appendix C) are included in the thesis, as per journal guidelines.}

\footnote{\textsuperscript{2} Titles are numbered for thesis submission but will be removed for submission to journal.}
2.2 ABSTRACT

There has been a recent increase in the amount of research exploring the association between maternal mental health during pregnancy and its effects on offspring outcomes, both in terms of understanding of the mechanisms and identifying possible targets for psychosocial intervention. This review aimed to examine and evaluate prospective studies examining the effects of maternal antenatal anxiety on child psychopathology and neurodevelopment. A systematic review of the literature identified 16 relevant prospective studies. Characteristics of the included studies are presented both in terms of the maternal antenatal anxiety and child outcomes. The results of the included studies indicated that maternal antenatal anxiety can be validly measured and does have a negative impact on offspring development; potential mediators of this relationship are identified. A broad risk phenotype was identified, suggesting that interventions should not necessarily be targeted only to women reaching clinical caseness. This review identifies several avenues for future research, including understanding the process of maternal-foetal programming, identifying protective mediating factors and developing effective interventions.

KEYWORDS

maternal, antenatal, pregnancy, anxiety, stress, child, infant, behaviour, development, neurodevelopment, psychopathology

HIGHLIGHTS

- Maternal antenatal anxiety effects child psychopathology & neurodevelopmental outcomes
- Effects are varied in terms of specific outcomes, size & timing of antenatal anxiety
- Future research is required into the mediating factors & mechanisms
- Future research is required into antenatal psychological interventions
2.3 INTRODUCTION

Healthy early years lay the foundations for a lifetime of well-being, beginning with the mother’s health before pregnancy. Maternal mental health during the perinatal period and the effect of this on offspring development has become an area of intense study, transitioning from experimental animal research to human studies. Researchers have indicated that during the perinatal period up to 54% of mothers will report clinical symptoms of anxiety at least once and up to 37% report clinical symptoms of depression (Antoinette et al., 2007). In 2012 the American Academy of Paediatrics issued a policy statement encouraging investment in research and intervention aimed at identifying and reducing external threats to the healthy brain growth of infants, one of which is maternal antenatal mental health (Garner et al., 2012). The Scottish Government have also recognised the importance of maternal mental health for expectant mothers, as well as the need to develop appropriate service provision (Early Years Framework, 2008; Better Health Better Care, 2009; Refreshed Framework for Maternity Care in Scotland, 2011). The majority of research into maternal mental health across the perinatal period has focused on the effects of maternal postnatal depression, whilst the effects of experiencing depression or anxiety during the antenatal period have often been overlooked, despite being long recognised as having significant implications (Glasheen, Richardson, & Fabio, 2010; Strott, 1973). However, there has been a recent growth in the empirical literature investigating the association between maternal antenatal mental health and its effect on offspring psychological development (Glover, 2014; O’Connor, Monk, & Fitelson, 2014; Talge, Neal, & Glover, 2007).

Symptoms of depression and anxiety occur frequently during the antenatal period; there is evidence to suggest that these are more common during pregnancy than during the postnatal period (Heron, O’Connor, Evans, Golding, & Glover, 2004) and are associated with adverse developmental offspring outcomes (Glover, 2014). Not only has postnatal mood been shown to be worse when preceded by antenatal anxiety, but antenatal anxiety remains a significant predictor of negative offspring outcomes even once the effect of postnatal mood is controlled for (O’Connor, Heron, Golding, & Glover, 2002). Much of the evidence regarding the long-term effects of maternal distress on childhood outcomes has been derived from retrospective studies, often in relation to external sources of stress such as natural or man-made disasters (Weinstock, 2008); these fail to capture ongoing psychosocial stressors and their effects on development. Recent prospective studies have attempted to examine the effects of
maternal antenatal anxiety on infant and child development. However, the majority of findings relate to infant development as opposed to later child development. That is to say, outcome measurement tends to focus on offspring follow-up periods from zero to three years of age, rather than age of three and up.

With regard to this literature there are several examples of the effect of maternal anxiety on foetal, birth and infant outcomes. These remain significant even after controlling for known contributing risk factors, such as maternal age, education, antenatal smoking and postnatal mood. For example, elevations in foetal heart rate have been shown in mothers who had rated themselves as being anxious when completing a stressful computerised task (Monk, Myers, Sloan, Ellman, & Fifer, 2003). This is concerning as heart-rate variability and foetal movement have been identified as prenatal antecedents related to newborn motor activity and neurological response to auditory stimuli (DiPietro et al., 2010). Several birth outcomes thought to increase vulnerability to sub-optimal development have been associated with elevated maternal antenatal stress/anxiety, such as, shorter gestational age (Brett, Strogatz, & Savitz, 1997; Copper et al., 1996), lower birth weights for gestational age (Lou et al., 1994; Wadhwa, Sandma, Porto, Dunkel-Schetter, & Garite, 1993) and poorer performance on behavioural assessments on the Brazelton assessment of neonatal behaviour (Field et al., 2003). A variety of infant outcomes have been associated with increased maternal antenatal anxiety/stress. These include: more variable or ‘difficult’ infant temperament (Austin, Hadi-Pavlovic, Leader, Saint, & Parker, 2005; Davis et al., 2004; Huizink, Robles de Medina, Mulder, Visser, & Buitelaar, 2002), lowered ratings of cognitive ability and elevated fearfulness (Bergman, Sarkar, O’Connor, Modi, & Glover, 2007), and poorer scores on the Bayley scales for infant developmental outcomes (Huizink, Robles de Medina, Mulder, Visser, & Buitelaar, 2003; LaPlante et al., 2004).

Whilst research has been predominantly focused on outcomes during infancy, there have been some studies into the effects of maternal antenatal stress/anxiety on the neurodevelopmental and psychopathology outcomes of children aged 3 to 18 (Talge et al., 2007). Results suggest that, where the mother experiences increased antenatal anxiety, offspring are at increased risk of childhood psychopathology and behavioural problems (O’Connor et al., 2002; Rodriguez & Bohlin, 2005; Van den Bergh & Marcoen, 2004; Van den Bergh et al., 2005) and reduced cognitive performance (LaPlante, Brunet, Schmitz, Ciampi, & King, 2008; Niederhofer & Reiter, 2004). These later childhood
outcomes have not been collated in a systematic review. Therefore, there is an absence of an adequate synthesis to provide a baseline for research, clinical and policy development.

However, taken together, these results show an association between antenatal stress/anxiety and altered outcomes of offspring. The prospective studies offer some of the strongest evidence, as they allow consideration of significant covariates occurring throughout the child’s development, for instance postnatal maternal mood (O’Connor et al., 2002; Rodriguez et al., 2005; Van den Bergh & Marcoen, 2004; Van den Bergh et al., 2005). These results offer evidence for a foetal programming effect during the antenatal period, the process through which the developing foetus physiologically adapts to the intrauterine environment. These delicate structural and functional adaptations are affected by the mother’s environment, health and behaviour; if these conditions are not optimal the offspring may have an increased vulnerability to a range of poorer health, sociological and psychological outcomes (Talge et al., 2007). The programming effect has been well established with regard to physical outcomes, for example in relation to the development of asthma and cardiovascular disease (Barker, 2003; Khashan et al., 2012) and also in terms of the long-term effects of teratogens such as alcohol and nicotine (Mayes, 2000).

Whilst the underlying mechanisms involved in the long-term effects of antenatal stress/anxiety are less established, several have been suggested. One biological mechanism could be the regulation/dynamics of the hypo-thalamic-pituitary-adrenal (HPA) axis which is affected by increased levels of cortisol (Wadhwa, Sandman, & Garite, 2001). However, much of the weight for this evidence for this comes from animal studies (Schneider, Coe, & Lubacj, 1992; Schneider, Moore, Kraemer, Roberts, & DeJesus, 2002) and natural decreases in cortisol responses have been evidenced to occur over the course of human pregnancies (Sarkar, Bergman, Fisk, & Glover, 2006). Other biological mechanisms that have been suggested include: increased transplacental transfer of maternal cortisol regardless of maternal levels (Mairesse et al., 2007; O’Donnell et al., 2012), altered function of immune systems cells in response to stress (Coussons-Read, Okun, & Nettles, 2007), placental metabolic pathways modulating foetal brain development (Bonnin et al., 2011) and transgenerational epigenetic programming of genes (Radtke et al., 2011). These are likely to form the biological predisposition which may increase vulnerability of the offspring to contributory social and psychological factors such as maternal availability, attachment style and socio-economic status.
Whilst there have been recent reviews of the research into the effects of antenatal maternal anxiety on child psychopathology and neurodevelopmental outcomes these have been non-systematic, descriptive and often combine definitions and measurement of anxiety/stress (Dunkel-Schetter & Tanner, 2012; Glover, 2014; O’Connor et al., 2014; Talge et al., 2007). This is illustrated by the considerable variation in the assessments used to examine anxiety/stress, from assessment of pregnancy-specific-anxiety and daily hassles (Huizink et al., 2003), to use of standardised anxiety assessments assessing both chronic and state anxiety (O’Connor et al., 2002; Van den Bergh et al., 2005) and to the assumed anxiety/stress accompanying exposure to an acute external stressor (Huizink et al., 2008; Kinney, Miller, Crowley, Huang, & Gerber, 2008; Yehhda et al., 2005). Despite this, there is evidence for the contribution of maternal antenatal stress/anxiety to adverse offspring outcomes; the aforementioned variations in measurement and study design suggest that stress/anxiety does not need to be chronic or diagnosable to have an impact on offspring outcomes.

Given the lack of a synthesis of the literature on anxiety and offspring outcomes beyond the age of three, this paper will systematically review the relevant literature from prospective studies in the area. Studies will be included if they used standardised assessments of anxiety and child psychopathology and neurodevelopmental outcomes. It will review the strength of the effects, highlight the strengths and weaknesses of the literature and make recommendations for future research. Specifically, the following questions were asked:

1. What are the associations between maternal antenatal anxiety and child psychopathology?
2. What are the associations between maternal antenatal anxiety and child neurodevelopment?
3. What are the methodological considerations for future prospective studies in this area?

2.4 METHOD

2.4.1 Inclusion and Exclusion Criteria

A priori inclusion and exclusion criteria were developed for the review. These criteria are outlined in Table 1 (Appendix B). The criteria were applied at each stage of the literature search resulting in the exclusion of studies not meeting the inclusion criteria.
2.4.2 Search Strategy

A systematic review was conducted in line with PRISMA guidelines (BMJ, 2009), a combined search of OVID (Medline: 1946-2014, EMBASE: 1974-2014, MIDIRS: 1937-2014) and EBSCO (CINAHL: 1937-2014, Psychology and Behavioural Sciences Collection: 1937-2014, PsychINFO: 1947-2014) was conducted in January 2014. Search terms “anxiety OR stress” were combined with “pregnancy OR antenatal” and were then combined with the Boolean operator ‘AND’ with each of the following terms separately, truncations [*] were utilised to increase search sensitivity: “child* develop*”, “child* behav*”, “infant* develop*”, “infant* behav*”, “neurodevelopment” and “psychopathology”. The titles were reviewed online and duplicates were removed. Inclusion and exclusion criteria were then applied to titles, abstracts and full-texts sequentially to ascertain eligibility. The reference lists, citing papers and most recent issues of the source journal of the included full-text articles were also searched. The application of inclusion and exclusion criteria was completed by the first author for titles, 50% of the identified abstracts were reviewed by a second rater (99.6% agreement) and all full-text articles were reviewed by the second rater (89.5% agreement). Four full-text articles were discussed with regard to their inclusion but were ultimately excluded from the review. The literature search process is illustrated in Figure 1 (Appendix C).

2.4.3 Quality Assessment of the Included Studies

The Scottish Intercollegiate Network (SIGN) methodology checklist for cohort studies was adapted to generate 10 a priori quality criteria for identified studies (details in Table 2, Appendix B). The outcome ratings for the quality criteria were: “well covered” (2 points); “adequately addressed” (1 point); “poorly addressed”, “not addressed”, “not reported” and “not applicable” (0 points). The highest quality rating each study could achieve was 20. To reduce potential bias in the quality assessments, an individual blind to the review aims rated 50% of the studies, with exact agreement for 93.75% of the criteria. In cases where discrepancy existed between ratings a further review was undertaken together by both reviewers, none of the ratings had differed by more than one point.
2.5 RESULTS

From the 1370 studies identified in the initial literature search, 1127 were excluded after screening the titles and 205 after screening abstracts. An in-depth screening of 38 full-text articles was undertaken. This resulted in 12 studies meeting the inclusion criteria for this review; four articles were identified through reference and citation searching of these included studies, resulting in a total of 16 articles. A summary of the characteristics of these studies and their main findings can be seen in Table 3 (Appendix B). The findings reported in this review from each paper are those where significant covariates were included in the analysis.

2.5.1 Characteristics of the Included studies

The numbers of participants in the included studies varied considerably, from n=57 (Van den Bergh et al., 2005) to n=7448 (O’Connor et al., 2002), with a combined total of n=39447 participants. The mean age of mothers ranged from 27 to 32 years, although some studies did not report maternal age. The mean age at which the child outcomes were assessed ranged from three years (Van Batenburgh-Eddes et al., 2013) to 15.6 years of age (Van den Bergh, Van Calster, Smits, Van Huffel, & Legae, 2008). Only five of the 16 studies assessed outcomes in children aged 10 or above.

All studies used a prospective cohort design, apart from that of Van Batenburgh-Eddes et al. (2013), which used a cross-cohort design. The aforementioned study combined results from the Avon Longitudinal Study of Parents and their Children (ALSPAC; Fraser et al., 2012) and the Generation R (Jaddoe et al., 2010) cohorts. The Amsterdam Born Children and their Development (ABCD; Van Eijsden, Vrijkotte, Gemke, & van der Wal, 2010) was the source of data for two of the included studies. Four of the included papers followed-up the same (unnamed) cohort at different ages throughout development (Van den Bergh & Marcoen, 2004; Van Den Bergh et al., 2005; Van den Bergh et al., 2006; Van den Bergh et al., 2008).

The data collection for studies was conducted in the UK (Van Batenburgh-Eddes et al., 2013; O’Connor et al., 2002; O’Connor, Heron, Golding, & Glover, 2003; Barker, Jaffe, Uher, & Maugan, 2011; Barker & Maughan, 2009), Sweden (Rodriguez & Bohlin, 2005), Belgium (Van den Bergh & Marcoen, 2004), Australia (Calvarino et al., 2009), the Netherlands (Guttleling et al., 2006; Loomans et al., 2011a; Loomans et al., 2011b; Van Batenburgh-Eddes et al., 2013; Van Den Bergh et al., 2005;
Van Den Bergh et al., 2006; Van Den Bergh et al., 2008) and the USA (Buss, Davis, Hobel, & Sandman, 2011; Davis & Sandman, 2012).

2.5.2 Measurement of Antenatal Anxiety

The assessments of maternal antenatal anxiety used in the included studies varied, from assessments of clinical symptoms of anxiety, to pregnancy specific anxiety and anxiety related to day-to-day life events. Studies were excluded if anxiety was assessed in terms of a count of life-events alone. Van Batenburgh-Eddes et al (2013) analysed the results of two studies, the ALSPAC study which used the Crown-Crisp index (CCEI; Birtchnell, Evans & Kennard, 1988) and the Generation R study which used the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); both of these were completed within the second trimester (18 and 20 weeks respectively). All of the studies based on the ALSPAC cohort report using the CCEI, which was administered at 18 and 32 weeks of gestation (O’Connor et al., 2002; O’Connor et al., 2003; Barker & Maughan, 2009; Barker et al., 2011). The ABCD cohort used the state subscale of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) at 16 weeks gestation (Loomans et al., 2011a). The STAI was also used by four other studies (Van den Bergh & Marcoen, 2004; Van Den Bergh et al., 2005; Van den Bergh et al., 2006; Van den Bergh et al., 2008) and was collected at three time points 12-22 weeks, 23-31 weeks and 32-40 weeks. Loomans et al (2011b) also administered the STAI, at week 16 of the antenatal period.

Rodriguez and Bohlin (2005) administered the Perceived Stress Scale (PSS; Cohen & Williamson, 1988) at six time points (10, 12, 20, 28, 32 and 36 weeks) during the antenatal period. The PSS was also used by Davis and Sandman (2012) and Buss et al (2011), alongside the State Anxiety subscale of the State-Trait Personality Inventory (STPI; Spielberger, Gorsuch, & Lushene, 1983), and the Pregnancy Related Anxiety scale (PRA; Rini, Dunkel-Schetter, Wadhwa, & Sandman, 1999); these were administered at three time points during the antenatal period (19, 25 and 31 weeks) by Davis and Sandman (2012) and five time points (15, 19, 25, 31 and 37 weeks) by Buss et al (2011). Davis and Sandman (2012) also used salivary cortisol as a physiological marker of stress.

Menges, 1989), the Life Events Questionnaire (VRMG; Van de Willige, Schreurs, Tellehem, & Zwart, 1985) and the Pregnancy Related Anxiety Questionnaire-Revised (PRAQ; Van den Bergh, 1990).

Calvarino et al (2009) utilized the anxiety subscale from the Delusions Symptoms-States Inventory: State of Anxiety and Depression (DSSI/SAD; Bedford & Foulds, 1977). This was the least comprehensive assessment of antenatal anxiety but was demonstrated to be reliable and valid.

2.5.3 Measurement of Childhood Outcomes

Van Batenburgh-Eddes et al (2013) summarised child developmental outcomes in terms of attentional problems and emotional problems, from two cohorts (ALSPAC and Generation R), using parent versions of both the Strengths and Difficulties Questionnaire (SDQ; Goodman & Scott, 1999) and Child Behaviour Checklist (CBCL; Archenbach & Rescorla, 2000) respectively, both of which are assessments of emotional and behavioural problems in children. Three of the studies based on the ALSPAC cohort and two others report using the SDQ (O’Connor et al., 2002; O’Connor et al., 2003; Barker & Maughan, 2009, Loomans et al., 2011a; Rodriguez & Bohlin, 2005). Rodriguez and Bohlin (2005) also rated an ADHD symptom checklist based on DSM-IV criteria from the scores on the SDQ (APA, 1994; DuPaul et al., 1998). Barker and Maughan (2009) used repeat administration of the SDQ at specified childhood follow-up points during childhood and two measurements of infant characteristics: the McCarthy Scales of Children’s Abilities (McCarthy, 1972) and the Carey Infant Temperament scale (Carey & McDevitt, 1978). These measures are screening measures rather than clinical assessments and as such are not diagnostic and are less reliable at differentiating different forms of psychopathology. In particular, O’Connor et al (2003) noted that the prediction of total problems was more robust than for problems identified by subscales; this may be accounted for by the greater reliability of a total score from a screening assessment.

Van den Bergh and Marcoen (2004) utilised five outcome measures: the CBCL and the Teacher’s Report Form (TRF; Verhulst, Van der Ende, & Koot, 1997) to assess behavioural problems, the Conners Abbreviated Teacher Rating Scale (CATRS; Blöte & Curfs, 1986) to measure ADHD symptoms, the Groninger Behaviour Observation Scale (GBO; Kalverboer, 1990) to indicate attention and hyperactivity problems, and the State-Trait Anxiety Scale for Children (STAIC; Bakker, Van Wieringen, Van der Ploeg, & Spielberger, 1989). The CBCL is administered alongside the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2000) as an assessment
of anxiety by Davis and Sandman (2012). Clavarino et al (2009) administered the Achenbach’s Attention Problem subscale of the CBCL to parents and the Youth Self Report (YSR; Achenbach, 1991a) of problem behaviour was completed by each child.


The Van den Bergh et al (2008) study was the only included study to combine a physiological outcome measure (day-time cortisol profile) alongside a standardised self-report assessment of depression, the Children’s Depression Inventory (CDI; Kovacs, 1992).

Four of the included studies used reliable and valid experimental assessments of cognitive functioning as indicators of neurodevelopment. Loomans et al (2011b) and Van Den Bergh et al (2005) used subtests from a neurocognitive battery, the Amsterdam Neuropsychological Tasks (ANT; De Sonneville, Visser & Licht, 1999). Loomans et al (2011b) used two reaction time tasks (RT), one simple and one complex, to assess RT and intra-individual variability (standard deviation of RT). Intra-individual variability is thought to be more strongly associated with individual differences in intelligence than RT alone (Jensen, 1992; Waldhovd & Fjell, 2007). Although the specificity of this intra-individual variability on RT tasks is not fully understood, it is thought to represent inefficiency in underlying neurobiological mechanisms contributing to executive functioning (Li & Lindenberger, 1999; Li, Lindenberger & Sikstrom, 2001; Walhovd & Fjell, 2007).

Van den Bergh et al (2005) utilised the encoding subtest from the ANT as an assessment of visual attention and working memory. They also used a computerised assessment of response inhibition, The Stop Task (Logan & Cowan, 1984), and subtests from the Weschsler Intelligence Scale for Children - Revised (WISC-R; Wechsler, 1991). Van den Bergh et al (2006) combined a computerised continuous performance test (Van der Meere, Shaley, Borger, & Gross-Tsur, 1995) and subtests from the WISC-R. Buss et al (2011) used two computerised assessments: The Flanker task was used to assess inhibitory control and a sequential memory test was used to assess a child’s capacity for holding a visuospatial sequence in their working memory.
2.5.4 Relationship between Maternal Antenatal Anxiety and Child Psychopathology Outcomes

Overall, the results suggested that there was a significant negative association between maternal antenatal anxiety and child outcomes (psychopathology and neurodevelopment) from ages three through to fifteen years. The effect sizes were predominantly small, but significant. A large effect size was found in the high quality paper by Rodriguez and Bohlin (2005), with ADHD as the outcome.

In terms of child psychopathology, child outcomes included internalising problems (Barker et al., 2011; Davis & Sanman, 2012; O’Connor et al., 2002; O’Connor et al., 2003; Van Batenburgh-Eddes et al., 2013; Van den Bergh & Marcoen, 2004; Van den Bergh et al., 2008) and externalising problems (Barker & Maughan, 2009; Loomans et al., 2011a; O’Connor et al., 2002; O’Connor et al., 2003; Rodriguez & Bohlin, 2005; Van den Bergh & Marcoen, 2004). More specifically, outcomes included anxiety (Van den Bergh & Marcoen, 2004; Barker et al., 2011; Davis & Sandman, 2012), depression (Van den Bergh et al., 2008) and ADHD (Rodriguez & Bohlin, 2005; Van den Bergh & Marcoen, 2004; Barker & Maughan, 2009).

The results from the studies based on the ALSPAC cohort show a consistent association between maternal antenatal anxiety and negative outcomes from children at follow up points over the course of childhood. For example, O’Connor et al (2003) showed an association between maternal antenatal anxiety and offspring behavioural/emotional problems at two time points (47 and 81 months), Barker et al (2011) found an association with internalising problems at age 7 to 8 and in older children Barker and Maughan (2009) showed that maternal antenatal anxiety was predictive of persistent conduct problems. The results from the ALSPAC studies are consistent across time and have taken into account antenatal, birth and postnatal confounding variables. Similarly, Clavarino et al (2009) took into account antenatal, birth and postnatal covariates and illustrated stable effects of antenatal anxiety on attentional problems (from age 5 to 14 years). These results suggest that there is a persistent effect of maternal antenatal anxiety throughout a child’s development.

In terms of mediating factors, Van den Burgh et al (2008) found that the effects of early maternal antenatal anxiety on adolescent depression were in part mediated by flattened day-time cortisol profiles in girls. Clavarino et al (2009) showed that chronicity of maternal anxiety in early childhood elevated the risk of attentional problems in their offspring.
2.5.5 Relationship Between Maternal Antenatal Anxiety and Child Neurodevelopmental Outcomes

Several illustrations of an association between maternal antenatal anxiety and negative neurodevelopmental outcomes were found by the included studies. These included intra-variability on a reaction time task (an outcome associated with intellectual functioning; Loomans et al., 2011b), attention (Clavarino et al., 2010; Gutteling et al., 2006; Van den Bergh et al., 2006), concentration (Gutteling et al., 2006), inhibitory control (Buss et al., 2011), visuo-spatial working memory (Buss et al., 2011), impulsivity (Van den Bergh et al., 2005) and subtests of intellectual functioning (Van den Bergh et al., 2005). However, Barker et al (2011) found no direct association between maternal antenatal anxiety and verbal IQ. These neurodevelopmental deficits may represent an extended endophenotype leading to an increased underlying vulnerability to developmental and neuropsychiatric disorders (Andersen, 2003).

2.5.6 Sex Differences in the Results

There were some demonstrations that the sex of the offspring moderated the effect of maternal antenatal anxiety on offspring outcomes (Barker & Maughan, 2009; Buss et al., 2011; Loomans et al., 2011a; Loomans et al., 2011b; O'Connor et al., 2002; O'Connor et al., 2003; Van den Bergh et al., 2006). Loomans et al (2011a) found that maternal antenatal anxiety measured at 16 weeks of pregnancy accounted for more variance in boys overall problem behaviour, aged five, than girls. Whilst O'Connor et al (2002) found that in children aged 47, maternal antenatal anxiety measured at 18 weeks was associated with higher rates of emotional problems in girls, but that maternal antenatal anxiety measured at 32 weeks was associated with higher rates of emotional problems in boys and girls, attention/hyperactivity problems in boys and conduct problems in girls. In later follow up studies of the ALSPAC cohort O'Connor et al (2003) found higher rates of behavioural and emotional problems in boys aged 81 months, than girls, and Barker et al (2009) found higher rates of persistent conduct problems in young teenage boys than girls. Similarly, maternal antenatal anxiety was shown to account for variation in intra-individual variability in reaction times and difficulties with sustained attention in boys (Loomans et al., 2011b; Van den Bergh et al., 2006). Conversely-, Buss et al (2011) found that pregnancy specific anxiety was significantly associated with impaired inhibitory control in girls, aged six to nine, not girls. These results may indicate that there are sex differences in the
programming effects of maternal antenatal anxiety; however, explanations for this are limited (Weinstock, 2001). Differential postnatal sex-specific maturational patterns and the timing of the assessment in childhood (Muftuler et al., 2011) are likely to account for these differences; following up these children in adulthood would allow further evaluation of this.

2.5.7 Timing of antenatal assessment and main effects

There was a marked degree of heterogeneity amongst the included studies in terms of the timing of the assessment of maternal anxiety during the antenatal period; Table 4 (Appendix B) summarises the main effects by the associated timing of maternal assessment. Only one of the studies’ main effects was found to be associated with maternal antenatal anxiety in the first trimester, eleven during the second trimester and five during the third trimester. Rodriguez and Bohlin (2005) was the only included study to assess antenatal anxiety before week 12. Studies by Van den Bergh’s group (Van den Bergh & Marcoen, 2004; Van den Bergh et al., 2005; Van den Bergh et al., 2006; Van den Bergh et al., 2008) assessed maternal antenatal anxiety during four time periods throughout the second and third trimesters, and consistently found that antenatal anxiety at 12-22 weeks was the strongest predictor of negative childhood outcomes. Studies from the ALSPAC cohort consistently found that maternal antenatal anxiety at 18 and 32 weeks was associated with adverse outcomes in childhood. This provides inconclusive evidence in terms of a specific period of vulnerability to the effects of maternal antenatal anxiety during the antenatal period, although the weighting of the results from the larger cohort studies are suggestive of vulnerability within the second trimester.

2.5.8 Quality Rating of the Included Studies

All studies were rated against ten quality criteria; see Table 5 (Appendix B) for a summary of the ratings. All studies recruited mothers during routine attendance at antenatal appointments - a relatively unbiased recruitment method, apart from the location of the study, when equal access to routine health services is assumed. However, not all studies explicitly state their inclusion and exclusion criteria at both recruitment and follow-up (Clavarino et al., 2009; Barker et al., 2011; Loomans et al., 2011a, O’Connor et al., 2002; Van Batenburgh-Eddes et al., 2013; Van den Bergh et al., 2008). This is largely due to them being sub-studies from a large cohort design like ALSPAC and ABCD and, as such, rely on these cohort protocols for these details.
All of the studies incorporated longitudinal follow-up. However, the length of follow-up varied considerably, meaning that there is a lack of specificity with regard to the conclusions of this review. All studies provide figures for drop-out rates. However, not all studies report results of analysis regarding the effect on this in terms of a biased follow-up sample (Barker & Maughan, 2009; Barker et al., 2011; Buss et al., 2011; Davis and Sandman, 2012; O’Connor et al., 2002; Van den Bergh & Marcoen, 2004; Van Den Bergh et al., 2005; Van den Bergh et al., 2006; Van den Bergh et al., 2008).

As per the inclusion criteria, all studies used standardised, reliable and valid assessments of maternal antenatal anxiety. However, reporting of tests for reliability and validity is not always full (Barker & Maughan, 2009; Barker et al., 2011; Davis & Sandman, 2012; O’Connor et al., 2002; Rodriguez & Bohlin, 2005; Van Batenburgh-Eddes et al., 2013). This shortcoming is mirrored in the reporting of offspring outcome assessments (Barker & Maughan, 2009; Barker et al., 2011; Davis & Sandman, 2012; O’Connor et al., 2002; Rodriguez & Bohlin, 2005; Van Batenburgh-Eddes et al., 2013; Van den Bergh et al., 2005; Van Den Bergh et al., 2006). This introduces potential variability into the measurement of outcome.

In studies that required the offspring outcome assessment to be conducted by a trained and/or unbiased assessor, particularly those assessing cognitive functioning (Barker et al., 2011; Buss et al., 2011; Gutteling et al., 2006; Loomans et al., 2011b; Van den Bergh & Marcoen, 2004; Van den Bergh et al., 2005; Van den Bergh et al., 2006), four reported that the assessor was trained and four were administered by a computer. Only one of these studies reported that the assessor was blind to results (Van den Bergh & Marcoen, 2004). This is a potential weakness, as the outcomes may have been biased during administration or interpretation of the results if they were aware of initial assessment outcomes.

The remainder of the studies outcome assessments were completed by parents self-report (Barker & Maughan, 2009; Barker et al., 2011; Clavarino et al., 2009; Davis et al., 2012; Loomans et al., 2011a; O’Connor et al., 2002; O’Connor et al., 2002; Rodriguez & Bohlin, 2005; Van Batenburgh-Eddes et al., 2013; Van den Bergh & Marcoen, 2004), by children themselves (Barker & Maughan, 2009; Clavarino et al., 2009; Van den Bergh & Marcoen, 2004; Van den Bergh et al., 2008) and by teachers (Barker et al., 2011; Loomans et al., 2011a; Rodriguez et al., 2005; Van den Bergh & Marcoen, 2004). The subjective nature of self-report measures leads to potential biases in the results, as such, where
only one informant (parent, child or teacher) was recruited this quality criteria was rated as adequately assessed.

In terms of the assessment of confounding variables and their appropriate inclusion in analyses, consideration of antenatal variables, obstetric birth outcome variables and postnatal characteristics (including postnatal maternal mood) and maternal mood at time of follow-up outcome assessment were included in 13 studies (Barker & Maughan, 2009; Buss et al., 2011; Clavarino et al., 2010; Davis & Sandman, 2012; Gutteling et al., 2006; Loomans et al., 2011a; Loomans et al., 2011b; O’Connor et al., 2002; O’Connor et al., 2003; Van den Bergh & Marcoen, 2004; Van den Burgh et al., 2005; Van den Bergh et al., 2006; Van Den Bergh et al., 2008). Van Batenburgh-Eddes et al (2013) adjusted for demographic antenatal characteristics and maternal mood at the time of follow-up outcome assessment, but no obstetric covariates. Obstetric risks were not accounted for in the analysis by Barker et al (2011). Rodriguez and Bohlin (2005) did not consider obstetric or postnatal maternal mood covariates, which may in themselves be proxies to antenatal mood and have been shown to have independent contributions to child development (Glasheen, Richardson, & Fabio, 2010).

With regard to statistical analyses, most papers provide a comprehensive summary of effect sizes and confidence intervals. None of the studies either report or refer to a power calculation in their papers. However, if small sample size is noted as a limitation (Gutteling et al., 2006; Loomans et al., 2011b; Rodriguez et al., 2005; Van den Bergh & Marcoen, 2004; Van den Burgh et al., 2005; Van den Bergh et al., 2008) or if the cohort is of a large size it would be reasonable to conclude that power issues have been considered and adequately addressed.

In terms of the overall quality of the studies included, the mean score was 15 out of a maximum of 20, with all but three papers scoring within two points of this. It is likely that the majority of the shortcomings noted here are due to a lack of reporting in articles as opposed to poorly designed studies.

2.6 DISCUSSION

The studies included in this review show an effect of maternal antenatal anxiety on a variety of child psychopathology and neurodevelopmental outcomes, from ages 3 to 15, with maternal anxiety having been assessed in all trimesters of pregnancy. The child outcomes include emotional, behavioural and
cognitive domains. The child outcomes range in severity from meeting the diagnostic criteria of ADHD (Rodriguez & Bohlin, 2005) to non-clinical individual differences in cognitive performance (Buss et al., 2011). The diversity and apparent pervasiveness of the psychopathological and neurodevelopmental outcomes is considerable. These results suggest, but do not confirm, a role of foetal programming in increasing offspring vulnerability. Whilst the studies in this review show that both the risk phenotype and developmental outcomes are fairly broad, there is limited specificity regarding both the magnitude and timing of exposure. Also, they do not directly demonstrate the mechanisms through which maternal antenatal anxiety is ‘communicated’ to the foetus.

2.6.1 Possible Mechanisms of Vulnerability

The results from this review illustrate the transmission of vulnerability from mother to offspring, with expressed anxiety as the proxy, this invites discussion regarding possible mechanisms involved in this. There is a large amount of animal research supporting a general foetal programming hypothesis, specifically, it has shown that antenatal and postnatal stress is predictive of adult behavioural and physiological outcomes (Schneider & Moore, 2002). Some of the strongest evidence for the foetal programming hypothesis in humans comes from monitoring of the intrauterine environment and the later physical health outcomes of offspring (Tegethoff, Greene, Olsen, Schaffner, & Meinlschmidt, 2011; Khashan et al., 2012; Mayes, 2000). Indeed, abnormal development of the brain during gestation is known to manifest in psychopathological conditions throughout the lifespan (Rees, Harding, & Walker, 2008). For example, reductions in the volume of grey matter in specific regions of offspring’s brains have been shown to be associated with high levels of pregnancy specific anxiety (Buss, Davis, Muftuler, Head, & Sandman, 2010), this potentially increases vulnerability to neurodevelopmental and psychiatric disorders as well as impaired cognitive and intellectual functioning. There have been several demonstrations of the impact of maternal mood and the associated physiological responses on the foetus, for example by inducing stress or relaxation (DiPietro, Costigan, Nelson, Gurewitsch, & Laudenslager, 2008; Monk et al., 2011). These findings show a real-time communication between mother and foetus. The results from this review do lend some tentative, albeit indirect, support for the programming hypothesis. However, the development research into the mechanisms involved is itself still in its infancy.
Studies examining the biological mechanisms have focused largely on the altered functioning hypothalamic-pituitary-adrenal (HPA) axis over the course of gestation, critically involved in the biological response to stress and threat. There are suggestions that increased maternal antenatal stress could result in transplacental transport of cortisol to the foetus, a release of hormones within the placenta, and/or a decrease in blood flow to the placenta, potentially altering brain maturation and HPA-axis functioning in offspring (Huizink, Mulder, & Buitelaar, 2004; Sandman, Davis, Buss, & Glynn, 2011). This may increase the susceptibility of offspring’s neurobiology to the environment, in terms of regulating the effects of the environment on health, development and adaptation (Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Ijzendoom, 2011).

There may also be genetic factors at play, a shared variance, although the evidence for this is not confirmatory (Braithwaite et al., 2013; Pluess et al., 2011). Many of the studies included in this review controlled for maternal mood at more than one point, either during the antenatal, postnatal or follow-up period, and a specific contribution of antenatal anxiety still remained; this does not support genetic mediation. If there is a significant genetic contribution, then a similar association would be expected to exist between fathers and their offspring, with whom the children share genetic variance.

With regard to the temporal period in which these mechanisms may operate, the results suggest that the effects of maternal antenatal anxiety are maximal during the second trimester, although this evidence is not conclusive. There were also indications of negative offspring outcomes associated with anxiety measured in the first (Rodriguez & Bohlin, 2005) and third trimesters (Barker & Maughan, 2009; Barker et al., 2011; Davis & Sandman, 2012; O’Connor et al., 2002; O’Connor et al., 2003). Whilst most studies employed assessments of state anxiety, there is a lack of temporal boundaries surrounding a period of anxiety. Anxiety may have been elevated prior to and/or following assessment, potentially causing discrepancies. It may have been due to recruitment strategies employed by the studies meaning that limited assessments of maternal antenatal anxiety were taken within the first and third trimesters. However, this may have been by design, to avoid contamination with anxieties about the viability of the pregnancy in the first trimester and the imminent birth in the third trimester. This in itself highlights the difficulties of defining a temporal period of anxiety.

It is likely that the effects of a suboptimal intrauterine environment are moderated by early care and postnatal factors. Indeed, the effect sizes indicate that a substantial proportion of the variance is due
to other factors. The studies included in this review predominantly use demographic characteristics as proxies for the child's environment and health. However, these fail to capture some of the psychological constructs known to be important to child development and those known to bolster resilience; for example, parental attachment style, mentalisation, parenting styles, infant attachment, self-compassion and mindfulness. For example, Pearson et al (2012) examined maternal sensitivity in 872, one year old, mother-infant pairs from the ALSAC study, and found that those who had high depressive symptoms during the antenatal period were 30% more likely to show low levels of responsiveness, whilst postnatal depression symptom scores did not increase the risk of impaired maternal sensitivity. It is likely that the effects of maternal antenatal anxiety are a component part in the complex interaction between genetics, biological, contextual and psychological factors contributing to a child's development (Rutter, Moffitt, & Caspi, 2006).

2.6.2 Limitations of the Literature

Whilst there are associations between maternal antenatal anxiety and child outcomes, these are modest. One possibility accounting for the modest effect sizes could be that participants are self-selecting and report relatively low levels of maternal antenatal anxiety and negative child outcome behaviours (Loomans et al., 2011a). Also, studies report differences in antenatal maternal mood, between with those participating at follow-up reporting less distress during pregnancy than those who did not participate at follow-up (e.g. O'Connor et al., 2002). Indeed, the effects on offspring development are larger when analysis is carried out on sub-groups of mothers who experienced high antenatal anxiety (e.g. Loomans et al., 2011b), suggesting that in a clinical or vulnerable population these effects may be larger. It is also possible that, in some studies, the strength of the association is influenced by the timing of the antenatal assessment, if only one is completed (Loomans et al., 2011a).

Importantly, some exclusion criteria applied at follow-up may in themselves be associated with maternal antenatal anxiety and, therefore, may have led to conservative effect sizes. For example, children who had diagnosed neurological conditions at follow up (Loomans et al., 2011b), low birth weight (Gutteling et al., 2006) and maternal antenatal tobacco use (Buss et al., 2011). Despite this, significant effects are reported in offspring where obstetric complications or maternal postnatal mood cannot be considered as contributing factors.
The maternal antenatal anxiety assessment measures used are all self-report questionnaires; none of the studies employed clinical interviews, which may have identified specific maternal psychopathologies and their associated behavioural, cognitive and biological profiles. However, a recent meta-analysis showed that there was no difference between effect sizes of maternal postnatal psychopathology measured by self-report or through application of a clinical diagnosis on offspring outcome (Goodman et al., 2011). A diverse set of measures for maternal antenatal anxiety were used and each measure takes a slightly different approach to defining the concepts of “anxiety and stress”. This means that collectively the results lose some specificity, leading to suggestions that the risk phenotype may be fairly broad.

In studies where more than one measure is utilised, it remains unclear as to why one measure may be associated with a negative offspring outcome and another is not (Davis & Sandman, 2012; Buss et al., 2011; Gutteling et al., 2006). It is unlikely that these measures represent distinctly different experiences. There are also no estimations of premorbid trait anxiety. It may be that if a mother has been chronically anxious this may contribute to various biological and psychological factors, potentially affecting foetal and child development.

Several of the studies included in this review show that the effects of maternal antenatal anxiety on offspring persist into adolescence; this could be considered as evidence for the foetal programming effects of anxiety. However, the studies included in this review are limited in their consideration of moderating factors, both throughout the antenatal period and the child’s development, lifestyle, psychological and health factors. For instance, it has been reported that anxious mothers are more likely to be disengaged (Bogels & Brechman-Toussaint, 2006; McLeod, Wood, & Weisz, 2007) and engage in over-controlling parenting (Schrock & Woodruff-Borden, 2010); over-controlling parenting has been associated with internalising and externalising difficulties in children (Joussemet et al., 2008; Schrock & Woodruff-Borden, 2010).

Many of the reported child outcomes are based on maternal reports of child behaviour, which are likely to be subjective and, as such, related to bi-directional influences. For example, maternal experience of internalising symptoms has been shown to affect their report of child problem behaviour (Briggs-Gowan, Carter, & Schwab-Stone, 1996; Fergusson, Lynskey, & Horwood, 1993; Kroes, Veerman, & De Bruyn, 2003; Najman et al., 2000). This may contribute to modest findings when
Maternal psychopathology is taken into consideration at initial assessment and follow-up (e.g. Loomans et al., 2011a).

Mothers experiencing anxiety and/or depression during pregnancy are more likely to experience symptoms of these during the postnatal period, which is likely to affect parenting throughout the child’s early years. Indeed when postnatal mood is taken into account, lower associations between maternal antenatal anxiety and child outcome are reported (O’Connor et al., 2002). Although some studies take into account maternal postnatal mood and maternal mood at follow up, these may not capture the child’s life course exposure to maternal mood. Calvarino et al. (2009) illustrated that, whilst maternal antenatal anxiety alone is predictive of attentional problems in offspring, the effect is greater when maternal anxiety is chronic across the perinatal period. Finally, none of the studies, other than Van Batenburg-Eddes et al. (2012), have taken into account the role of paternal mental health, therefore ignoring the shared impact of this on both mother and child’s health and development.

2.6.3 Potential biases in the Review Process

It is possible that the search process and terms used may have biased results, as specific terms for child psychopathology and neurodevelopmental outcomes were not used. The search terms were also specific to maternal antenatal anxiety; this means that other maternal antenatal mental health problems where anxiety was measured as covariate may not have been identified during the search. However, this seems unlikely when the included results are compared against past literature reviews in the area (e.g. Talge et al., 2007).

With any systematic review an element of subjectivity should be acknowledged, for example in the selection of and rating of quality criteria. Attempts were made, however, to reduce this by making only minor adaptations to published reviewing guidelines (SIGN 50) and through enlisting an independent reviewer. Despite this, the quality criteria were not validated, so interpretation of the results should be cautionary. Unpublished studies were excluded from this review, which may mean that the reported findings are subject to publication bias. This is likely to be a particular problem when conducting prospective studies akin to those included in this review.
2.6.4 Implications for Research

All of the included studies were conducted in the UK, Australia, USA and Europe. This limits the generalizability of current findings to other countries, especially those that are considered to be developing or are experiencing war/conflict. Therefore, cross-cultural research into the anxieties experienced by women during the antenatal period could potentially add to the shared knowledge of risk and resilience factors for children.

Only two of the included studies combined a physiological measure of anxiety with a standardised self-report assessment (Davis & Sandman, 2012; Van den Bergh et al., 2008). This should be considered in future research, as it may add to the understanding of the programming hypothesis.

It is clear from the literature summarised here that maternal antenatal anxiety adds to the vulnerability of offspring. However, the results also suggest that not every child is affected in the same way. Therefore, there is de facto a significant degree of inter-individual and inter-dyad variability. More research into the effects of the dose of anxiety, timing, other residual vulnerability factors and their pairings with protective factors is required (Rothman, Greenland, & Lash, 2008). For example, this could be done by retrospectively examining protective factors at points of longitudinal follow up. It is also worth noting that the clinical significance of the results is limited by the non-diagnostic nature of the outcome assessments administered. Future findings could be strengthened by the use of assessments routinely used within clinical settings to identify caseness.

It could be suggested from the research that there might be a reduction in the incidence of childhood psychopathology and neurodevelopmental problems if mothers receive appropriate antenatal intervention for stress/anxiety. Effective interventions rely on further examination of moderating psychological, social and health factors affecting the onset, severity and course of maternal antenatal anxiety, across the risk phenotype. This should also include continued research into understanding the underlying the possible biological programming mechanisms of anxiety during gestation (Cuthbert & Insel, 2010).
2.6.5 Implications for Clinical Practice

The results have considerable implications for clinical practice. Given the shared impact of maternal antenatal anxiety the implications are relevant for maternal perinatal psychological care and child mental health care. Given that women included in the studies were not required to meet clinical “caseness” or diagnosis, yet there remained an effect on the offspring, there needs to be a broadening of the phenotype for which intervention is deemed appropriate. With regard to clinical practice with children, the evidence summarised in this review suggests that maternal antenatal anxiety is a potential contributing factor to child psychopathology, but it does not currently suggest that differential treatments are required for children where this has been identified as a factor.

Psychological and behavioural interventions delivered during pregnancy may have preventative benefits to the offspring as well as mothers. It could be suggested that specialist interventions may be required during the perinatal period, given the hormonal and social changes occurring during this period. Comparative evidence, however, is sparse as pregnancy is frequently an exclusion criterion in treatment efficacy studies (O’Connor et al., 2014). A recent exploratory trial with vulnerable mothers showed modest improvements in maternal mental health following engagement in the “Mellow Bumps” intervention, aimed at decreasing antenatal stress and increasing maternal understanding of the importance of early interactions (Wilson et al., 2013).

Several traditional psychological interventions have been trialled for the treatment of low maternal mood during the antenatal period specifically, including Interpersonal Psychotherapy (IPT; Sockol, 2011; Spinelli & Endicott, 2013) and Cognitive Behavioural Therapy (Austin et al., 2008), with mixed results. There is growing exploration of the use of non-traditional interventions (e.g. yoga, relaxation and mindfulness-based stress reduction) during the antenatal period, which are potentially preferable and more accessible to pregnant women; however, it has been suggested that these studies often fail to meet methodological criteria for review and that further research into these interventions is required (Cochrane review; Dennis & Allen, 2008).

Given the demonstrated influences of maternal mood across the perinatal period on offspring outcomes, intervention is likely to have a beneficial effect when delivered at any time during the perinatal period. Indeed, interventions delivered during the postnatal period may moderate the impact of antenatal anxiety on offspring outcomes, through optimising early care (Bergman, Sarker, Glover, &
O'Connor, 2010). Providing intervention during the antenatal period is shown to reduce the risk of postnatal depression, which itself impacts upon offspring development (Dennis & Dowsell, 2013).

Professional and public awareness regarding the long-term impacts of maternal mental health during the perinatal period continue to rise. It is likely that increased screening of maternal mood during pregnancy for all would ensure that mothers who are most vulnerable are identified and offered needs matched interventions. Given the unique risk factors to mental ill health during the perinatal period, and the broad phenotype shown to have long-term impacts on offspring development, self-help information delivered to mothers regarding the identification of symptoms of distress and simple stress reduction techniques are likely to be beneficial, as well as clinical staff making use of perinatal maternity liaison services for those mothers for whom concern is greatest (No Health without Mental Health, 2011).

Another consideration, for both clinicians and researchers, is the need to gain further understanding of the qualities of the bidirectional processes within a family which may impact of their wellbeing during the perinatal period on maternal mental health and offspring outcomes, specifically those between partners and those between parents and their offspring. Paternal mental health during the perinatal period has also been found to be affected by maternal mental health and to contribute to increased risks to offspring development (Ramchandani et al., 2008).

2.6.6 Concluding Remarks

This review offers further evidence for the effects of maternal antenatal anxiety on offspring psychopathology and neurodevelopmental outcomes. These effects were found to be varied in terms of specific outcomes, effect sizes and the timing of the maternal antenatal anxiety; but nevertheless offer support to findings from experimental animal studies. Findings are suggestive of a foetal programming effect. Future research is required into the mediating psychological, biological and social mechanisms involved in this. Likewise, future research is required into effective psychological interventions that can be delivered during the antenatal period. Given the broad risk phenotype, a broad delivery of low intensity interventions may be implicated for mothers throughout the perinatal period.
ACKNOWLEDGEMENTS

The author would like to thank research supervisors Dr Angus Macbeth and Professor Matthias Schwannauer for their support in completing this review and Hannah Watkins (Trainee Clinical Psychologist) for her assistance in selecting and rating the reviewed papers.

REFERENCES


Braithwaite, E. C., Ramachandani, P. G., O'Connor, T. G., van Ijzendoorn, M., Bakermans-Kranenburg, M. J., Glover., V. & Murphy, S. E. (2013). No moderating influence of the serotonin...


preterm birth at less than thirty-five weeks’ gestation. *American Journal of Obstetrics and Gynaecology*, 175, 1286-1292.


3. RESEARCH AIMS AND HYPOTHESES

AIMS

As outlined in the systematic literature review (Chapter 2), maternal antenatal psychopathology is associated with suboptimal outcomes in offspring. However, it is likely that a substantial proportion of variance in offspring outcomes is unexplained by this relationship. Consequently, an understanding of the mediating and protective factors underlying this relationship merits further exploration. The principle objective of the present study is to explore adult attachment style and self-compassion as protective factors in parents’ experience of emotional distress during the antenatal period. The study will investigate relationships between self-compassion and adult attachment style in relation to antenatal attachment, emotional distress and obstetric outcomes in mothers and their partners. Specific hypotheses are outlined below.

HYPOTHESES

Primary Hypothesis One

It is hypothesised that high levels of parental antenatal anxiety will be negatively correlated with low levels of self-compassion and adult attachment security in mothers and their partners.

Primary Hypothesis Two

It is hypothesised that high levels of parental antenatal depression will be negatively correlated with low levels of self-compassion and adult attachment security in mothers and their partners.

Secondary Hypothesis One

It is hypothesised that higher parental antenatal attachment will be positively correlated with higher levels of self-compassion and adult attachment security, and lower levels of distress.

Secondary Hypothesis Two

It is hypothesised that better neonatal outcomes will be positively correlated with higher levels of self-compassion, antenatal attachment and adult attachment security, and lower levels of distress.

Secondary Hypothesis Three

It is hypothesised that the direct relationship between adult attachment security and levels of distress will be partially mediated by self-compassion.
4. EMPIRICAL PAPER\textsuperscript{1, 2}

4.1 TITLE PAGE

Title: Self-compassion mediates the relationship between adult attachment style and distress during the antenatal period.

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This review was completed as part of a Doctorate in Clinical Psychology with the University of Edinburgh and NHS Grampian.

Acknowledgements

The author would like to thank my research supervisors Dr Angus Macbeth and Professor Matthias Schwannauer for their support in the preparation of this paper.

\textsuperscript{1} Produced according to author submission guidelines for the journal “Development and Psychopathology” (Appendix D).

\textsuperscript{2} Titles are numbered for thesis submission but will be removed for submission to journal. Tables (Appendix E) and figures (Appendix F) are included in the thesis appendix, as per journal guidelines. Font size is kept at 10 for submission of thesis but will be changed to 12 for journal submission.
4.2 ABSTRACT

Introduction: Maternal psychological distress during the antenatal period has been shown to have long-term effects on offspring outcomes. Psychological processes involved in this relationship are poorly specified. In adult non-perinatal samples, self-compassion and attachment security have been identified as protective factors in modulating stress. This study examines these factors during the antenatal period and their relation to parental mood, antenatal attachment and neonatal outcomes.

Method: During the second trimester, 77 women and 38 partners completed self-report assessments of distress (anxiety and depression), adult attachment style, self-compassion and antenatal attachment. Neonatal birth outcome data were gathered for 44 births.

Results: The results indicated that higher levels of self-compassion and attachment security were related to fewer self-reported symptoms of distress in mothers and partners. Self-compassion was found to mediate the relationship between attachment security and distress. Neither antenatal attachment nor birth outcomes were significantly related to attachment security, self-compassion or levels of distress.

Discussion: The role of self-compassion as a protective mediating factor is discussed in relation to identification and treatment of distress during the antenatal period. Implications for future research and clinical practice are also discussed.

KEYWORDS self-compassion, attachment, pregnancy, anxiety, depression
4.3 INTRODUCTION

Pregnancy and the transition into parenthood is a significant life-event with inherent stress (Belsky, Ward, & Rovine, 1986). The prevalence of mental health problems during the ante- and postnatal periods are recognised as a significant public health concern (Gavin et al., 2005; Heron, O’Connor, Evans, Golding, & Glover, 2004; Matthey, 2004). Research regarding the identification and treatment of psychopathology has traditionally focused on the postnatal period; however, there is growing evidence that maternal antenatal psychopathology has long term effects on offspring’s physical and psychological health (Deave, Heron, Evans, & Emond, 2008; Talge, Neal, & Glover, 2007). These effects include obstetric outcomes, for example, lower gestational age and birth weight (Weinstock, 2008). Effects on infant temperament, sleep and attachment have also been illustrated (Austin, Hadzi-Pavlovic, Leader, Saint, & Parker, 2005; Del Carmen, Pedersen, Huffman, & Bryan, 1993; O’Connor et al., 2007). Whilst there are fewer prospective studies illustrating the effects on child and adolescent development, a modest association is evident (O’Connor, Heron, Golding, Beveridge, & Glover, 2002; Ram, Macbeth & Schwannauer, in preparation). A considerable proportion of variance in offspring outcomes is unexplained and, consequently, an understanding of the mediating and protective factors underlying this association is required. Research identifying protective factors to maternal distress during the antenatal period will aid the identification of targets for intervention during this period.

To date most research on perinatal (ante- and postnatal) psychopathology has focused on that experienced by mothers. However, recent evidence suggests that fathers also experience increased psychopathology during the perinatal period. A recent meta-analysis estimated the rate of paternal depression to be 10.4% between the first trimester and one year (Paulson & Bazemore, 2010). Studies have also indicated that fathers report higher levels of psychological distress during the antenatal period as opposed to the postnatal period (Buist, Morse & Durkin, 2003; Condon, Boyce, & Corkindale, 2004). There is some evidence to suggest an interaction between the psychopathology experienced by each partner, both outwith the perinatal period and during it (Matthey et al, 2004; Paulson & Bazemore, 2010; Wee, Skouteris, Pier, Richardson, & Milgrom, 2011). Goodman (2004) found that observed rates of paternal postnatal depression were higher in father’s whose partners were also experiencing postpartum depression. There is some evidence that paternal depression during the perinatal period may have a long term effect on offspring’s emotional and behavioural...
development (Ramchandani et al., 2008). The effect size for this association was larger when fathers experienced both antenatal and postnatal depression. This suggests that early interventions aimed at ameliorating the effects of parental low mood should consider both mothers and their partners. As such, a better understanding of the psychological factors involved in maintaining or reducing distress in these groups is required.

The construct of self-compassion has been identified as being a protective buffer against the psychological impact of stressful events, primarily expressions of psychopathology such as depression, anxiety and stress (Leary, Tate, Adams, Allen, & Hancock, 2007; Neff, 2003; Macbeth & Gumley, 2012). A recent review found a large effect size between self-compassion and levels of psychopathology (Macbeth & Gumley, 2012). Gilbert (2010) explains compassion in terms of the interaction between three affective systems, partially defined by their neurophysiological substrates (Depue & Morone-Strupinsky, 2005). Firstly, the threat system detects and responds to threat, i.e. the flight/fight response and the corresponding emotions, anxiety/anger. Secondly, an incentive seeking system functions as motivation, excitement and drive. Lastly, the soothing system, this is representative of the human attachment system which desires to alleviate distress in others. These affective systems balance each other according to an individual’s goal. Specifically, compassion is understood as one’s ability to respond to negative affect (threat) in the self or another with the expression of kindness and non-judgemental understanding (sooth). Given the prevalence and impact of maternal psychopathology during the antenatal period, higher self-compassion could be a protective factor during the antenatal period.

A theoretical application of Gilbert’s (2010) model of compassion to psychological distress during the perinatal period has been proposed (Cree, 2010). Whilst for many mothers pregnancy is a time of joy, considerable threat may also be experienced. Examples of threats experienced during pregnancy are hormonal changes, physical bodily changes, tiredness, the actual birth, perceived or actual lack of support and fears regarding fulfilling the role of “mother”. Cree (2010) also suggests that the maternal attachment system may be a source of threat, in that the mother’s own learned emotional contingencies may be reactivated under the imminent expectation of providing care to another. This suggests an inextricable link between the mothers own attachment system, moderation of the
affective systems and her ability to feel compassion towards self and others. Supporting this, Neff and McGehee (2010) found that higher levels of self-compassion were related to attachment security in young adults. Cree (2010) suggested that increasing one’s self-compassion during the antenatal period would inhibit the threat system. Oxytocin is thought to be a major hormone involved in the soothing system and in the formation of mammalian attachment bonds, for example in maternal bonding to the foetus/infant (Bell, 2001; Carter, 1998). It is thought that, at times when the threat system suppresses the positive affective systems, oxytocin is disrupted. As a result, Cree (2010) suggests that if the mother’s soothing system is reactivated/boosted then oxytocin will be regulated, inhibiting the threat system. This model, therefore, suggests that secure maternal attachments are more likely to be associated with higher levels of self-compassion and lower levels of psychopathology during pregnancy.

To date, only one study has examined self-compassion as a protective factor during the perinatal period (Sawyer-Cohen, unpublished data). As seen previously, there is a significant association between self-compassion and perinatal psychopathology. A significant amount of the variance in antenatal attachment was also accounted for by maternal levels of self-compassion. However, this study did not control for maternal adult attachment-style. Theoretical and empirical evidence suggests that attachment is highly likely to be a covariate of self-compassion (Cree, 2010; Gilbert, 2010; Raque-Bogdan, Ericson, Jackson, Martin, & Bryan, 2011). Neither the mother’s or partner’s adult attachment style or a partner’s psychopathology were considered by Sawyer-Cohen (unpublished data).

Attachment theory posits that responsive and sensitive care giving for infants is critical (Bowlby, 1969) and that this is potentially mediated by the carers own attachment style (Cree, 2010). Typically, those with an insecure attachment style are characterised by fear or distrust in relationships, or worry about the emotional availability of others. Pregnancy is a time where attention and cognitions are likely to be focused on current, future and past attachment relationships (Monk, Leight, & Fang, 2008). Maternal adult attachment insecurity has been associated with pregnancy “hassles”, depression during the perinatal period and marital dissatisfaction (Monk et al, 2008; Feeny, Alexander, & Noller, 2003). Fonagy, Steele and Steele (1991) found a strong relationship between adult attachment security
measured during pregnancy and the infants’ attachment security at one year. It is likely that throughout the antenatal period parents begin to develop an antenatal attachment to the foetus. Indeed, maternal antenatal attachment has also been related to postnatal infant attachment and mother-infant interaction (Muller, 1996; Siddiqui & Hagglof, 2000). Infant attachment has been shown to impact greatly upon the later development of the child, specifically emotion dialogues between mother and child (Oppenheim, Koren-Karie, & Sagi-Schwartz, 2007). Lindgren (2001) found that maternal antenatal psychopathology was related to the level of antenatal attachment security, which itself was associated with positive health practices during pregnancy. Paternal antenatal attachment has been somewhat overlooked in the research, although measures do exist (Brandon, Pitts, Denton, Stringer, & Evans, 2009; Maas, Vreeswijk, de Cock, Rijk, & Van Bakel, 2012).

Consideration of the potential interaction between both partners’ adult attachment styles is also important, especially during the perinatal period which is familial and systemic in nature. Whilst a sense of attachment is thought to develop primarily through our interactions with our primary caregivers, it is also thought that interactions within meaningful and significant relationships throughout life affect our beliefs about others’ availability and supportiveness (Bowlby, 1969). It is also thought that these, whilst current beliefs can be contradictory to one’s global sense of attachment, can be related to the context of a specific relationship (Collins & Read, 1994). Self-report measures of adult attachment are largely assessments of one’s own attachment in close adult relationships and, as such, lead to an over generalisation of “state” attachment within the current dyad. Therefore within the context of pregnancy, a partner’s adult attachment style is likely to have an effect on the mothers rating of this.

The transition to parenthood brings complex interactions between current, past and evolving attachment relationships. Self-compassion and adult attachment style have been shown to be independent protective factors against depression and anxiety. However, it is likely that, given the relationship between self-compassion and attachment, there is an indirect effect, with self-compassion mediating the direct relationship between adult attachment style and mood during pregnancy. Given the long-term impact of psychopathology during pregnancy on developmental outcomes of offspring, further understanding of the relationship between both maternal and paternal
attachment (adult and antenatal) and self-compassion is vital, in order to provide improved and tailored interventions during this period. This study, therefore aims to assess whether a relationship between self-compassion and psychopathology exists when controlling for adult attachment styles in both mothers and their partners, and the effect of these factors on antenatal attachment and obstetric outcomes. It is first hypothesised that antenatal distress will be negatively correlated with self-compassion and adult attachment style. Secondly that higher antenatal attachment and better neonatal birth outcomes will be associated with higher levels of self-compassion and attachment security, and lower levels of distress. It is also hypothesised that self-compassion mediates the relationship between attachment security and antenatal distress. This may indicate that compassion focused interventions are appropriate for increasing well-being and thus reducing distress during the antenatal period.

4.4 METHOD

4.4.1 Design and Procedure

Women and their partners were recruited and cross-sectional, quantitative, self-report data were collected. All mothers consented to the collection of longitudinal neonatal birth outcome data as a follow-up; 60% of mothers had delivered at the time of paper preparation. Women and their partners were approached at routine antenatal midwifery appointments during their second trimester (mean: 21 weeks) by a member of their care team. They were given a questionnaire pack upon verbal agreement and, following consent, returned the completed questionnaires by post. The study was approved by the North of Scotland Ethics Committee and relevant NHS Research and Development departments. All participants gave their informed consent.

4.4.2 Participants

All women who attended an antenatal scanning appointment and who met the inclusion criteria were eligible to take part in this study. The inclusion criteria were: women who were in their second trimester, over the age of eighteen, literate in English and had intentions of carrying the pregnancy to term. Mothers who had a diagnosis of a psychotic or neurological disorder, were using substances, had a confirmed non singleton pregnancy or were a surrogate were excluded from the study. Mothers were asked to invite their partners to take part if they themselves were taking part; the same exclusion
criteria were applied to partners. A total of 475 women and their partners were given questionnaire packs; 77 mothers and 36 partners returned their questionnaire packs.

4.4.3 Measures

Five self-report measures were completed alongside a demographic data collection sheet by all mothers and partners taking part.

Self-Compassion Scale (SCS; Neff, 2003)

The independent variable of self-compassion was assessed using the SCS. The SCS is a self-report assessment with 26 items assessing the frequency of certain behaviours; these are rated on a 5-point Likert scale and scored positively and negatively. The outcomes of this measure include a total score of self-compassion and 6 subscale scores (Self-Kindness, Self-Judgement, Common Humanity, Isolation, Mindfulness and Over-Identification). It is reported to have high internal consistency, Cronbach’s α = 0.92 (Neff, 2003). The total score for this scale was used in the regression and mediation analysis due to collinearity between the subscale scores.

Maternal Antenatal Attachment Scale (MAAS, Condon, 1993) and Paternal Antenatal Attachment Scale (PAAS, Condon, 1993)

The MAAS (19 item) and PAAS (16 item), both self-report measures, were used to assess maternal and paternal antenatal attachment. These assessments provide a score of “global” antenatal attachment and two subscale scores, one measuring “quality” and the other “intensity”. The “quality” score describes the affective experience and the “intensity” score refers to the amount of time the parent spends thinking/dreaming about, interacting with and talking to the foetus. These measures are reported to be reliable and valid, Cronbach’s α = 0.82 (Condon, 1993). The “global” subscale score was used in the regression and mediation analysis, due to collinearity between the subscale scores.

The Experiences in Close Relationships- Revised (ECR-R; Fraley, Waller, & Kelly, 2000)

In the current study, the ECR-R, a 36-item self-report measure, was used to assess adult attachment style. It is based on romantic attachment and provides two scores, one of attachment anxiety and one of attachment avoidance. In this measure, romantic attachment is defined as an individual’s emotional
feelings associated with their general experience in intimate relationships. Sibley and Liu (2004) showed correlations of >0.90 in test-retest analysis (later confirmed by Sibley, Fischer & Liu, 2005). Sibley, Fischer and Liu (2005) also conducted confirmatory factor analyses which showed that the ECR-R conforms to a two factor structure.

*Edinburgh Post-Natal Depression Inventory (EPDS; Cox, Holden, & Sagovsky, 1987)*

Antenal depression was assessed using the EPDS. It is a 10-item, self-report measure of depressive symptoms, focusing on cognitive symptoms as opposed to biological ones, which may be tied to the pregnancy rather than mood. Scores have been shown to have high specificity (95.7%) and sensitivity (81.1%) in mothers (Murray & Carothers, 1990). Whilst initially designed for use in the postnatal period, this measure has been validated for use during the antenatal period (Murray & Cox, 1990; Cox & Holden, 2003; O'Connor et al., 2002). The EPDS has also been validated for use during the perinatal period with fathers (Matthey, Barnett, Kavanagh, & Howie, 2001; O’Connor et al., 2003), with estimates of sensitivity ranging from 71% to 86% and specificity ranging from 75% to 94% (Matthey et al., 2001; Ramchandani et al., 2008).

*State-trait Anxiety Inventory (STAI; Spielberger, 1983)*

Antenatal anxiety was assessed using the STAI; it is a self-report measure of the temporary condition of “state anxiety” and the long standing quality of “trait anxiety”. The use of the STAI during the antenatal period is considered to be reliable (Davis et al., 2004; Hart & McMahon, 2006; O’Connor et al., 2003). The STAI has also been found to be reflective of anxiety-related experiences of pregnant women, with the risk level of the pregnancy being reflected in the state score (Gunning et al., 2010). The state subscale was used in the regression and mediation analysis, due to colinearity between the two subscales.

*Neonatal Birth Outcome Data*

Routinely collected birth outcome data was obtained from maternity records. This included gestational length, birth weight, length of labour, sex and delivery method. The APGAR scores (Apgar, 1953) at one minute and five minutes after birth were also extracted from maternity records. The APGAR score is determined by an evaluation of the neonate on five criteria (appearance, pulse, grimace, activity,
respiration), rated on a scale of zero to two, resulting in an APGAR score between zero and ten for each time point.

4.4.4 Statistical Analysis

All data were analysed using IBM SPSS statistics Version 19. Data were checked to ensure that it met the assumptions for multiple regression analyses were met; results indicated that several variables were non-parametric, both in terms of skewness and kurtosis. Consequently, all data were bootstrapped for all analyses, reflected in all reported confidence intervals. A series of t-tests, Kruskal-Wallis tests and correlations were used to identify significant demographic covariates. Hypotheses were then tested through a series of correlations, before proceeding to modelling of the data using multiple regression and mediation analyses. The mediation process utilised a resampling bootstrapping technique. One mother and two partners did not complete the ECR-R; one partner did not complete the SCS. All data from these three participants were excluded from analyses using these measures.

4.5 RESULTS

4.5.1 Sample Demographics and Measurement Characteristics

The demographic characteristics for mothers (n=77) and their partners (n=38) are detailed in Table I (Appendix E). The mean age of mothers was 30 years (SD=5.4) and of partners was 34.1 years (SD=6.7). The majority of participants were white British (mothers 96.1%; partners 94.7%) and self-reported as having no religious faith (mothers 68.8%; partners 65.8%). A majority of mothers reported their highest educational undertaking to be either college (37.7%) or undergraduate courses (34.4%); whilst a majority of partners reported theirs to be either high school (39.5%) or undergraduate courses (28.9%). Full-time employment was reported by the majority of both mothers (46.8%) and their partners (76.3%). A household income of £50000 per year or below was reported by 72.8% of mothers. The majority of mothers reported that their partners either lived with them (54.5%) or that they were married (42.9%) and the average length of their current relationship was 6.4 years (SD=4.11). A majority of mothers reported that their pregnancy was planned (79.2%), low risk (68.8%) and that they had experienced quickening (90.9%). The average gestation time at participation was 21.1 weeks (SD=1.4). Only 3.9% of mothers reported that they were smoking at this time.
The descriptive statistics for all self-report measures, for all participants, are shown in Table II (Appendix E). A series of independent t-tests were conducted to compare mothers’ and partners’ outcomes for these variables. A significant difference was found between the EPDS scores (t(113)=−2.017, p<.05), trait anxiety (t(113)=2.078, p<.05), and the SCS over-identification subscale (t(112)=−2.581, p<.05); in all cases mothers scored higher than partners. All antenatal attachment scores were also significantly different, global attachment score (t(113)=−16.728, p<.001), attachment quality (t(113)=−22.170, p<.001) and attachment preoccupation (t(113)=−10.614, p<.001); mothers reported a stronger antenatal attachment than partners. In terms of depressive symptomology, 92.2% of mothers and 94.7% of partners were below the clinical cut off (12) on the EPDS. When using 40 as the clinical cut off on both of the STAI subscales, 77.9% of mothers and 86.8% of partners fell below this on the state subscale and 66.2% of mothers and 73.7% of partners fell below the cut off on the trait subscale. This suggests that the sample as a whole did not report experiencing a significant amount of distress.

Descriptive statistics for the neonatal outcomes are detailed in Table III (Appendix E). Of the 46 births 54% of these were females. The mean gestational age was 273.2 days (SD=41.7), mean birth weight was 3512.2 grams (SD=513.6) and the mean length of labour was 6:43 hours (SD=5:11), all within healthy ranges. The mean total APGAR score was 17.4 (SD=1.4), at 1 minute it was 8.4 (SD=1.3) and at 5 minutes it was 9 (SD=0.3). The majority of births were delivered without assistance (67.4%), without assistance.

4.5.2 Bivariate Analysis

Analyses were conducted to identify demographic variables that should be considered as covariates in subsequent analysis. Those identified included gestation period, ethnicity, religion, education level, employment, household income, marital status, quickening, risk status and maternal smoking.

For mothers, a series of Kruskal-Wallis tests indicated that there was a significant effect of maternal education and marital status on STAI-State (H(5)=15.367, p<.01; H(3)=8.203, p<.05 respectively) and EPDS scores (H(5)=11.994, p<.05; H(3)=13.760, p<.01 respectively). There were significant differences on the mindfulness subscale of the SCS according to maternal education level.
(H(5)=18.22, p<.01) and marital status (H(3)=8.273, p<.05). Finally, there was a significant effect of smoking (H(1)=5.967, p<.05) on the ‘quality of antenatal attachment’ subscale. A one-way ANOVA indicated that there was a significant effect of marital status (F(3,73)=4.910, p<.01) on STAI-Trait scores. In summary, maternal education and marital status were considered to be covariates for main outcomes (anxiety and depression), and smoking was considered to be a covariate in antenatal attachment subscale analysis.

For partners, their education level had an effect on their antenatal attachment, across all three subscales, global (F(4, 33)=3.070, p<.05), quality (F(4, 33)=2.519, p<.05) and preoccupation (F(4, 33)=4.488, p<.01) of antenatal attachment.

With regard to neonatal outcome, a series of Kruskal-Wallis tests showed marital status had an effect on APGAR score at 5 minutes (H(2)=8.791, p<.05) and the risk status of pregnancy had an effect on the gestational age of the neonate (H(2)=7.032, p<.05).

Therefore, maternal education, marital status, maternal smoking, partners’ education and risk status of the pregnancies were included as covariates in secondary analyses containing the associated variables. These were added in separate steps in hierarchical stepwise regression analyses.

4.5.3 Correlations Between Variables
Correlations were conducted between independent and dependant variables for mothers (Table IV, Appendix E) and partners (Table V, Appendix E). For mothers, state and trait anxiety were negatively correlated with self-compassion (r=-.611, p<.001; r=-.742, p<.001; respectively) and positively correlated with adult attachment avoidance (r=.421, p<.01; r=.421, p<.001; respectively). Maternal depression was also negatively correlated with self-compassion (r=-.640, p<.001) and positively correlated with adult attachment avoidance (r=.488, p<.001). Antenatal attachment was correlated with adult attachment avoidance (r=-.353, p<.05). Gestational age and birth weight were correlated with antenatal attachment (r=-.305, p<.05; r=.441, p<.05; respectively).
For partners, state and trait anxiety were negatively correlated with self-compassion \((r = -0.710, p < 0.001; r = -0.720, p < 0.001; \text{respectively})\), these were also positively correlated with adult attachment anxiety \((r = 0.592, p < 0.01; r = 0.756, p < 0.001; \text{respectively})\) and adult attachment avoidance \((r = 0.651, p < 0.001; r = 0.741, p < 0.001; \text{respectively})\). Partner depression was also negatively correlated with self-compassion \((r = -0.734, p < 0.001)\), and positively correlated with adult attachment anxiety \((r = 0.676, p < 0.001)\) and adult attachment avoidance \((r = 0.604, p < 0.01)\). Antenatal attachment was not correlated with adult attachment style, self-compassion or mood. Gestational age was correlated with partner antenatal attachment \((r = 0.501, p = 0.021)\).

### 4.5.4 Regression Analysis:

#### 4.5.4.1 Prediction of Antenatal Mood

Hierarchical linear regression analyses were used to test the prediction that variance in antenatal mood (depression and state anxiety) can be accounted for by adult attachment style and self-compassion; these were entered in separate steps (Table VI, Appendix E). Demographic covariates were also added in the final steps. For maternal state anxiety the final model was significant, explaining 53% of the total variance in state anxiety scores \((R^2 = 0.60, \text{adjusted } R^2 = 0.53, F_{11, 64} = 8.628, p < 0.001)\). All variables evidenced significant independent contributions apart from maternal avoidant attachment \((b = 0.065, 95\% \text{CI} -0.061 - 0.279, \text{beta} = 0.106, p = 0.338)\) and marital status \((b = 1.634, 95\% \text{CI} -9.132 - 11.254, \text{beta} = 0.106, p = 0.859)\). For maternal depression the final model was significant, explaining 61% of the total variance in depression scores \((R^2 = 0.67, \text{adjusted } R^2 = 0.61, F_{11, 64} = 11.6, p < 0.001)\). All variables evidenced significant independent contributions apart from maternal avoidant attachment \((b = 0.019, 95\% \text{CI} -0.028 - 0.103, \text{beta} = 0.071, p = 0.575)\).

For partner state anxiety the final model was significant, explaining 55% of the total variance in state anxiety scores \((R^2 = 0.58, \text{adjusted } R^2 = 0.55, F_{3, 32} = 15.073, p < 0.001)\). All variables evidenced significant independent contributions apart from partners’ adult attachment anxiety \((b = 0.057, 95\% \text{CI} -0.144 - 0.290, \text{beta} = 0.144, p = 0.406)\). For partner depression the final model was significant, explaining 57% of the total variance in depression scores \((R^2 = 0.61, \text{adjusted } R^2 = 0.57, F_{3, 32} = 16.353, p < 0.001)\). Only self-compassion evidenced a significant independent contribution \((b = -3.42, 95\% \text{CI}-5.013 - -1.415, \text{beta} = -0.501, p < 0.001)\).
4.5.4.2 Prediction of Antenatal Attachment

Hierarchical linear regression analysis was used to test the prediction that variance in antenatal attachment can be accounted for by adult attachment style, self-compassion, and antenatal mood (depression and state anxiety); these were entered in separate steps (Table VII, Appendix E). Demographic covariates were also added in the final steps. For maternal antenatal attachment the final model was significant, explaining 20% of the total variance in maternal antenatal attachment scores ($R^2 = .35$, adjusted $R^2 = .20$, $F_{(14, 61)} = 2.306$, $p<.05$). Only maternal avoidant attachment ($b = -.207$, 95%CI -.311 - -.121, beta= -.4.156, $p<.001$) made a significant independent contribution to the model. For partner antenatal attachment the final model was not significant, explaining only 19% of the total variance in partner antenatal attachment scores ($R^2 = .36$, adjusted $R^2 = .19$, $F_{(9, 26)} = 1.519$, $p=.193$). None of the partner variables evidenced a significant independent contribution.

4.5.4.3 Prediction of Neonatal Outcome

Hierarchical linear regression analyses assessed the amount of variance in neonatal outcomes (gestational age, weight and total APGAR scores) that was accounted for by adult attachment style, self-compassion, antenatal mood (depression and state anxiety) and antenatal attachment; these were entered in separate steps (Table VIII, Appendix E). Demographic covariates were also added in the final steps. For gestational age and maternal predictors the final model was significant, explaining 27% of the total variance in gestational age ($R^2 = .51$, adjusted $R^2 = .28$, $F_{(14, 30)} = 2.248$, $p<.05$). However, in the final model, only the risk status of the pregnancy ($b = -10.978$, 95%CI -19.223 - -2.754, beta= -.4.89, $p<.01$) and attachment avoidance ($b = .219$, 95%CI .021 - .553, beta= .489, $p<.05$) evidenced significant independent contributions. For gestational age and partner predictors the final model was not significant, explaining only 9% of the total variance in state anxiety ($R^2 = .532$, adjusted $R^2 = .091$, $F_{(12, 9)} = .853$, $p=.610$).

For birth weight and maternal predictors the final model was not significant, explaining only 3% of the total variance in birth weight ($R^2 = .253$, adjusted $R^2 = -.027$, $F_{(12, 32)} = .905$, $p=.552$). None of the variables evidenced a significant independent contribution. For birth weight and partner predictors the final model was not significant, explaining 15% of the total variance in birth weight ($R^2 = .40$, adjusted
None of the variables evidenced a significant independent contribution.

For total APGAR score and maternal predictors the final model was not significant, explaining only 16% of the total variance in APGAR scores ($R^2 = .159$, adjusted $R^2 = -.166$, $F_{(12, 31)} = .489$, $p = .906$). Again, none of the variables evidenced a significant independent contribution. For total APGAR score and partner predictors the final model was not significant, explaining 13% of the total variance in APGAR scores ($R^2 = .44$, adjusted $R^2 = -.13$, $F_{(10, 10)} = .778$, $p = .651$), with no variables evidencing a significant independent contribution.

### 4.5.5 Mediation Analysis

To address the final hypothesis a simple set of mediation analyses were conducted, with adult attachment style entered as the independent variable, self-compassion as the mediating variable and mood as the outcome variable. The bootstrapping and re-sampling method was used, with 95% confidence intervals and 5000 bootstrap samples as recommended by Hayes (2009). Mediation using this approach is considered to be significant if the bias corrected confidence intervals (BC CI) do not contain zero. Due to sample size, mediation was only carried out with maternal state anxiety and depression as the dependant variables. Models tested for the mediating effects of self-compassion between independent variables (adult attachment anxiety and adult attachment avoidance) and dependant variables (depression and state anxiety), see Figure I (Appendix F). The kappa-squared ($k^2$) and values are reported as estimations of the effect size, alongside the proportion of variance accounted for by the model ($R^2$).

Results indicated that maternal self-compassion significantly mediated the relationship between attachment anxiety and state anxiety (BC CI = .0334 - .1749) and between attachment avoidance and state anxiety (BC CI = .0356 - .1872). The models accounted for 49% and 44% of the variance in state anxiety respectively ($R^2 = .49, .44$) and effect sizes were medium ($k^2 = .16, .16$).

Maternal self-compassion also significantly mediated the relationship between attachment anxiety and depression (BC CI = .0383 - .1526), and attachment avoidance and depression (BC CI = .0391 -
.1694). The models accounted for 58% and 48% of the variance in state anxiety respectively ($R^2 = .58$, .48) and effect sizes were medium ($k^2 = .20, .20$).

4.6 DISCUSSION

Much of the research into maternal distress during the antenatal period has focused on the long term impacts of this for parent and offspring. Consequently, identification of protective psychological factors has been neglected. This study aimed to investigate adult attachment style and self-compassion and their relationship with maternal mood during the antenatal period. It also aimed to assess whether these factors affect antenatal attachment and neonatal birth outcomes.

The results showed that higher levels of self-compassion and adult attachment security were related to lower levels of distress (depression and state anxiety) in parents. This supports findings from general adult samples that self-compassion and attachment security operate at as protective factors to experiences of distress (Leary et al., 2007; Macbeth & Gumley, 2012; Neff, 2003). It also supports the finding that higher levels of self-compassion are related to attachment security (Neff & McGehee, 2010).

A significant amount of variance in maternal antenatal depression and state anxiety was accounted for in regression models, with self-compassion and attachment anxiety being the key predictors. This supports others findings between attachment style and perinatal mood disorder, for example Monk et al’s (2008) finding that mothers who had a more fearful attachment style experienced more distress during pregnancy. It may be that pregnancy activates attachment anxiety schemas, thoughts and behaviours in mothers, due to the increased actual and future reliance on others. The results from the current study also implicated self-compassion as a further protective factor.

For partners, a significant amount of variance in paternal antenatal depression was accounted for in regression models, in which self-compassion emerged as the only significant independent predictor. In a model with state anxiety as the dependant variable, attachment avoidance and self-compassion were significant independent predictors. It may be that, for partners, avoidant attachment related cognitions and behaviours are activated during the antenatal period. This is potentially associated
with the mothers’ temporal preoccupation with a new attachment figure and the possibility that their female partner may become less available (Stern, 1998). This may lead partners to temporally increase their self-reliance and emotional containment.

Furthermore, self-compassion was found to significantly mediate the relationship between adult attachment style and antenatal mood in mothers. This lends empirical support to the theoretical model proposed by Cree (2010). It is likely that attachment security leads to the natural development of an effective soothing system (self-compassion) which, when activated, decreases the negative outcomes of a perceived or actual threat on one’s mood (Gilbert, 2010). That said, this relationship is most likely to be bidirectional, i.e. that compassionate thoughts and behaviours are likely to limit the activation of negative attachment related thoughts and behaviours. Thereby, increasing resilience and reducing the impact of a perceived or actual threat on one’s mood. It is likely that, during pregnancy, attachment concerns may become activated (Monk et al., 2008). In Gilberts (2010) model of compassion these activations may be perceived as a threat, resulting in a need for the soothing system to become activated to limit the effects of these attachment related behaviours on mood.

The hypotheses that adult attachment style, self-compassion and antenatal mood would be related to antenatal attachment and neonatal outcomes were largely unsupported. In relation to maternal antenatal attachment, avoidant attachment was the only significant predictor; this is contradictory to the findings by Sawyer Cohen (unpublished data), who found that self-compassion accounted for a significant amount of variance in antenatal attachment, measured in the third trimester. The timing of the assessment of antenatal attachment may be a possible reason for the contradictory results. The results from the current study suggest that women with a more avoidant attachment style experience less antenatal attachment. It is not unexpected that mothers who utilise a pattern of avoidant attachment behaviours will report being less attached to their unborn child during the antenatal period. Regression models for partner antenatal attachment were not significant.

Regression models showed that neonatal birth outcomes were not predicted by any of the psychological constructs that were measured, in mothers or partners. Gestational age was related to the risk status of the pregnancy, which is not unexpected. It is hypothesised that the lack of
contributions from the psychological factors is due to the relatively low levels of self-reported distress and high levels of attachment security and self-compassion reported by the participants. It is also likely that the quality of routine antenatal care provided at both rural recruitment bases lowered the occurrence of sub optimal birth outcomes, combined with relatively low levels of deprivation. However, it has been highlighted in past research that the phenotype of maternal mental health during pregnancy is broad in relation to later offspring outcomes (Talge et al., 2007; Glover, 2014; O’Connor et al., 2014; Ram et al., in preparation). Thus, further research could extend the current study to investigate the effects of antenatal distress and longevity of these protective factors in terms of offspring’s developmental outcomes.

Given the prevalence of maternal mental health problems across the perinatal period and the long lasting, inter-generational effects, research to identify protective factors must remain a priority (Glover, 2014; O’Connor et al., 2014). It is important to identify mothers who may be vulnerable to increased distress during the antenatal period and active, protective psychological factors that will aid the provision of effective treatment.

4.6.1 Limitations

The results from this study should be considered alongside its limitations. The primary limitation of this study is that the sample was self-selecting. The sample had relatively low expression of symptoms of anxiety and depression and high expression of attachment security. This is in line with Gumming et al (2009) who found that mothers experiencing high trait anxiety were less likely to take part in follow-up research. It is therefore likely that a floor effect was observed in this study, in terms of self-reported experiences of distress in this sample. Whilst this has allowed analysis of self-compassion as a protective factor in this population, it does not confirm that if adults were less securely attached then self-compassion would still offer the same resilience in terms of mood.

It is worth noting that the response rate for questionnaire packs was only 16%. This resulted in a relatively small sample size, increasing the likelihood of Type I and Type II errors, a significant limitation. Whilst maternal data reached the desired sample size, partner’s and neonatal data did not. This limited the analysis of these data sets. It is also acknowledged that 84% of the questionnaire packs were not returned. There would also have been other mothers who were approached within the
sampling period who did not take a questionnaire pack. This decreases the return rate from the whole sampling frame. Unfortunately, due to the rural and multisite nature of this study, estimates cannot be made regarding the total number of mothers who were approached and invited to take part in the study by their midwives.

The study’s scope for recruitment also resulted in a relatively homogenous sample, in terms of demographic variables such as household income, education, ethnicity and marital status. To an extent these participants may self-select as being a group more adept, and willing, to make the most of clinical services offered. This limits the generalisability of these results but does suggest that further research would be desirable, particularly in samples considered to be high risk, such as those with a pre-existing mental health diagnosis or those considered to be living in deprived circumstances. Whilst previous empirical studies in this area have acknowledged that these are hard to reach groups, future research could consider the identification of vulnerable mothers during the antenatal period through the use of screening criteria, such as the SNIP antenatal criteria (Special Needs in Pregnancy; Glasgow Child Protection Committee, 2008) which is based on demographic variables. It has also been suggested that it is advantageous, in terms of recruitment, for maternity departments to identify individuals to participate in the regular conceptualisation and facilitation of research (White et al., under review).

All data in this study were collected by self-report. Whilst the assessment measures selected are considered to be reliable and valid, they have not been corroborated with non-self-report measures of mood or pregnancy characteristics. Whilst outwith the scope of this study, future research should give consideration to the inclusion of standardised interviews, observations and physiological biomarkers of well-being and attachment, for example, the adult attachment inventory, oxytocin levels and salivary cortisol.

In terms of the assessment of antenatal attachment, it has been shown that antenatal attachment increases with gestational age (Alhusen, 2008; DiPietro, 2010); it may be, therefore, that measurement of antenatal attachment in this study was taken too early in the gestation to detect differences in antenatal attachment resulting from mood or distress. Also, whilst the assessments of
antenatal attachment have face validity and statistical reliability, there may be some demand characteristics shown within the self-reporting bias. Much of the current research focuses on antenatal attachment in relation to postnatal developmental variables, e.g. mother-infant attachment (Muller, 1996; Siddiqui & Hagglof, 2000). Future research could examine the ways in which self-compassion and adult attachment security relate to this relationship.

Given the cross-sectional nature of the present study, no causality can be inferred. Whilst both attachment style and self-compassion can be considered to be protective factors in terms of antenatal mood, it is likely that the relationship between these variables is dynamic and bidirectional. With larger samples, more advanced statistical techniques, such as structural equation modelling, could be implemented to enhance understanding of these relationships between variables.

4.6.2 Implications

The clinical implications of this study primarily relate to self-compassion as a protective factor during the antenatal period. Current evidence regarding early intervention programmes, such as nurse-family partnership, show considerable promise, both in terms of improved health and developmental outcomes for offspring and a reduction of economic costs (Olds, Sadler, & Kitzman, 2007). However, there is a need for further exploration of effective psychological therapies to be delivered during the antenatal period (Friedli & Parsonage, 2007). There is a bias of maternal choice of psychological intervention being towards “non-traditional” approaches. Compassion-focused interventions have shown promise in terms of ameliorating psychological distress and promoting well-being outwith the antenatal period (Öst, 2008; Macbeth & Gumley., 2012). Further research is required to examine the effectiveness of such an intervention during the antenatal period. The literature illustrates that the long-term effects of distress during pregnancy have a broad risk phenotype (Ram et al., in preparation; Talge et al., 2007), suggesting that there should be a low threshold in regards to delivering psychological interventions during this period. Given the strong effect size for the association between self-compassion and distress, it may be that brief compassion-focused interventions (or techniques) should be piloted as a part of routine antenatal care. Alternatively, identification of mothers-to-be (and partners) considered to be at psychosocial high risk, or identified
as experiencing clinical symptoms of anxiety and depression, could be used to match patients to higher intensity psychological interventions, incorporating compassion-focused techniques.

4.7 REFERENCES


5. METHODOLOGY

5.1 DESIGN

This study utilised a mixed methods design consisting of two components. Part one used a cross sectional design, using self-report measures to make between participant comparisons. Part two added a longitudinal follow-up, investigating relationships between the cross sectional questionnaire data and neonatal birth outcome data from the offspring of participants.

Participants

Inclusion and exclusion criteria for expectant mothers and their partners were as follows:

Principal inclusion criteria for expectant mothers:

Principal inclusion criteria:

- Second trimester of pregnancy (13-28 weeks)
- Age 18+
- Fluent in English
- Intentions of carrying the pregnancy to term
- Literate to the extent required to complete the self-report questionnaires

Principal exclusion criteria:

- Current substance use
- Diagnosis of a psychotic disorder
- History of/current neurological disorder
- Confirmed non-singleton pregnancy
- Surrogate pregnancy

Principal inclusion criteria for partners:

Principal inclusion criteria:

- Partner of a female participant meeting the above criteria who is taking part in the study
- Age 18+
- Fluent in English
• Literate to the extent required to complete the self-report questionnaires

Principal exclusion criteria:

• Current substance use
• Diagnosis of a psychotic disorder
• History of/current neurological disorder

5.2 PROCEDURE

Participant Identification and Recruitment

Lead obstetricians and midwives in NHS Grampian and NHS Highland agreed to allow the study to take place in their localities. All midwives and auxiliaries who had been identified as being best placed to approach potential participants met with the lead researcher and were given the opportunity to ask any questions. Following this, participants packs (including a freepost envelope), were given to the teams for recruitment. Women were approached during their second trimester by a member of their care team at a routine antenatal appointment. If they agreed to take a participant pack they were offered one for their partner too. Also, posters were placed in the maternity units and participants had the option of self-referral by contacting the lead researcher and requesting a participant pack. However no participants were recruited in this way.

The participant packs contained a participant information sheet, consent form, demographic data collection sheet, five self-report measures and an opt-in follow-up contact sheet. Women also consented to the collection of birth outcome data, which was collected following the estimated due date by the lead researcher. Only their name was required to identify the appropriate obstetric record (Mothers Pack: Appendix G; Partners Pack: Appendix H).
5.3 MEASURES

All measures can be found in Appendix G (mother’s participant pack) and Appendix H (partner’s participant pack) and Table 1 and Table 2 summarise these.

Demographic information

Self-reported demographic information was collected for all participants, see table below:

Table 1: Demographic Information Collected

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>Mothers</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>current gestation in weeks</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>ethnicity</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>religion</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>education level</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>employment status</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>household income</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>sexual orientation</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>marital status</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>length in current relationship</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>number of children in house</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>number of past pregnancies</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>number of past live births</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>number of past abortions</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>number of past miscarriages</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>number of previous still births</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>planned pregnancy or not</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>quickening</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>dating scan</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>risk status of this pregnancy</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Smoking status</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>

Self-Compassion Scale (SCS; Neff, 2003)

The SCS was used as an assessment of self-compassion. The SCS is a self-report assessment with 26 items assessing the frequency of certain behaviours; these are rated on a 5-point Likert scale and scored positively and negatively. The maximum total score is 26. The measure consists of 6 subscales (Self-Kindness, Self-Judgement, Common Humanity, Isolation, Mindfulness and Over-Identification). The 6 factors are supported by confirmatory factor analysis; test-retest correlations for
the subscales are significant (.80 to .93) and the total measure has high internal consistency (.92; Neff, 2003). The SCS has only been validated once with women during the ante-natal period (Sawyer Cohen, 2010), finding a Cronbach’s α=.93-.94 between antenatal and postnatal SC. The internal consistency of the SCS is the sample recruited in this study was good (mothers: α=.89; partners: α=.84).


The MAAS (19 item) and PAAS (16 item) are self-report measures assessing antenatal attachment. Two scores are generated from each of the measures, one measuring ‘quality’ and the other ‘intensity’ of antenatal attachment. The ‘quality’ score describes the mother’s, or partner’s, affective experience, such as closeness/distance, tenderness/irritation, joyful/unpleasant anticipation, and vivid/vague representation of the foetus as a real person. Whilst ‘intensity’ refers to the amount of time the mother or partner spends thinking/dreaming about, interacting with and talking to the foetus. The scores can be combined to form a global score that can also be used as an outcome. It is possible to remove three items from the MAAS measure so that the scores from both the MAAS and PAAS contain only items common in both (Condon, 1993). These measures are reported to be reliable (Condon et al, 1993) and valid (Condon, 1998). The two factors accounted for 39% and 42% of the variance in maternal and paternal data respectively and items showed good internal consistency (Cronbach α>.8; Condon, 1993). The internal consistency of these measures in the sample recruited in this study was good (MAAS: α=.80; partners: α=.73). They have been used in several studies as assessments of antenatal attachment (Goecke et al, 2012; Hart & McMahon, 2006; Righetti, Dell’Avanzo, Grigio & Nicolini, 2005).

The Experiences in Close Relationships- Revised (ECR-R; Fraley, Waller & Kelly, 2000)

The ECR-R is a 36-item self-report measure that was used to measure adult attachment style in the mothers and their partners. The ECR-R measures adult romantic attachment, in terms of attachment anxiety and avoidance. This measure was developed through item-response analysis of various alternative self-report attachment measures. The ECR-R is a reliable and valid measure. Sibley and Liu (2004) showed correlations of >.90 in test-retest analysis (later confirmed by Sibley, Fischer & Liu,
Sibley, Fischer and Liu (2005) also conducted confirmatory factor analyses which showed that the ECR-R does fit the two factors it sets out to measure, i.e. anxiety and avoidance. They also reported that it predicted 30%-40% of variance between participants' social interactions with their romantic partners, suggesting it is a valid measure of romantic attachment. It appears that this measure has not been used during the perinatal period before; researchers have tended to use the Adult Attachment Interview (AAI; Main & Goldwyn, 1990). However, due to the need for extensive training in administration and coding, the AAI was unsuitable for the current project. The internal consistency of both the avoidance (mothers: α=.84; partners: α=.87) and anxiety (mothers: α=.92; partners: α=.93) subscales was good within the sample recruited in this study.

**Edinburgh Post-Natal Depression Inventory (EPDS; Cox, Holden & Sagovsky, 1987)**

The EPDS was used to measure antenatal depression experienced by the mothers and their partners. It is a 10-item self-report measure, assessing the past seven days. This measure is focused on the affective and cognitive symptoms of depression as opposed to somatic symptoms (which may be related to the pregnancy and not mood). Items are positively marked, with a maximum score of 30; a score of 12 is considered to be the clinical cut-off (Evans *et al*, 2001). Scores have been shown to have high specificity (95.7%) and sensitivity (81.1%) in mothers (Murray & Carothers, 1990). However, the score alone does not confirm a diagnosis of depression; further assessment would be required in a clinical setting (Cox *et al*, 1987). This measure has been validated for use during the antenatal period in mothers, and is regularly used (Murray & Cox, 1990; Cox & Holden, 2003). It is also recommended as a standardised measure of antenatal depression in mothers in the NICE guidelines (NICE, 2007). The EPDS has also been validated for its use during the peri-natal period with fathers (Matthey *et al*, 2001). It was used throughout the perinatal period with fathers in the “Avon Longitudinal Study of Parents and Children (ALSPAC)” study. Scores of 12 or above have been used as the cut-off for men too, with estimates of sensitivity ranging from 71% to 86% and specificity ranging from 75% to 94% (Matthey *et al*, 2001; Ramchandani *et al*, 2008). The internal consistency of the EPDS in the sample recruited in this study was good (mothers: α=.90; partners: α=.84).

**State-trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1983)**

The STAI is a self-report measure of anxiety, measuring transient state anxiety and long-standing trait anxiety. It consists of 40 items, split into two sections corresponding to state and trait anxiety. Items
are rated on a 4-point Likert scale, scored positively and negatively. The use of the STAI during the antenatal period is considered to be reliable (Davis et al., 2004; Hart & McMahon, 2006; O’Connor et al., 2005). Gunning et al. (2009) found that the STAI was reflective of anxiety-related experiences of pregnant women, with the risk level of the pregnancy being reflected in the state score. However, they did also note that women with higher state and trait anxiety were less likely to take part in research. The internal consistency of both the state anxiety (mothers: α=.96; partners: α=.91) and trait anxiety (mothers: α=.89; partners: α=.89) subscales was good within the sample recruited in this study.

**Neonatal Birth Outcome Data**

Routinely collected birth outcome data was obtained from maternity records. This included gestational length, birth weight, length of labour, sex and delivery method. The APGAR scores at one minute and five minutes after birth were also extracted from maternity records (Apgar, 1953). The APGAR score is determined by an evaluation of the neonate on five criteria (appearance, pulse, grimace, activity, respiration), rated on a scale of zero to two, resulting in an APGAR score between zero and ten for each time point.

**Table 2: Summary of Measures**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Sub Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR-R</td>
<td>Anxiety</td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
</tr>
<tr>
<td>SCS</td>
<td>Total Score</td>
</tr>
<tr>
<td></td>
<td>Self-Kindness</td>
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<tr>
<td></td>
<td>Self-Judgement</td>
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<tr>
<td></td>
<td>Common Humanity</td>
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<tr>
<td></td>
<td>Isolation</td>
</tr>
<tr>
<td></td>
<td>Mindfulness</td>
</tr>
<tr>
<td></td>
<td>Over Identified</td>
</tr>
<tr>
<td>STAI</td>
<td>State Anxiety</td>
</tr>
<tr>
<td></td>
<td>Trait Anxiety</td>
</tr>
<tr>
<td>EPDS</td>
<td>Total Score</td>
</tr>
<tr>
<td>MAAS/PAAS</td>
<td>Global Attachment</td>
</tr>
<tr>
<td></td>
<td>Quality of Attachment</td>
</tr>
<tr>
<td></td>
<td>Intensity of Preoccupation</td>
</tr>
</tbody>
</table>

**5.4 ETHICS**

Ethical approval was sought and obtained through the utilisation of The Integrated Research Application System (IRAS) for approval from the North of Scotland Research Committee (NRES) in May 2013 (Appendix I). Following favourable ethical consideration by the committee, the study was
also approved by both local NHS Research and Development Departments (NHS Highland and NHS Grampian) through NRS Permissions in May 2013 (Appendix J). Caldicott approval was also sought and received from Caldicott Guardians in both NHS boards (Appendix K). During the design of this study considerable time and attention was given to assessment of potential ethical risks and concerns for participants. Issues of consent, potential distress of participants and confidentiality are discussed below.

5.4.1 Consent
Mothers-to-be were verbally invited to take part in this study by a member of their direct care team during their second trimester. Upon verbal agreement mothers were given a participation pack to take home and were asked if their partner would take one too. Within the participant packs, there was a comprehensive Participant Information Sheet (PIS), together with a consent form. The consent form asked participants to consent to taking part in the study, to allow the lead researcher to collect birth outcome data, and for participants to be contacted for follow-up at a later date; each of these were consented to separately. The time to consider participation in the study was self-paced by the participants, as long as the mother-to-be was within her second trimester of pregnancy.

5.4.2 Potential Distress of Participants
This study was considered to be at low risk of potentially causing distress to participants. The self-report questionnaires asked participants for basic demographic information and about their mood, anxiety and relationships. All of the standardised assessments used in this study are regularly used in research and clinical practice. More specifically, they have all been administered to mothers during the antenatal period and no cautionary advice has been documented. Despite this, the PIS advised participants to contact their midwife or General Practitioner if they had concerns arising from their participation. The PIS also contained contact details for the researchers involved in the study and an external contact, who was a person they were able to contact with any questions or concerns regarding the study. When potential participants were approached, they were told that their participation was voluntary and that their decision would not affect the continuity of their care. This was reiterated in the PIS, as well as informing participants were free to withdraw their participation at any time.
5.4.3 Confidentiality

All information was collected and stored according to the NHS Confidentiality Code of Practice. The 'ACCORD data protection and confidentiality policy' was also consulted. As such, all data collection and use of identifiable information was conducted in a manner consistent with the Data Protection Act (1998) and the Caldicott principles (1997). Documents containing identifiable information (completed consent forms and the contact sheet for follow-up) were kept together for each mother-to-be and their partner, but separately from the questionnaire data. A numerical code, for researchers’ purposes, was applied to consent forms and questionnaire data, thus ensuring the data was appropriately linked. The same code was applied to both the mother and the partner. The questionnaire data and contact sheets with consent forms were stored in separate locked cabinets in The Department of Clinical and Counselling Psychology, Pluscarden Clinic, Dr Gray’s. When the data were entered into a computerised database it was fully anonymised and kept password protected. Only the Chief Investigator and local academic researcher, Dr Angus Macbeth, had access to identifiable participant data during the study.

5.5 DATA ANALYSIS

5.5.1 Power Analysis and Sample Size

To the author’s knowledge, this is the first study to examine the relationship between adult attachment style, self-compassion and distress in mothers during pregnancy. Therefore, a series of power calculations were carried out using G* Power3 (Faul et al, 2009) to estimate the sample size required for correlational and regression analyses in order to evaluate the primary research questions.

The meta-analysis by Macbeth and Gumley (2012) was used as the template for estimating the effect size for the correlation between SC and psychopathology, as this is the principal relationship under study. Sample size was estimated using a mean effect size of $r=0.51$, with power = 0.8 and alpha = 0.05 for a one-tailed correlation analysis. Based on these parameters, the estimated number of participants required was $n=20$. Two further power calculations were conducted using the 95% CI’s of the mean effect size reported by Macbeth and Gumley (2012), with power =0.8 and alpha =0.05. Using the lower bound effect size of $r=0.48$, the number of participants would be $n=23$. Using the upper bound effect size of $r=0.55$, the number of participants would be $n=16$. 
To estimate the sample size for a two-tailed linear multiple regression with 4 predictors the above effect sizes were squared. Assuming a large mean effect size of $r=0.51 (R^2=0.26)$, with power =0.95 and alpha =0.05, the estimated number of participants would be n=53. Using the lower bound effect size of $r=0.48 (R^2=0.23)$, the number of participants would be n=59. Using the upper bound effect size of $r=0.55 (R^2=0.30)$, the number of participants would be n=46. In summary, from these calculations a maximum sample size of 59 mothers was required for this study. The same size was assumed to be needed to run the same analysis on partners’ data. Mediation analyses were also planned, the method to be used was the resampling technique of bootstrapping, and therefore the guidelines for sample size are less stringent. However, larger samples are recommended to ensure that analyses are based on data representative of the population (Preacher and Hayes, 2013). Therefore, this study aimed to recruit a minimum of 59 mothers and 59 partners.

5.5.2 Analysis

Data were analysed using IBM SPSS Statistics Version 19 and the computational and modelling add-on macro, PROCESS, for SPSS was used for mediation analyses (Hayes, 2013).

5.5.3 Data Screening

All data were screened prior to running scoring syntax’s and after, to establish that assumptions for further analyses were met.

5.5.4 Missing Data and Outliers

All variables were screened for missing data, frequencies and histograms were examined for outliers. Missing data which appeared to be systematic included: a mothers ECR-R, two partners’ ECR-R, a partner’s SCS and a set of APGAR scores were unobtainable; data from these participants were excluded from analyses using these measures, as recommended by Tabachnick and Fidell (2013). The age of mothers was missing in 9 cases and in 7 partners’ cases. As age was normally distributed the mean score was used. From the SCS, 4 individual scores were missing; these scores were normally distributed so the mean score was entered. On the ECR-R, there were 14 missing scores,
deemed to be non-systematic; these scores were non parametric and therefore the median score was entered.

5.5.5 Distribution of Data

Histograms were used to ensure that the dataset was not biased by outliers. The distribution of the data was examined using skewness (symmetry of distribution) and kurtosis (spread of values) statistics, which were converted into z-scores to establish whether the normality was violated (Field, 2013). Tabachnick and Fidell (2013), recommend that in small to moderate samples an alpha level of .05 is used (z>1.96). The z-scores indicated that a normal distribution could not be assumed for all variables (see highlighted values in Tables 3, 4, 5 below).

Table 3: Mothers’ Variables Normality tests: Skewness and Kurtosis Values, Standard Errors (SE) and z-scores.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Subscale</th>
<th>Skewness</th>
<th>SE</th>
<th>Kurtosis</th>
<th>SE</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECR-R</td>
<td>Anxiety</td>
<td>1.163</td>
<td>0.276</td>
<td>0.952</td>
<td>0.545</td>
<td>4.214</td>
<td>1.747</td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
<td>1.658</td>
<td>0.276</td>
<td>2.713</td>
<td>0.545</td>
<td>6.007</td>
<td>4.978</td>
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<tr>
<td>SCS</td>
<td>Total Score</td>
<td>0.202</td>
<td>0.274</td>
<td>-0.163</td>
<td>0.541</td>
<td>0.737</td>
<td>-0.301</td>
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<tr>
<td></td>
<td>Self-Kindness</td>
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<td>-0.217</td>
<td>0.541</td>
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<tr>
<td></td>
<td>Self-Judgement</td>
<td>0.041</td>
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<td>-0.298</td>
<td>0.541</td>
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<td></td>
<td>Common Humanity</td>
<td>-0.18</td>
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<td>0.211</td>
<td>0.541</td>
<td>-0.657</td>
<td>0.390</td>
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<tr>
<td></td>
<td>Isolation</td>
<td>0.049</td>
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<td>-0.61</td>
<td>0.541</td>
<td>0.179</td>
<td>-1.128</td>
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<td>Mindfulness</td>
<td>0.85</td>
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<td>0.037</td>
<td>0.541</td>
<td>3.102</td>
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<td></td>
<td>Over Identified</td>
<td>-0.062</td>
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<td>0.541</td>
<td>-0.226</td>
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<tr>
<td>STAI</td>
<td>State Anxiety</td>
<td>1.207</td>
<td>0.274</td>
<td>0.769</td>
<td>0.541</td>
<td>4.405</td>
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<tr>
<td></td>
<td>Trait Anxiety</td>
<td>0.683</td>
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<td>0.541</td>
<td>2.493</td>
<td>-0.251</td>
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<tr>
<td>EPDS</td>
<td>Total Score</td>
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<td>0.274</td>
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<td>0.541</td>
<td>3.836</td>
<td>1.235</td>
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<tr>
<td>MAAS</td>
<td>Global Attachment</td>
<td>-0.414</td>
<td>0.274</td>
<td>0.14</td>
<td>0.541</td>
<td>-1.511</td>
<td>0.259</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>-1.171</td>
<td>0.274</td>
<td>0.865</td>
<td>0.541</td>
<td>-4.274</td>
<td>1.599</td>
</tr>
<tr>
<td></td>
<td>Preoccupation</td>
<td>-0.042</td>
<td>0.274</td>
<td>-0.388</td>
<td>0.541</td>
<td>-0.153</td>
<td>-0.717</td>
</tr>
</tbody>
</table>

z_{skewness} = (Skew Value – 0)/ SE_{skewness}; z_{kurtosis} = (Kurtosis Value – 0)/ SE_{kurtosis}.

z > 1.96 significant at p<.05; z >2.58 significant at p<.01; z >3.29 significant at p<.001
Table 4: Partners’ Variables Normality Tests: Skewness and Kurtosis Values, Standard Errors (SE) and z-scores.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Subscale</th>
<th>Value</th>
<th>SE</th>
<th>Value</th>
<th>SE</th>
<th>Skewness</th>
<th>Kurtosis</th>
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<tbody>
<tr>
<td>ECR-R</td>
<td>Anxiety</td>
<td>1.589</td>
<td>0.393</td>
<td>1.925</td>
<td>0.768</td>
<td>4.043</td>
<td>2.507</td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
<td>0.892</td>
<td>0.393</td>
<td>0.277</td>
<td>0.768</td>
<td>2.269</td>
<td>0.361</td>
</tr>
<tr>
<td>SCS</td>
<td>Total Score</td>
<td>-0.268</td>
<td>0.388</td>
<td>-0.932</td>
<td>0.759</td>
<td>-0.69</td>
<td>-1.228</td>
</tr>
<tr>
<td></td>
<td>Self-Kindness</td>
<td>0.546</td>
<td>0.388</td>
<td>0.983</td>
<td>0.759</td>
<td>1.407</td>
<td>1.295</td>
</tr>
<tr>
<td></td>
<td>Self-Judgement</td>
<td>0.135</td>
<td>0.388</td>
<td>-0.871</td>
<td>0.759</td>
<td>0.347</td>
<td>-1.148</td>
</tr>
<tr>
<td></td>
<td>Common Humanity</td>
<td>-0.241</td>
<td>0.388</td>
<td>0.706</td>
<td>0.759</td>
<td>-0.621</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>Isolation</td>
<td>0.363</td>
<td>0.388</td>
<td>-0.775</td>
<td>0.759</td>
<td>0.935</td>
<td>-1.021</td>
</tr>
<tr>
<td></td>
<td>Mindfulness</td>
<td>-0.534</td>
<td>0.388</td>
<td>1.03</td>
<td>0.759</td>
<td>-1.376</td>
<td>1.357</td>
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<td></td>
<td>Over Identified</td>
<td>0.505</td>
<td>0.388</td>
<td>-0.666</td>
<td>0.759</td>
<td>1.301</td>
<td>-0.877</td>
</tr>
<tr>
<td>STAI</td>
<td>State Anxiety</td>
<td>0.882</td>
<td>0.383</td>
<td>0.19</td>
<td>0.75</td>
<td>2.302</td>
<td>0.253</td>
</tr>
<tr>
<td></td>
<td>Trait Anxiety</td>
<td>0.766</td>
<td>0.383</td>
<td>-0.591</td>
<td>0.75</td>
<td>2</td>
<td>-0.788</td>
</tr>
<tr>
<td>EPDS</td>
<td>Total Score</td>
<td>1.076</td>
<td>0.383</td>
<td>0.232</td>
<td>0.75</td>
<td>2.809</td>
<td>0.309</td>
</tr>
<tr>
<td>PAAS</td>
<td>Global Attachment</td>
<td>-0.102</td>
<td>0.383</td>
<td>-0.802</td>
<td>0.75</td>
<td>-0.254</td>
<td>-1.069</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>-0.414</td>
<td>0.383</td>
<td>-0.549</td>
<td>0.75</td>
<td>-1.08</td>
<td>-0.732</td>
</tr>
<tr>
<td></td>
<td>Preoccupation</td>
<td>0.032</td>
<td>0.383</td>
<td>-0.412</td>
<td>0.75</td>
<td>0.083</td>
<td>-0.549</td>
</tr>
</tbody>
</table>

z_{skewness} = (Skew Value – 0)/ SE_{skewness}; z_{kurtosis} = (Kurtosis Value – 0)/ SE_{kurtosis}

z > 1.96 significant at p<.05; z >2.58 significant at p<.01; z >3.29 significant at p<.001

Table 5: Neonate Variables Normality tests: Skewness and Kurtosis Values, Standard Errors (SE) and z-scores.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Skewness</th>
<th>SE</th>
<th>Kurtosis</th>
<th>Value</th>
<th>SE</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational Length</td>
<td>-1.759</td>
<td>0.35</td>
<td>6.278</td>
<td>0.688</td>
<td>-5.028</td>
<td>9.125</td>
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<tr>
<td>Birth Weight</td>
<td>-0.089</td>
<td>0.35</td>
<td>0.885</td>
<td>0.688</td>
<td>-0.254</td>
<td>1.286</td>
<td></td>
</tr>
<tr>
<td>APGAR 1 min</td>
<td>-2.575</td>
<td>0.354</td>
<td>6.468</td>
<td>0.695</td>
<td>-7.274</td>
<td>9.306</td>
<td></td>
</tr>
<tr>
<td>APGAR 5 min</td>
<td>0.417</td>
<td>0.354</td>
<td>6.81</td>
<td>0.695</td>
<td>1.179</td>
<td>9.798</td>
<td></td>
</tr>
<tr>
<td>APGAR Total</td>
<td>-2.524</td>
<td>0.354</td>
<td>5.977</td>
<td>0.695</td>
<td>-7.129</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Length of Labour</td>
<td>0.694</td>
<td>0.35</td>
<td>0.07</td>
<td>0.688</td>
<td>1.983</td>
<td>0.101</td>
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<tr>
<td>Sex</td>
<td>-0.181</td>
<td>0.35</td>
<td>-2.059</td>
<td>0.688</td>
<td>-0.517</td>
<td>-2.992</td>
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</tr>
<tr>
<td>Delivery Method</td>
<td>1.554</td>
<td>0.35</td>
<td>1.59</td>
<td>0.688</td>
<td>4.44</td>
<td>2.311</td>
<td></td>
</tr>
</tbody>
</table>

z_{skewness} = (Skew Value – 0)/ SE_{skewness}; z_{kurtosis} = (Kurtosis Value – 0)/ SE_{kurtosis}

z > 1.96 significant at p<.05; z >2.58 significant at p<.01; z >3.29 significant at p<.001

5.5.6 Covariance with Demographic Variables

To determine whether any of the demographic variables should be considered as covariates in later analysis, a series of parametric and non-parametric analyses were conducted between all independent and dependant variables. Demographic variables included in these analyses were age, gestation length, ethnicity, education level, employment status, household income, marital status,
experience of quickening, risk status of the pregnancy and maternal smoking. Analyses were
determined by whether the variable violated the assumption of normality or not.

For mothers, a series of Kruskal-Wallis tests indicated that there was a significant effect of maternal
education and marital status on STAI-State anxiety (H(5)=15.367, p=.009; H(3)=8.203, p=.042;
respectively) and EPDS scores (H(5)=11.994, p=.035; H(3)=13.760, p=.003; respectively). There
were significant differences on the mindfulness subscale depending on maternal education level
(H(5)=18.22, p=.003) and marital status (H(3)=8.273, p=.041). Finally, there was a significant effect
of maternal smoking (H(1)=5.967, p=.015) on the quality of antenatal attachment subscale. A one-way
ANOVA indicated that there was a significant effect of marital status (F(3,73)=4.910, p=.004) on STAI-
Trait scores. In summary, maternal education and marital status were considered to be covariates for
main outcomes, and maternal smoking was considered to be a covariate in SCS subscale analysis.

For partners, education level had an effect on their antenatal attachment, across all three subscales,
global (F(4, 33)=3.070, p=.030), quality (F(4, 33)=2.519, p=.060) and preoccupation (F(4, 33)=4.488,
p=.005) of antenatal attachment.

With regard to neonatal outcome, a series of Kruskal-Wallis tests indicated that marital status had an
effect on APGAR score at 5 minutes (H(2)=8.791, p=.012) and the risk status of pregnancy had an
effect on the gestational age of the neonate (H(2)=7.032, p=0.030). Consequently, mothers and
partners education level, mothers’ marital status, maternal smoking and the risk status of the
pregnancies were included as covariates in secondary analyses containing the corresponding
variables.

5.5.7 Bivariate Correlations/ Multicolinearity
Multicolinearity occurs when there are strong correlations between independent variables, which
leads to difficulties in differentiating the importance of the variables. Two methods of assessing
multicolinearity are suggested by Field (2013). The first is to conduct bivariate correlations, as high
correlations (>0.80) are suggestive of multicolinearity (Table IV and Table V, Appendix E). For both
mothers and partners data there were instances of multicolinearity between subtests for both the SCS
and MAAS/PAAS, therefore only the total scores from these measures were used in later analyses. Also, for both mothers and partners, the correlation between the EPDS and STAI trait anxiety was >.80, therefore only the STAI state subscale was used in further analysis. The second method is through the analysis of the VIF (variance inflation statistic). The VIF indicates whether variables have a strong linear relationship with the other variables. Related to this is the tolerance statistic, which is reciprocal to the VIF (1/VIF), indicating what variance of the variable cannot be accounted for by the other variables. If a VIF value is >10 this is a concern, and if the average VIF is substantially greater than 1 then analysis may be biased. Also, a tolerance value of 0.2 indicates concern. Multicollinearity statistics were conducted for all mother and partner variables including subscales for the SCS and MAAS/PAAS. However, the VIF statistics when the subscales were included were substantially larger than 1, indicating multicollinearity (Appendix L). The statistics were repeated with the total scores for all independent variables and the average VIF’s were close to 1 and less than 10, and all tolerances were above 0.2.

5.5.8 Methods of analysis

As not all of the variables met the assumptions for parametric testing, several measures were taken. Total scores for scales were used in the analyses to reduce the effects of multicollinearity and state-anxiety was used as the measure of anxiety. The data were also bootstrapped, which was done using the resampling technique, with a 95% confidence interval and 5000 resamples. This was used throughout the analyses to ensure consistency, as these were the parameters suggested by Hayes (2009) for mediation analyses. The bootstrapping also allows parametric testing of non-parametric data. The re-sampling technique of bootstrapping creates an empirical estimation of the distribution of the population, based on the data in the sample. Bivariate correlations using Pearson’s product moment coefficients were conducted to assess multicollinearity (as above), but also to explore the relationships between the independent and dependant variables. Multiple, linear and hierarchical regressions were then conducted to further investigate the nature of these relationships; significant categorical covariates were dummy coded and incorporated into these models. Mediation analyses using the re-sampling technique of bootstrapping were carried out to further examine the hypothesised mediating effect of self-compassion between adult attachment and maternal antenatal mood; if the upper and lower bounds bias-corrected confidence interval (BC CI) do not contain zero, a
significant mediation effect can be assumed. The BC CI, index of explained variance ($R^2$) and the Kappa-squared ($K^2$) effect size were reported. Mediation analyses could not be carried out on partner or neonatal data due to small sample size.

6. REFERENCES


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Appendix A: Author Guidelines – Clinical Psychology Review

CLINICAL PSYCHOLOGY REVIEW

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DESCRIPTION

Clinical Psychology Review publishes substantive reviews of topics germane to clinical psychology. Papers cover diverse issues including: psychopathology, psychotherapy, behavior therapy, cognition and cognitive therapies, behavioral medicine, community mental health, assessment, and child development. Papers should be cutting edge and advance the science and/or practice of clinical psychology.

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Appendix B: Systematic Literature Review Tables

Table 1: Inclusion and Exclusion Criteria for Literature Search

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study population</td>
<td>• Humans</td>
</tr>
<tr>
<td></td>
<td>• Mother and child (aged 3-18) dyads</td>
</tr>
<tr>
<td>Study settings</td>
<td>• All nations</td>
</tr>
<tr>
<td>Time period</td>
<td>• Studies published between 1937 and 2014</td>
</tr>
<tr>
<td>Publication criteria</td>
<td><strong>Included:</strong></td>
</tr>
<tr>
<td></td>
<td>• Written in English language</td>
</tr>
<tr>
<td></td>
<td>• Articles in print</td>
</tr>
<tr>
<td></td>
<td><strong>Excluded:</strong></td>
</tr>
<tr>
<td></td>
<td>• Articles published out-with peer-reviewed journals (including dissertations and conference abstracts)</td>
</tr>
<tr>
<td></td>
<td>• Abstracts where full-text unavailable from author</td>
</tr>
<tr>
<td>Study design and other criteria</td>
<td><strong>Included:</strong></td>
</tr>
<tr>
<td></td>
<td>• Prospective follow-up cohort design</td>
</tr>
<tr>
<td></td>
<td>• Maternal anxiety assessed at one or more time point during the antenatal period</td>
</tr>
<tr>
<td></td>
<td>• Maternal anxiety assessment is reliable and valid</td>
</tr>
<tr>
<td></td>
<td>• Child outcome assessment is reliable and valid</td>
</tr>
<tr>
<td></td>
<td>• Data is presented and extractable on the association between maternal antenatal anxiety and child outcome</td>
</tr>
<tr>
<td></td>
<td><strong>Excluded:</strong></td>
</tr>
<tr>
<td></td>
<td>• Studies measuring anxiety as a result of natural disaster or war/conflict</td>
</tr>
<tr>
<td></td>
<td>• Maternal anxiety is measured solely before pregnancy, during labour or postnatal</td>
</tr>
<tr>
<td></td>
<td>• Recruitment based on specific aspect of maternal health (e.g. substance use or IVF)</td>
</tr>
</tbody>
</table>
Table 2: Quality Criteria Scoring Guidelines

<table>
<thead>
<tr>
<th>1: Appropriate and clear research question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well-covered (2)</strong></td>
</tr>
<tr>
<td>The aims and hypotheses are stated.</td>
</tr>
<tr>
<td><strong>Adequately addressed (1)</strong></td>
</tr>
<tr>
<td>The aims or hypotheses are stated.</td>
</tr>
<tr>
<td><strong>Not addressed (0)</strong></td>
</tr>
<tr>
<td>Neither the aims or hypotheses are stated.</td>
</tr>
<tr>
<td><strong>Not reported (0)</strong></td>
</tr>
<tr>
<td><strong>Not applicable (0)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2: The recruitment method is unbiased</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well-covered (2)</strong></td>
</tr>
<tr>
<td>Recruitment method is reported and does not bias one group mothers more than another. Inclusion/exclusion criteria are clearly defined.</td>
</tr>
<tr>
<td><strong>Adequately addressed (1)</strong></td>
</tr>
<tr>
<td>Recruitment method is described but lacks details OR inclusion/exclusion criteria are referred to but not defined.</td>
</tr>
<tr>
<td><strong>Not addressed (0)</strong></td>
</tr>
<tr>
<td>Limited details available for all aspects of recruitment.</td>
</tr>
<tr>
<td><strong>Not reported (0)</strong></td>
</tr>
<tr>
<td><strong>Not applicable (0)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3: The number of participants approached, participant and dropped out are reported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well-covered (2)</strong></td>
</tr>
<tr>
<td>The number of participants included at the initial assessment and at follow-up is reported. Analysis of potential bias in drop out. Demographic characteristics are clearly reported for mothers and children.</td>
</tr>
<tr>
<td><strong>Adequately addressed (1)</strong></td>
</tr>
<tr>
<td>Loss to follow-up analysis lacks detail demographic information is not fully reported.</td>
</tr>
<tr>
<td><strong>Not addressed (0)</strong></td>
</tr>
<tr>
<td>Neither loss to follow-up analysis OR demographic information is fully detailed.</td>
</tr>
<tr>
<td><strong>Not reported (0)</strong></td>
</tr>
<tr>
<td><strong>Not applicable (0)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4: The outcomes are clearly defined</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well-covered (2)</strong></td>
</tr>
<tr>
<td>The choice of measures is adequately justified and appropriate to aims and hypotheses. Outcomes are described fully.</td>
</tr>
<tr>
<td><strong>Adequately addressed (1)</strong></td>
</tr>
<tr>
<td>A limited description of outcomes is given.</td>
</tr>
<tr>
<td><strong>Not addressed (0)</strong></td>
</tr>
<tr>
<td>No description is given.</td>
</tr>
<tr>
<td><strong>Not reported (0)</strong></td>
</tr>
<tr>
<td><strong>Not applicable (0)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5: The antenatal assessments used are reliable and valid (other sources of this documented)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well-covered (2)</strong></td>
</tr>
<tr>
<td>Evidence measures used are reliable and have been validated for use in antenatal population. A full description is given of primary and secondary outcome measurements used.</td>
</tr>
<tr>
<td><strong>Adequately addressed (1)</strong></td>
</tr>
<tr>
<td>Some evidence of validity and reliability given but not specific to population and/or evidence is not provided for all outcomes.</td>
</tr>
<tr>
<td><strong>Not addressed (0)</strong></td>
</tr>
<tr>
<td>No assessment of the measures reliability/validity is provided.</td>
</tr>
<tr>
<td><strong>Not reported (0)</strong></td>
</tr>
<tr>
<td><strong>Not applicable (0)</strong></td>
</tr>
</tbody>
</table>
6: The child outcome assessments used are reliable and valid (other sources of this are documented)

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-covered (2)</td>
<td>Evidence that the measures used are reliable and have been validated for use in antenatal population prior to their use in the study. A full description is given of primary and secondary outcome measurements used.</td>
</tr>
<tr>
<td>Adequately addressed (1)</td>
<td>Some evidence of validity and reliability given but not specific to population and/or evidence is not provided for all outcomes.</td>
</tr>
<tr>
<td>Not addressed (0)</td>
<td>No assessment of the measures reliability/validity is provided.</td>
</tr>
<tr>
<td>Not reported (0)</td>
<td></td>
</tr>
<tr>
<td>Not applicable (0)</td>
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7: Assessments are carried out by a trained, unbiased, assessor

<table>
<thead>
<tr>
<th>Status</th>
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<tbody>
<tr>
<td>Well-covered (2)</td>
<td>Evidence that the assessor is trained to undertake the child outcome assessment and that they are blind to the antenatal assessments results.</td>
</tr>
<tr>
<td>Adequately addressed (1)</td>
<td>Evidence that the assessor is trained to undertake assessments.</td>
</tr>
<tr>
<td>Not addressed (0)</td>
<td>No evidence that the assessor is trained or blind to antenatal assessments outcomes.</td>
</tr>
<tr>
<td>Not reported (0)</td>
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<td>Not applicable (0)</td>
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</table>

8: Confounding variable are identified and taken into account

<table>
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<th>Description</th>
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<tbody>
<tr>
<td>Well-covered (2)</td>
<td>Antenatal, obstetric and postnatal confounding variables have been identified in the design and as appropriate have been assessed or allowed for in the analysis.</td>
</tr>
<tr>
<td>Adequately addressed (1)</td>
<td>Confounding variables in one of the antenatal, obstetric or postnatal periods have not been adequately considered in design or analysis.</td>
</tr>
<tr>
<td>Not addressed (0)</td>
<td>Minimal consideration of confounding variables in design and analysis.</td>
</tr>
<tr>
<td>Not reported (0)</td>
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<td>Not applicable (0)</td>
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9: Effect size and confidence interval is reported

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</thead>
<tbody>
<tr>
<td>Well-covered (2)</td>
<td>Effect sizes and confidence intervals are reported for main effects.</td>
</tr>
<tr>
<td>Adequately addressed (1)</td>
<td>Partially reported.</td>
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<td>Not reported.</td>
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<tr>
<td>No reported (0)</td>
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</tr>
<tr>
<td>Not applicable (0)</td>
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</table>

10: Power calculation is reported and power is achieved

<table>
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<th>Status</th>
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<tbody>
<tr>
<td>Well-covered (2)</td>
<td>A priori sample size calculation provided.</td>
</tr>
<tr>
<td>Adequately addressed (1)</td>
<td>Issues regarding power or sample size acknowledged and/or post hoc power calculation completed. Or, the cohort is of a large size.</td>
</tr>
<tr>
<td>Not addressed (0)</td>
<td>Not provided/no evidence.</td>
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<tr>
<td>No reported (0)</td>
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<tr>
<td>Not applicable (0)</td>
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Table 3: Characteristics of Included Studies, Ordered by age of Child at Follow-up (psychopathology and neurodevelopmental)

<table>
<thead>
<tr>
<th>First Author Year Location</th>
<th>Maternal Characteristics</th>
<th>Child Characteristics</th>
<th>Maternal Anxiety Assessment</th>
<th>Childhood Outcomes</th>
<th>Main Findings</th>
<th>Covariates Accounted For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ye (2013), Netherlands &amp; UK</td>
<td>N= 3442 Age= mean 29</td>
<td>ALSPAC Cohort:</td>
<td>ALSPAC: 18 wks pma CCEI</td>
<td>Attentional &amp; Emotional Problems</td>
<td>Maternal antenatal anxiety was associated with an increased risk of attentional problems (ALSPAC OR 1.32, 95% CI 1.19-1.47, p&lt;.001; Generation R OR 1.24, 95% CI 1.06-1.46, p&lt;.01). These effects remained only in the ALSPAC cohort after adjusting for maternal postnatal mood (ALSPAC OR 1.16, 95% CI 0.98-1.20, p&lt;.05.).</td>
<td>ALSPAC: Childs age and gender, ethnicity and age of mother and partner, maternal education, antenatal smoking/alcohol, family income at follow-up, partner mood during pregnancy, postnatal maternal mood.</td>
</tr>
<tr>
<td>Loomans (2011a), Netherlands</td>
<td>N= 3446 Age= mean 31.8 (sd= 4.6)</td>
<td>ABCD Cohort:</td>
<td>16 wks pma STAI (state-anxiety subscale)</td>
<td>Behaviour</td>
<td>When covariates included into analysis antenatal anxiety accounted for variance of problem behaviour, (R² =.01), emotional symptoms (R² =.01), peer relationship problems (R² =.01), conduct problems (R² =.01) and less pro-social behaviour (R² =.01) rated by parents. When covariates included into analysis antenatal anxiety accounted for variance of problem behaviour (R² =.01) and pro-social behaviour (R² =.01). Sex moderated the effect, before the addition of covariates antenatal anxiety accounted for more variance in boys overall problem behaviour than girls (R² =.18 vs R² =.17), but not following the addition of covariates (both R²=.01). Antenatal anxiety accounted for variance in hyperactivity/ inattention problems in boys (R² =.01) not seen in girls after covariates added to analysis.</td>
<td>ABCD: Childs birth weight for gestational age and sex, maternal ethnicity educational level, antenatal smoking/alcohol, maternal distress at follow up, parental report of psychopathology.</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
<td>Country</td>
<td>Cohort</td>
<td>N</td>
<td>Age</td>
<td>Antenatal:</td>
</tr>
<tr>
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<td>------</td>
<td>---------</td>
<td>--------</td>
<td>---</td>
<td>-----</td>
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</tr>
<tr>
<td>O'Connor</td>
<td>2002</td>
<td>UK</td>
<td>ALSPAC</td>
<td>7448</td>
<td>47  months</td>
<td>18 &amp; 32 wks pma CCEI</td>
</tr>
<tr>
<td>O'Connor</td>
<td>2003</td>
<td>UK</td>
<td>ALSPAC</td>
<td>6493</td>
<td>28 months</td>
<td>32 wks pma CCEI</td>
</tr>
<tr>
<td>Barker</td>
<td>2011</td>
<td>UK</td>
<td>ALSPAC</td>
<td>3298</td>
<td>7-8 (mean 7.5)</td>
<td>32 wks pma CCEI</td>
</tr>
<tr>
<td>Rodriguez</td>
<td>2005</td>
<td>Sweden</td>
<td></td>
<td>290</td>
<td>27 (sd 4)</td>
<td>10, 12, 20, 28, 32, 36 wks pma PSS</td>
</tr>
<tr>
<td>Study</td>
<td>Sample</td>
<td>Design</td>
<td>Measures</td>
<td>Findings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Davis (2012), USA</td>
<td>N=178</td>
<td>N= 178 (B:31, G:97)</td>
<td>20, 25, 31 wks pma</td>
<td>Children in the high anxiety group were exposed to higher maternal pregnancy specific anxiety (OR= 1.1, 95% CI 1-1.2, p&lt;.05). Pregnancy specific anxiety remained an independent predictor of child anxiety after accounting for covariates (beta= 0.22, F(4, 165)= 6.4, p&lt;.05). Perceived stress at wk 25 was the strongest predictor of child anxiety (beta= 0.22, F(4, 158)= 5.8, p&lt;.05).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barker (2009), UK</td>
<td>ALSPAC cohort</td>
<td>N= 7218 (B:3681, G:3537)</td>
<td>12-22, 23-31, 32-40 wks pma</td>
<td>Early-onset persistent conduct problems predicted by maternal antenatal anxiety in boys (OR 1.43, 95% CI 1.22-1.68 p&lt;.001) and girls (OR 1.23, 95% CI 1.03-1.47 p&lt;.05).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van den Bergh (2008), Belgium</td>
<td>N= 58</td>
<td>N= 58 (B:29, G:29)</td>
<td>12-22, 23-31, 32-40 wks pma</td>
<td>Maternal antenatal trait anxiety (12-22pma) leads to a high, flattened daytime cortisol profile in both sexes (p&lt;.05) which was associated with depression in female post-pubertal adolescents (p&lt;.01, ω²=.08).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurodevelopmental Outcomes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loomans (2011b), Netherlands</td>
<td>ABCD Cohort</td>
<td>N = 922</td>
<td>16 wks pma</td>
<td>In the total group, a small positive relationship between antenatal state anxiety and and intra-individual variability (simple RT task: R² =.02; complex RT task: R² =.01). In the high antenatal anxiety subsample antenatal trait anxiety was related to intra-individual variability for boys in the simple RT task (R² =.09) and a non-sex specific effect on mean RT and intra-individual variability (R² =.05) in the complex RT task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gutteling (2006), Netherlands</td>
<td>N=112</td>
<td>N= 112 (B: 50, G:62)</td>
<td></td>
<td>Higher negative impact of life events measure at 15-17 weeks significantly negatively associated with attention and concentration (R² =.22).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Maternal age, civil status, ethnicity, obstetric risk, gestational age, child sex, child age at follow up, maternal mood at follow up.

Socio-economic status, civil status, maternal age, maternal education, antenatal alcohol/smoking, family history of alcohol use, contact with police, birth weight, gestational age, birth complications, parity, language development, child temperament, head injury (up to age 4), harsh parenting, parenting cruelty, maternal attitude towards child.
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>N</th>
<th>Age</th>
<th>Weeks PMA</th>
<th>Measures</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buss (2011), USA</td>
<td>N= 88 Age= 31.6 (sd 5.6)</td>
<td>N= 89 Age= 6-9</td>
<td>15, 19, 25, 31 &amp; 37 wks pma</td>
<td>Cognitive Performance</td>
<td>Pregnancy specific anxiety at 15, 19 and 25 wks pma was associated with impaired inhibitory control in girls (beta= 0.43, F(6,42)= 2.92, p&lt;.05) but not boys. Pregnancy specific anxiety across the antenatal period (peaking at 15 and 37) was predictive of performance of visuospatial working memory, this was non sex-specific (beta= 0.36, F(6,80)= 5.6, p&lt;.001).</td>
<td></td>
</tr>
<tr>
<td>Clavarino (2009), Australia</td>
<td>N= 3982 Age= 13-19: 426 20-34: 3365 35+: 191</td>
<td>N= 3982 Age: 5 and 14</td>
<td>18 wks pma</td>
<td>Attention</td>
<td>Antenatal anxiety is strongly associated with persistent attention problems after adjusting for confounders (OR= 3.02, 95% CI= 1.78-5.14). Maternal chronic anxiety (antenatal to age 5) was further associated with persistent attention problems (OR= 4.00, 95% CI= 2.36-6.78).</td>
<td></td>
</tr>
<tr>
<td>Van den Bergh (2005), Belgium</td>
<td>N = 57 Age = range 18-30</td>
<td>N = 57 (B:29, G:28) Age = mean 15 (range 14.54-15.54, sd .3)</td>
<td>12-22, 23-31, 32-40 wks pma</td>
<td>Neurocognitive outcome: Impulsivity and IQ</td>
<td>Adolescents of mothers who were highly anxious during the 12-22nd weeks of pregnancy responded faster (F(1,52)=6.01; p&lt;.05) on the encoding task but made more errors (F(1,52)=5.91; p&lt;.05), an impulsive response pattern. RT but not error rate remained significant when WISC-R results taken as covariates. They also scored lower on the WISC-R subtests (F(1,52)=7.13, p&lt;.01).</td>
<td></td>
</tr>
<tr>
<td>Van Den Bergh (2006), Belgium</td>
<td>N=64 Age = mean 15 (range 14.54-15.54, sd .3)</td>
<td>12-22, 23-31, 32-40 wks pma</td>
<td>Sustained attention/self-regulation</td>
<td>Adolescent boys, whose mothers had high levels of antenatal anxiety at 12-22 wks showed more difficulties with sustained attention/self-regulation, in terms of slower RT (F(1,53)=4.02; p&lt;.05) and increased SD of RT (F(1,53)=4.02; p&lt;.05) as the task progressed.</td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trimester</th>
<th>Timing (week of antenatal period)</th>
<th>First Author &amp; Year</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>1st trimester</td>
<td>10</td>
<td>Rodriguez (2005)</td>
<td>ADHD</td>
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<td></td>
<td>12 - 22</td>
<td>Van den Bergh (2005)</td>
<td>Impulsivity and IQ</td>
</tr>
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<td>15 - 17</td>
<td>Gutteling (2006)</td>
<td>Concentration and attention</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Loomans (2011a)</td>
<td>Behaviour problems</td>
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<td></td>
<td>16</td>
<td>Loomans (2011b)</td>
<td>Cognitive control</td>
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<td>18 &amp; 20</td>
<td>Van Batenburg-Eddes (2013)</td>
<td>Attentional and emotional problems</td>
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<td>Clavarino (2009)</td>
<td>Attention</td>
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<td>18 &amp; 32</td>
<td>O’Connor (2002)</td>
<td>Behaviour problems</td>
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<td>Davis (2012)</td>
<td>Anxiety</td>
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<td>Behaviour and emotional problems</td>
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<td>2nd trimester</td>
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<td>Internalising problems</td>
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<tr>
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<td>32</td>
<td>Barker (2009)</td>
<td>Conduct problems</td>
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Table 5: Quality Criteria and Ratings for all Included Studies

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<th>Author Year Location</th>
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<th>TOTAL SCORE</th>
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<tr>
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<td>AA</td>
<td>WC</td>
<td>AA</td>
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<td>AA</td>
<td>WC</td>
<td>AA</td>
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<td>O'Connor (2003)</td>
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<td>AA</td>
<td>WC</td>
<td>WC</td>
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<td>AA</td>
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<td>AA</td>
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<td>AA</td>
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<td>Loomans (2011b)</td>
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<td>NR</td>
<td>WC</td>
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<td>AA</td>
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<td>WC</td>
<td>WC</td>
<td>NR</td>
<td>Nad</td>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>

1: Appropriate and clear research question, 2: The recruitment method is unbiased, 3: The number of participants approached, participant and dropped out are reported, 4: The outcomes are clearly defined, 5: The antenatal assessments used are reliable and valid, 6: The child outcome assessments used are reliable and valid 7: Assessments are carried out by a trained, unbiased, assessor, 8: Confounding variable are identified and taken into account, 9: Effect size and confidence interval is reported, 10: Power calculation is reported and power is achieved

WC: Well covered (2 points), AA: Adequately addressed (1 point), Nad: Not Addressed (0 Points), NR: Not Reported (0 points), NA: Not Applicable
Appendix C: Systematic Literature Review Figures

Figure 1: Flow Chart Detailing the Literature Search Process

Total number of articles from searching electronic databases (duplicates removed) = 1370

Total included at title review = 243
Total excluded by title = 1127

Total included at abstract review = 38
Total excluded at abstract review = 205

Review or non peer-reviewed article = 58
No antental assessment of maternal anxiety = 64
Child outcome outwith ages 3-18 = 31
Child outcome is absent or unrelated to topic = 33
Study design = 19

Total included at full text review = 12
Total excluded at full text review = 26

Review or non peer-reviewed article = 3
No antental assessment of maternal anxiety = 16
Child outcome outwith ages 3-18 = 1
Child outcome is not valid or reliable = 2
Duplication of results = 2
Study design = 2

Included through searching references and citing papers of included papers = 4
TOTAL = 16
Appendix D: Author Guidelines – Development and Psychopathology

Instructions for Contributors

Development and Psychopathology strongly encourages contributions from a wide array of disciplines because an effective developmental approach to psychopathology necessitates a broad synthesis of knowledge. Manuscripts will be considered that address, for example, the causes and effects of genetic, neurobiological, biochemical, cognitive, or sociocultural factors in developmental processes with reference to various risk or psychopathological conditions. The journal also seeks articles on the processes underlying the adaptive and maladaptive outcomes in populations at risk for psychopathology.

Manuscript Review Policy

Manuscripts will have a blind review by at least two scholars. Every effort will be made to notify authors within 90 days of submission concerning the reviewers’ recommendations and comments. Development and Psychopathology has no page charges.

Manuscript Submission and Review

All manuscripts submitted to Development and Psychopathology must be made electronically via ScholarOne Manuscripts: http://mc.manuscriptcentral.com/dpp

Please follow the complete instructions on this website to avoid delays. The instructions will prompt the author to provide all necessary information, including the corresponding author’s contact information, which includes complete mailing address, phone and fax numbers, and e-mail address. The website also requests suggested reviewers. The website will automatically acknowledge receipt of the manuscript and provide a manuscript reference number. The Editor-in-Chief will assign the manuscript to an Editor who will choose at least two other reviewers. Every effort will be made to provide the author with a rapid review. If the Editor requests that revisions be made to the manuscript before publication, a maximum of 3 months will be allowed for preparation of the revision. For additional information on the online submission and review system, please read the Tutorial for Authors or the Tutorial for Reviewers available from ScholarOne Manuscripts.

Manuscript Preparation and Style

General. All manuscripts must be prepared in MS Word or PDF format in 12-point type with 1-in. margins on all sides. The entire manuscript must be double-spaced and numbered consecutively. The language of publication is English.

Style and Manuscript Order. Follow the general style guidelines set forth in the Publication Manual of the American Psychological Association (6th ed.). The Editor may find it necessary to return manuscripts for reworking or inverting that do not conform to requirements. Do not use embedded references, endnotes, or bookmarks. Manuscripts must be arranged in the following order:

Title Page (page 1). To facilitate blind review, all indication of authorship must be limited to this page. Other pages must only show the short title plus page number at the top right. The title page should include the (a) full article title; (b) name and affiliations of all authors; (c) acknowledgment; (d) mailing address and telephone number of the corresponding author; and (f) a short title of less than 50 characters.

Abstract Page (page 2). Include (a) a full article title, (b) an abstract of no more than 200 words, and (c) up to five keywords for indexing and information retrieval.

Text (page 3). Use a standard paragraph indent. Do not hyphenate words at the ends of lines or justify right margins.

References. Bibliographic citations in the text must include the author’s last name and date of publication and may include page references.

Examples of in-text citation style are Cicchetti (2002). Demonti (2008, pp. 1133–1135). Hart and Thomas (2008), (Hart & Thomas, 2008), (Parker, Rutter, Shane, & Tsyng, 2007), and subsequently (Parker et al., 2007). If more than one citation is in alphabetical order, every in-text citation must be included in the reference section; every reference must be cited in the text. Examples of reference styles:

Journal Article


Book


Chapter in an Edited Book


Appendix (optional). Use only if needed.

Tables. Tables must appear as a unit following the reference section. Each table should be typed double-spaced on a separate page numbered consecutively with an Arabic numeral, and given a short title (e.g., Table 5. Comparisons on language variables). All tables must be cited in the text.

Figures. Figures must appear as a unit following the tables. Each figure must be numbered consecutively with an Arabic numeral in the descriptive legend. Legends must be provided separately from the artwork (e.g., Figure 3). The progress in language development). Figures, which are normally in black and white, should be no larger than 6 × 9 in, and placed within the manuscript file. If authors have print color figures, Cambridge will provide a price quotation for the cost to the author. Online-only color is provided free of cost. Diagrams must be computer generated. All labels and details must be clearly presented and large enough to remain legible at a 50% reduction. Artwork should be identified by figure number and short title. All figures must be cited in the text.

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### Table I: Demographic characteristics for all participants

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<td><strong>Current Gestation (weeks)</strong></td>
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### Table II: Summary of Total Mean Scores, Standard Deviations and Ranges for Measures

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<th>Partners</th>
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<td>Max</td>
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<td>M(SD)</td>
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<td>38.66(19.47)</td>
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<td>34.05(8.55)</td>
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<td>Global Attachment</td>
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<td>88</td>
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<td>53.07(6.6)</td>
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<td>50</td>
<td>31.1(3.02)</td>
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<td>Preoccupation</td>
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<td>59</td>
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### Table III: Summary of Neonatal Outcomes

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<th>Min</th>
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<td><strong>Sex (%)</strong></td>
<td>Boy 45.7% Girl 54.3%</td>
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<td><strong>Gestational Age (days)</strong></td>
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<td><strong>Birth Weight (grams)</strong></td>
<td>3512.2 (513.6)</td>
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<td>4550</td>
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<td><strong>APGAR Total (1 and 5 minute)</strong></td>
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<td><strong>APGAR 1 Minute</strong></td>
<td>8.4 (1.3)</td>
<td>3</td>
<td>9</td>
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<tr>
<td><strong>APGAR 5 Minutes</strong></td>
<td>9.0 (0.3)</td>
<td>8</td>
<td>10</td>
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<td><strong>Length of Labour</strong></td>
<td>6:43 (5:11)</td>
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<td><strong>Delivery Method (%)</strong></td>
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<td>Normal Delivery</td>
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<td>Elective Caesarean</td>
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<td>Assisted Vaginal Delivery</td>
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<td>Emergency Caesarean</td>
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Table IV: Correlations (Pearson’s r) Between Independent and Dependant Variables for Mothers

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*p<.05, **p<.01 (two tailed)
Table V: Correlations (Pearson’s r) Between Independent and Dependant Variables for Partners

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*p<.05, **p<.01 (two tailed)
Table VI: Summary of linear multiple regression analysis for antenatal mood.

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<th>Model</th>
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<th>Adjusted R²</th>
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<th>F Change (p)</th>
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<td><strong>Partner Depression</strong></td>
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<td>Model 2</td>
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<td>14.027 (.001)</td>
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Δ R²: R² change
Predictors: Maternal adult attachment anxiety and avoidance
Predictors: Maternal adult attachment anxiety and avoidance and total self-compassion
Predictors: Maternal adult attachment anxiety and avoidance, total self-compassion and maternal education
Predictors: Maternal adult attachment anxiety and avoidance, total self-compassion, maternal education and marital status
Predictors: Partner adult attachment anxiety and avoidance
Predictors: Partner adult attachment anxiety and avoidance and total self-compassion

Table VII: Summary of linear multiple regression for antenatal attachment

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<th>Model</th>
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<th>Adjusted R²</th>
<th>∆ R²</th>
<th>F Change (p)</th>
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<td><strong>Partner Antenatal Attachment</strong></td>
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Δ R²: R² change
Predictors: Maternal adult attachment anxiety and avoidance
Predictors: Maternal adult attachment anxiety and avoidance and total self-compassion
Predictors: Maternal adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression and maternal education
Predictors: Maternal adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, maternal education and marital status
Predictors: Maternal adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, maternal education, marital status and maternal smoking
Predictors: Partner adult attachment anxiety and avoidance
Predictors: Partner adult attachment anxiety and avoidance and total self-compassion
Predictors: Partner adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression
Predictors: Partner adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, partner education
### Table VIII: Summary of linear multiple regression for neonatal birth outcomes

<table>
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<td>Model 2</td>
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<td>-.091</td>
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<td>Model 2</td>
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<tr>
<td>Model 2</td>
<td>.438</td>
<td>-.125</td>
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</tbody>
</table>

Δ R²: R² change

Predictors<br>Model 1*: Maternal adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, antenatal attachment, risk status, maternal education, marital status and maternal smoking  
Predictors<br>Model 2*: Partner adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, antenatal attachment, risk status, partner education  
Predictors<br>Model 1**: Maternal adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, antenatal attachment, maternal education, marital status and maternal smoking  
Predictors<br>Model 2**: Partner adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, antenatal attachment, partner education  
Predictors<br>Model 1*: Maternal adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, antenatal attachment, maternal education, marital status and maternal smoking  
Predictors<br>Model 2*: Partner adult attachment anxiety and avoidance, total self-compassion, state anxiety and depression, antenatal attachment, partner education
Figure I: Mediation Models for Maternal Antenatal Mood. Unstandardised regression coefficients are reported. (*p<.05; **p<.01; ***p<.001)

Maternal Self-Compassion → Maternal Adult Attachment Anxiety
-0.0122***

Maternal Self-Compassion → Maternal State Anxiety
-6.9607***

Direct effect: .2894***
Indirect effect: .0852, 95% BC CI .0334 - .1749

Maternal Adult Attachment Avoidance → Maternal Self-Compassion
-0.0120***

Maternal Adult Attachment Avoidance → Maternal State Anxiety
-7.5450***

Direct effect: .2504***
Indirect effect: .0903, 95% BC CI .0356 - .1872

Continued Overleaf…
Maternal Self-Compassion

Maternal Adult Attachment Anxiety

Maternal Depression

Direct effect: \(0.2413***\)
Indirect effect: \(0.0870, 95\% BC CI 0.0383 - 0.1526\)

Maternal Self-Compassion

Maternal Adult Attachment Avoidance

Maternal Depression

Direct effect: \(0.1670***\)
Indirect effect: \(0.0966, 95\% BC CI 0.0391 - 0.1694\)
Appendix G: Mothers Pack

Parents Self-Compassion and Wellbeing During Pregnancy

Mothers Pack

The University of Edinburgh

NHS Highland

NHS Grampian
Parents Self-Compassion and Wellbeing during Pregnancy

Mothers Participant Information Sheet

What is the aim of the research project?
The aim of this study is to evaluate the effects of self-compassion on anxiety and depression during pregnancy, in both mothers and their partners. Self-compassion can be thought of as having a healthy attitude to yourself and your circumstances. We know from research that being compassionate to yourself can help you to cope with life stress, and has a positive effect on wellbeing. However, the effect of self-compassion during pregnancy has not been well researched. This study will examine this in a maternity population.

Why have I been invited to take part in this study?
You have been invited to take part in this study because you are in the second trimester of your pregnancy.

Am I eligible to take part in the study?
You are eligible to take part if you meet the following inclusion criteria:
- Are in the 2nd trimester of pregnancy
- Aged 18+
- Literate in English to extent required to complete self-report questionnaires

Unfortunately, there are some criteria which will exclude some mothers taking part:
- Current substance use
- Diagnosis of a psychotic disorder
- History of, or current, neurological disorder
- Expecting a multiple birth

What will happen to me if I decide to take part in the study?
If you decide to take part in this study you will firstly need to complete the consent form which follows this participant information sheet. You can decide to consent to take part in this study at any time during the second trimester of your pregnancy. Following consent you will be then required to complete a set of questionnaires. These should take you no longer than 30 minutes to complete. If you do decide to take part we would also like you to invite your partner to take part, please see the partner pack. We would then ask you to return the questionnaires in the freepost envelope provided.

Following this, a researcher will collect routine birth outcome data from your maternity records. In the future you may be informed about follow-up studies, if you complete the contact sheet at the end of this pack.
What are the possible benefits of taking part?
In general, research improves our knowledge of what people's difficulties are and what we can do to help overcome these and improve people's lives. Your participation will help increase our knowledge and potentially improve treatment for others in the future.

Are there any down-sides to taking part?
We do not expect that taking part will cause you any distress. However, if you have any concerns about the questions, you can contact the researcher for more information or indeed discuss them with your midwife or doctor. Although we do not anticipate that participating in this study will cause you any distress, if this did happen we will help you to access the appropriate support if needed.

Will my information be kept confidential?
All the information that you provide will be treated confidentially. All data will be stored on a password-protected computer. No one outside the research team will be able to find out your name or any other information which would identify you. All questionnaires will be kept securely.

What happens to my consent form?
To ensure your privacy the consent form will be kept separately from all the other information in a locked filing cabinet in the research office.

What happens if I decide not to take part in the study?
Nothing. Taking part is entirely up to you. If you do not wish to take part it will not affect any treatment you currently receive. Also, if you do decide to take part, you are able to change your mind and withdraw from the study at any time without it affecting your care either now or in the future.

Can I change my mind?
Yes. You can change your mind at any time and you do not need to give any reason. This will not affect your care in anyway.

What will happen to the results of the study?
When the study is completed, the results will be written up for publication in academic journals and will be presented at scientific conferences. You will not be identified in any report or publication. If you would like to know the results of the study please contact the researcher at the below address.

Who is organising and funding the research?
The University of Edinburgh.

Who has reviewed the study?
The study has been reviewed and approved by the North of Scotland NHS Ethics Committee.
Who can I contact if I want more information about the study?
If you have any questions you would like to ask, please do not hesitate to get in contact.

What can I do if I want to make a complaint about this study?
If you would like to make a complaint about this study please contact NHS Grampian: NHS Grampian Feedback Service, Summerfield House, 2 Edy Road, Aberdeen, AB15 6RE
Telephone: 0845 337 6339
E-mail: nhsgrampian.feedback@nhs.net

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Elgin
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EH8 9AG
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Independant Contact:
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Telephone: 0131 6513971

Thank you for taking time to read this.
Invitation to Participate in a Research Project

Parents Self-Compassion and Relationships during Pregnancy
MOTHERS

Version 2 (11th April 2013) Study Number: I3-NS-0037
Please return this consent form in the small envelope provided.

Name of Participant:

Name of Researcher: Fiona Ram

Your participant ID is:

Do you have a partner who has also agreed to take part in this research project?
- Yes: Please pass your participant ID number to your partner to fill in on their consent form. This will be used to link your data anonymously.
- No: Your ID number will be used to store your own data anonymously.

1. I confirm that I have read and understand the information sheet dated Version 2 (11th April 2013) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. If I had any questions about the research I have contacted a relevant member of the research team and received satisfactory answers to my questions.

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

4. I agree to take part in the above study.

5. I understand that relevant sections of my medical notes and data collected during the study may be looked at by individuals from the Sponsor(s), from regulatory authorities or from the NHS Board where it is relevant to my taking part in this research. I give permission for those individuals to have access to my records.

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

7. I understand that the researcher, who does not normally have access to my records, will access my maternity records to collect birth outcome data.

Name of Participant:
Print name, sign and date

Researcher:
Print name, sign and date

Version 2 (11th April 2013)
Parents Self-Compassion During Pregnancy

THE UNIVERSITY OF HIGHLAND
NHS Highland
NHS Grampian

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Mothers Questionnaire Pack

My participant ID number is (as on consent form):

Date:

Please return this questionnaire pack in the large envelope provided.
**Self-Compassion Scale**

How I typically act towards myself in difficult times.


Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

<table>
<thead>
<tr>
<th>Almost never</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

1. I'm disapproving and judgmental about my own flaws and inadequacies.

2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.

4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.

5. I try to be loving towards myself when I'm feeling emotional pain.

6. When I fail at something important to me I become consumed by feelings of inadequacy.

7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.

8. When times are really difficult, I tend to be tough on myself.

---

Version 2 (11th April 2013)

Parents Self-Compassion during Pregnancy
9. When something upsets me I try to keep my emotions in balance.

10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

11. I’m intolerant and impatient towards those aspects of my personality I don’t like.

12. When I’m going through a very hard time, I give myself the caring and tenderness I need.

13. When I’m feeling down, I tend to feel like most other people are probably happier than I am.

14. When something painful happens I try to take a balanced view of the situation.

15. I try to see my failings as part of the human condition.

16. When I see aspects of myself that I don’t like, I get down on myself.

17. When I fail at something important to me I try to keep things in perspective.

18. When I’m really struggling, I tend to feel like other people must be having an easier time of it.

19. I’m kind to myself when I’m experiencing suffering.

20. When something upsets me I get carried away with my feelings.

21. I can be a bit cold-hearted towards myself when I’m experiencing suffering.
22. When I’m feeling down I try to approach my feelings with curiosity and openness.

23. I’m tolerant of my own flaws and inadequacies.

24. When something painful happens I tend to blow the incident out of proportion.

25. When I fail at something that’s important to me, I tend to feel alone in my failure.

26. I try to be understanding and patient towards those aspects of my personality I don’t like.

Maternal Antenatal Attachment Scale

Corden, J. (1992)

These questions are about your thoughts and feelings about the developing baby. Please tick one box only in answer to each question.

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 strong and weak
   - 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. This desire is:
   □ Very weak or non-existent
   □ Fairly weak
   □ Neither strong nor weak
   □ Moderately strong
   □ Very strong

5) Over the past two weeks I have been trying to picture in my mind 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 of the developing baby mostly as:
   □ A real little person 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 that 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 emotionally 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
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>15) When I first see my baby after the birth I expect I will feel:</td>
<td>□ Intense affection</td>
</tr>
<tr>
<td></td>
<td>□ Mostly affection</td>
</tr>
<tr>
<td></td>
<td>□ Dislike about one or two aspects of the baby</td>
</tr>
<tr>
<td></td>
<td>□ Dislike about quite a few aspects of the baby</td>
</tr>
<tr>
<td></td>
<td>□ Mostly dislike</td>
</tr>
<tr>
<td>16) When my baby is born I would like to hold the baby:</td>
<td>□ Immediately</td>
</tr>
<tr>
<td></td>
<td>□ After it has been wrapped in a blanket</td>
</tr>
<tr>
<td></td>
<td>□ After it has been washed</td>
</tr>
<tr>
<td></td>
<td>□ After a few hours for things to settle down</td>
</tr>
<tr>
<td></td>
<td>□ The next day</td>
</tr>
<tr>
<td>17) Over the past two weeks I have had dreams about the pregnancy or baby:</td>
<td>□ Not at all</td>
</tr>
<tr>
<td></td>
<td>□ Occasionally</td>
</tr>
<tr>
<td></td>
<td>□ Frequently</td>
</tr>
<tr>
<td></td>
<td>□ Very frequently</td>
</tr>
<tr>
<td></td>
<td>□ Almost every night</td>
</tr>
<tr>
<td>18) Over the past two weeks I have found myself feeling, or rubbing with my hand, the outside of my stomach where the baby is:</td>
<td>□ A lot of times each day</td>
</tr>
<tr>
<td></td>
<td>□ At least once per day</td>
</tr>
<tr>
<td></td>
<td>□ Occasionally</td>
</tr>
<tr>
<td></td>
<td>□ Once only</td>
</tr>
<tr>
<td></td>
<td>□ Not at all</td>
</tr>
<tr>
<td>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:</td>
<td>□ Very pleased</td>
</tr>
<tr>
<td></td>
<td>□ Moderately pleased</td>
</tr>
<tr>
<td></td>
<td>□ Neutral (i.e. neither sad nor pleased; or mixed feelings)</td>
</tr>
<tr>
<td></td>
<td>□ Moderately sad</td>
</tr>
<tr>
<td></td>
<td>□ Very sad</td>
</tr>
</tbody>
</table>
The Experiences in Close Relationships-Revised (ECR-R) Questionnaire

Fraley, Waller and Brennan (2000)

The statements below concern how you feel in emotionally intimate relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship.

At the left, please respond to each statement to indicate how much you agree or disagree with the statement, using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

1. I'm afraid that I will lose my partner's love.

2. I worry that romantic partners won't care about me as much as I care about them.

3. I am very comfortable being close to romantic partners.

4. My desire to be very close sometimes scares people away.

5. I find that my partner(s) don't want to get as close as I would like.

6. When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.

7. I feel comfortable sharing my private thoughts and feelings with my partner.

8. My partner only seems to notice me when I'm angry.

9. I find it easy to depend on romantic partners.
10. Sometimes romantic partners change their feelings for me for no apparent reason.

11. I tell my partner everything.

12. I am nervous when partners get too close to me.

13. I worry a lot about my relationships.

14. It makes me mad that I don’t get the affection and support I need from my partner.

15. I talk things over with my partner.

16. I often worry that my partner doesn’t really love me.

17. I rarely worry about my partner leaving me.

18. I find it relatively easy to get close to my partner.

19. I usually discuss my problems and concerns with my partner.

20. I often wish that my partner’s feelings for me were as strong as my feelings for him or her.

21. I don’t feel comfortable opening up to romantic partners.

22. I find it difficult to allow myself to depend on romantic partners.

23. I get uncomfortable when a romantic partner wants to be very close.

24. I’m afraid that once a romantic partner gets to know me, he or she won’t like who I really am.
25. My romantic partner makes me doubt myself.
26. My partner really understands me and my needs.
27. I prefer not to show a partner how I feel deep down.
28. I prefer not to be too close to romantic partners.
29. It’s easy for me to be affectionate with my partner.
30. I worry that I won’t measure up to other people.
31. I feel comfortable depending on romantic partners.
32. I often worry that my partner will not want to stay with me.
33. When my partner is out of sight, I worry that he or she might become interested in someone else.
34. It’s not difficult for me to get close to my partner.
35. I do not often worry about being abandoned.
36. It helps to turn to my romantic partner in times of need.
Edinburgh Post-Natal Depression Scale (EPDS)

This measure has been validated for its use by both mothers and their partners during the antenatal period.

Instructions for users:
1. Underline the response which comes closest to how you have been feeling in the previous 7 days, not just how you are feeling today.
2. All ten items must be completed.
3. Please do not discuss your responses with others.

Here is an example, already completed.

I have felt happy:
Yes, all the time
Yes most of the time
No, not very often
No, not at all

This would mean that the completer has felt happy most of the time during the past week.

Please complete the following questions in the same way.

In the past 7 days:

1) I have been able to laugh and see the funny side of things:
   As much as I always could
   Not quite so much now
   Definitely not so much now
   Not at all

2) I have looked forward with enjoyment to things:
   As much as I ever did
   Rather less than I used to
   Definitely less than I used to
   Hardly at all
93) I have blamed myself unnecessarily when things went wrong:
   Yes, most of the time
   Yes, some of the time
   Not very often
   No, never

94) I have been anxious or worried for no good reason:
   No, not at all
   Hardly ever
   Yes, sometimes
   Yes, very often

95) I have felt scared or panic for no very good reason:
   Yes, quite a lot
   Yes, sometimes
   No, not much
   No, not at all

96) Things have been getting on top of me:
   Yes, most of the time I haven’t been able to cope at all
   Yes, sometimes I haven’t been coping as well as usual
   No, most of the time I have coped quite well
   No, I have been coping as well as ever

97) I have been so unhappy that I have had difficulty sleeping:
   Yes, most of the time
   Yes, sometimes
   Not very often
   No, not at all

98) I have felt sad or miserable:
   Yes, most of the time
   Yes, quite often
   Not very often
   No, not at all

99) I have been so unhappy that I have been crying:
   Yes, most of the time
   Yes, quite often
   Only occasionally
   No, never

100) The thought of harming myself has occurred to me:
     Yes, quite often
     Sometimes
     Hardly ever
     Never

Mothers Background Information
Please complete all of the questions below:

Your Age: ____________________________  Gestation period (in weeks): ____________________________

NHS Region:
- [ ] NHS Grampian
- [ ] NHS Highland

Ethnicity:
- [ ] White British
- [ ] Mixed/Multiple Ethnic Groups
- [ ] Asian
- [ ] African
- [ ] Caribbean
- [ ] Polish
- [ ] Other European
- [ ] Other

Religion:
- [ ] No religion/ Atheist/ Agnostic
- [ ] Christian
- [ ] Jewish
- [ ] Buddhist
- [ ] Muslim
- [ ] Hindu
- [ ] Other

Education Level:
- [ ] High School
- [ ] College
- [ ] Undergraduate Degree
- [ ] Masters
- [ ] Phd/Doctorate

Employment:
- [ ] Unemployed
- [ ] Student
- [ ] Part-Time
- [ ] Full-Time

Household Income:
- [ ] < £20,000
- [ ] £20,001 - £30,000
- [ ] £30,001 - £40,000
- [ ] £40,001 - £50,000
- [ ] £50,001 - £60,000
- [ ] £60,001 - £70,000
- [ ] £70,001 - £80,000
- [ ] > £80,000

Sexual Orientation:
- [ ] Heterosexual
- [ ] Homosexual
- [ ] Bisexual
- [ ] Other

Marital Status:
- [ ] Single
- [ ] Partner Living Out
- [ ] Partner Living In Same Home
- [ ] Married
- [ ] Divorced/Widowed/ Separated

Length of Current Relationship:

Year(s): ____________________________  Month(s): ____________________________

Version 2 (11th April 2013)
Parents Self-Compassion During Pregnancy

THE UNIVERSITY OF EDINBURGH  NHS Highland  NHS Grampian
Children Living in the Home:
☐ None

Number of Children Aged 5 or Under: 

Number of Children Aged 6 - 12:

Number of Children Aged 12+:

Pregnancy History:
Number of Previous Pregnancies:

If you have had any of the experiences listed below please state the number of times this has happened to you:

Live Birth

Abortion

Miscarriage

Still-Birth

Is this pregnancy a result of fertility treatment?

YES ☐ NO (please circle)

Planned Pregnancy:

YES ☐ NO (please circle)

Quickening (felt foetus movement):

YES ☐ NO (please circle)

Have you had your dating scan?

YES ☐ NO (please circle)

Pregnancy Risk Status:
☐ Low-risk
☐ High-risk
☐ Unsure

Do you currently smoke?

YES ☐ NO (please circle)

Have you ever had medical treatment for infertility?

☐ No
☐ Evaluation and some advice, no intervention
☐ Evaluation and some intervention
☐ Extensive fertility treatment other than IVF
☐ IVF (number of cycles)
Mothers Contact Information

If you have consented to be informed about future follow-up studies please complete the below sheet. This information will be kept confidential and only used by researchers connected to this study to contact you in the future. Researchers may contact you to invite you to take part in future follow-up studies. This does not mean that you have consented to take part – just to be contacted and invited to future follow-up studies.

Many thanks and we look forward to inviting you to take part in future follow-up studies.

Please complete in BLOCK CAPITALS:

Your participant ID is:

Name of Participant:

Contact Telephone Number:

Contact Address:

E-mail Address:

Date of Birth:

Preferred Method of Contact:

☐ Phone
☐ Postal Mail
☐ E-mail
Appendix H: Partners Pack

Parents
Self-Compassion
and Wellbeing
During Pregnancy

Partners Pack

THE UNIVERSITY
of EDINBURGH

NHS
Highland

NHS
Grampian
Parents Self-Compassion and Wellbeing during Pregnancy

Partners Participant Information Sheet

What is the aim of the research project?
The aim of this study is to evaluate the effects of self-compassion on anxiety and depression during pregnancy in both mothers and their partners. Self-compassion can be thought of as having a healthy attitude to yourself and your circumstances. We know from research that being compassionate to yourself can help you to cope with life stress, and has a positive effect on wellbeing. However, the effect of self-compassion during pregnancy has not been well researched. This study will examine this in a maternity population.

Why have I been invited to take part in this study?
You have been invited to take part in this study as your partner is in her second trimester of pregnancy and she has agreed to take part in this study.

Am I eligible to take part in the study?
You are eligible to take part if they meet the following inclusion criteria:

- Partner of a mother-to-be that is taking part in the study
- Aged 18+
- Literate in English to extent required to complete self-report questionnaires

Unfortunately, there are some criteria which will exclude some partners taking part:

- Current substance use
- Diagnosis of a psychotic disorder
- History of, or current, neurological disorder

What will happen to me if I decide to take part in the study?
If you decide to take part in this study you will firstly need to complete the consent form which follows this participant information sheet. You can decide to consent to take part in this study at any time during your partners second trimester of pregnancy. Following consent you will be then required to complete a set of questionnaires. These should take you no longer than 30 minutes to complete. We would then ask you to return the questionnaires in the freepost envelope provided. In the future you may be informed of follow-up studies, if you complete the contact sheet at the end of this pack.
What are the possible benefits of taking part?
In general, research improves our knowledge of what people’s difficulties are and what we can do to help overcome these and improve people’s lives. Your participation will help increase our knowledge and potentially improve treatment for others in the future.

Are there any downsides to taking part?
We do not expect that taking part will cause you any distress. However, if you have any concerns about the questions, you can contact the researcher for more information or indeed discuss them with your midwife or doctor. Although we do not anticipate that participating in this study will cause you any distress, if this did happen we will help you to access the appropriate support if needed.

Will my information be kept confidential?
All the information that you provide will be treated confidentially. All data will be stored on a password protected computer. No one outside the research team will be able to find out your name, or any other information which would identify you. All questionnaires will be kept securely.

What happens to my consent form?
To ensure your privacy the consent form will be kept separately from all the other information in a locked filing cabinet in the research office.

What happens if I decide not to take part in the study?
Nothing taking part is entirely up to you. If you do not wish to take part it will not affect any treatment you currently receive. Also, if you do decide to take part, you are able to change your mind and withdraw from the study at any time without it affecting your care either now or in the future.

Can I change my mind?
Yes, you can change your mind at any time and you do not need to give any reason. This will not affect your care in any way.

What will happen to the results of the study?
When the study is completed, the results will be written up for publication in academic journals and will be presented at scientific conferences. You will not be identified in any report or publication. If you would like to know the results of the study please contact the researcher at the below address.

Who is organising and funding the research?
The University of Edinburgh.

Who has reviewed the study?
The study has been reviewed and approved by the North East of Scotland NHS Ethics Committee.
Who can I contact if I want more information about the study?
If you have any questions you would like to ask, please do not hesitate to get in contact.

What can I do if I want to make a complaint about this study?
If you would like to make a complaint about the study please contact NHS Grampian: NHS Grampian Feedback Service, Summerfield House, 2 Eday Road, Aberdeen AB15 6RE Telephone: 0845 337 6338 E-mail: nhsgrampian.feedback@nhs.net

Clinical Supervisor:
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Clinical Psychologist
Dr Grey’s Hospital
NHS Grampian
Elgin
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Chief Investigator:
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Dr Grey’s Hospital
NHS Grampian
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Moray IV30 1SH
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Telephone: 01343 567499

Independant Contact:
Dr Iain Wynner
Section of Clinical & Health Psychology
School of Health in Social Sciences
The University of Edinburgh
Teviot Place, Edinburgh
EH8 9AG
Telephone: 0131 6513971

PLEASE RETAIN PAGES 1, 2, 3.

PLEASE RETURN PAGES 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19

Thank you for taking time to read this.
Invitation to Participate in a Research Project

Parents Self-Compassion and Relationships during Pregnancy
PARTNERS
(VERSION 1, 31st January 2013)

Name of Participant: 

Name of Researcher: Fiona Ram 

In order to take part in this research your partner will also agreed to take part in this research project:

• Please enter the participant ID in the space below

Your participant ID is: 

1. I confirm that I have read and understand the information sheet dated January 30th 2013 (Version 1) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. 

2. If I had any questions about the research I have contacted a relevant member of the research team and received satisfactory answers to my questions. 

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

4. I agree to take part in the above study. 

5. I understand that relevant data collected during the study may be looked at by individuals from the Sponsor(s), from regulatory authorities or from the NHS Board where it is relevant to my taking part in this research. I give permission for those individuals to have access to my records. 

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

Participant Signature: ___________________________ Date: ___________________________ 

Person taking consent Signature: ___________________________ Date: ___________________________ 

Version 1 – 30th January 2013
Parents Self-Compassion During Pregnancy

The research project has been approved by NH & Grampian Ethics Committee

THE UNIVERSITY OF EDINBURGH
NHS Highland
NHS Grampian
Partners Background Information
Please complete all of the questions below:

Participant ID (as on consent form):

Today's date:

Your Age:

NHS Region:
- [] NHS Grampian
- [] NHS Highland

Ethnicity:
- [] White British
- [] Mixed/Multiple Ethnic Groups
- [] Asian
- [] African
- [] Caribbean
- [] Polish
- [] Other European
- [] Other

Religion:
- [] No religion/Atheist/Agnostic
- [] Christian
- [] Jewish
- [] Buddhist
- [] Muslim
- [] Hindu
- [] Other

Employment:
- [] Unemployed
- [] Student
- [] Part-Time
- [] Full-Time

Household Income:
- [] <£20,000
- [] £20,001 - £30,000
- [] £30,001 - £40,000
- [] £40,001 - £50,000
- [] £50,001 - £60,000
- [] £60,001 - £70,000
- [] £70,001 - £80,000
- [] >£80,000

Sexual Orientation:
- [] heterosexual
- [] Homosexual
- [] Bisexual
- [] Other

Education Level:
- [] High School
- [] College
- [] Undergraduate Degree
- [] Masters
- [] PhD/Doctorate

Marital Status:
- [] Single
- [] Partner Living Out
- [] Partner Living In Same Home
- [] Married
- [] Divorced/Widowed/ Separated

Experiences of Pregnancy:
Have you ever partnered your current or previous partners through any of the following experience?
Please give a number for how many times you have partnered through the experience:

Live Birth  [ ]  Planned Pregnancy:
Abortion  [ ]  YES / NO
Miscarriage  [ ]  (please circle)
Still-Birth  [ ]
**Self-Compassion Scale**

How I typically act towards myself in difficult times.


Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

<table>
<thead>
<tr>
<th>Almost never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Almost always</th>
</tr>
</thead>
</table>

1. I'm disapproving and judgmental about my own flaws and inadequacies.
2. When I'm feeling down, I tend to obsess and fixate on everything that's wrong.
3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.
4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.
5. I try to be loving towards myself when I'm feeling emotional pain.
6. When I fail at something important to me, I become consumed by feelings of inadequacy.
7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.
8. When times are really difficult, I tend to be tough on myself.
9. When something upsets me I try to keep my emotions in balance.

10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

11. I'm intolerant and impatient towards those aspects of my personality I don't like.

12. When I'm going through a very hard time, I give myself the caring and tenderness I need.

13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.

14. When something painful happens I try to take a balanced view of the situation.

15. I try to see my failings as part of the human condition.

16. When I see aspects of myself that I don't like, I get down on myself.

17. When I fail at something important to me I try to keep things in perspective.

18. When I'm really struggling I tend to feel like other people must be having an easier time of it.

19. I'm kind to myself when I'm experiencing suffering.

20. When something upsets me I get carried away with my feelings.

21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.
22. When I’m feeling down I try to approach my feelings with curiosity and openness.

23. I’m tolerant of my own flaws and inadequacies.

24. When something painful happens I tend to blow the incident out of proportion.

25. When I fail at something that’s important to me, I tend to feel alone in my future.

26. I try to be understanding and patient towards those aspects of my personality I don’t like.

Paternal Antenatal Attachment


These questions are about your thoughts and feelings about the developing baby. Please tick one box only in answer to each question.

1) Over the past two weeks I have thought about, or been preoccupied with the developing baby:
   - 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 developing baby I got emotional feelings which were:
   - Very weak or non-existent
   - Fairly weak
   - In between strong and weak
   - Fairly strong
   - Very strong
3) Over the past two weeks my feelings about the developing baby 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. This desire is:
- Very weak or non-existent
- Fairly weak
- Neither strong nor weak
- Moderately strong
- Very strong

5) Over the past two weeks I have been trying to picture in my mind what the developing baby actually looks like in my partner’s womb:
- Almost all the time
- Very frequently
- Frequently
- Occasionally
- Not at all

6) Over the past two weeks I think of the developing baby mostly as:
- A real little person 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 when I think about the developing baby 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

8) Over the past two weeks my ideas about possible names for the baby have been:
- Very clear
- Fairly clear
- Fairly vague
- Very vague
- I have no idea at all
9) Over the past two weeks when I think about the developing baby I get feelings which are:

- Very sad
- Moderately sad
- A mixture of happiness and sadness
- Moderately happy
- Very happy

10) Over the past two weeks I have been thinking about what kind of child the baby will grow into:

- Not at all
- Occasionally
- Frequently
- Very frequently
- Almost all the time

11) Over the past two weeks I have felt:

- Very emotionally distant from the baby
- Moderately emotionally distant from the baby
- Not particularly emotionally close to the baby
- Moderately close emotionally to the baby
- Very close emotionally to the baby

12) When I first see the baby after the birth I expect I will feel:

- Intense affection
- Mostly affection
- Affection, but I expect there may be a few aspects of the baby I will dislike
- I expect there may be quite a few aspects of the baby I will dislike
- I expect I might feel mostly dislike

13) When the 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 a few hours for things to settle down
- The next day

14) Over the past two weeks I have had dreams about the pregnancy or baby:

- Not at all
- Occasionally
- Frequently
- Very frequently
- Almost every night

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Parents Self-Compassion During Pregnancy

THE UNIVERSITY OF EDINBURGH
NHS
NHS
10

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15) Over the past two weeks I have found myself feeling, or rubbing with my hand, the outside of my partner's stomach where the baby is:

- A lot of times each day
- At least once per day
- Occasionally
- Once only
- Not at all

16) If the pregnancy was lost at this time (due to miscarriage or other accidental event) without any pain or injury to my partner, I expect I would feel:

- Very pleased
- Moderately pleased
- Neutral (i.e. neither sad nor pleased; or mixed feelings)
- Moderately sad
- Very sad
# The Experiences in Close Relationships-Revised (ECR-R) Questionnaire

_Esley, Waller and Brennan (2000)_

The statements below concern how you feel in emotionally intimate relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship.

At the left, please respond to each statement to indicate how much you agree or disagree with the statement, using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

1. I'm afraid that I will lose my partner's love.
2. I worry that romantic partners won't care about me as much as I care about them.
3. I am very comfortable being close to romantic partners.
4. My desire to be very close sometimes scares people away.
5. I find that my partner(s) don't want to get as close as I would like.
6. When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.
7. I feel comfortable sharing my private thoughts and feelings with my partner.
8. My partner only seems to notice me when I'm angry.
9. I find it easy to depend on romantic partners.
10. Sometimes romantic partners change their feelings for me for no apparent reason.

11. I tell my partner everything.

12. I am nervous when partners get too close to me.

13. I worry a lot about my relationships.

14. It makes me mad that I don’t get the affection and support I need from my partner.

15. I talk things over with my partner.

16. I often worry that my partner doesn’t really love me.

17. I rarely worry about my partner leaving me.

18. I find it relatively easy to get close to my partner.

19. I usually discuss my problems and concerns with my partner.

20. I often wish that my partners feelings for me were as strong as my feelings for him or her.

21. I don’t feel comfortable opening up to romantic partners.

22. I find it difficult to allow myself to depend on romantic partners.

23. I get uncomfortable when a romantic partner wants to be very close.

24. I’m afraid that once a romantic partner gets to know me, he or she won’t like who I really am.
25. My romantic partner makes me doubt myself.

26. My partner really understands me and my needs.

27. I prefer not to show a partner how I feel deep down.

28. I prefer not to be too close to romantic partners.

29. It's easy for me to be affectionate with my partner.

30. I worry that I won't measure up to other people.

31. I feel comfortable depending on romantic partners.

32. I often worry that my partner will not want to stay with me.

33. When my partner is out of sight, I worry that he or she might become interested in someone else.

34. It's not difficult for me to get close to my partner.

35. I do not often worry about being abandoned.

36. It helps to turn to my romantic partner in times of need.
Edinburgh Post-Natal Depression Scale (EPDS)

J.L. Cox, J.M. Holden, R.S. Sagovsky Department of Psychiatry, University of Edinburgh

This measure has been validated for its use by both mothers and their partners during the antenatal period.

Instructions for users:

1. Underline the response which comes closest to how you have been feeling in the previous 7 days, not just how you are feeling today.
2. All ten items must be completed.
3. Please do not discuss your responses with others.

Here is an example, already completed.

I have felt happy:
Yes, all the time
Yes, most of the time
No, not very often
No, not at all

This would mean that the completer has felt happy most of the time during the past week.

Please complete the following questions in the same way.

In the past 7 days:

1) I have been able to laugh and see the funny side of things:
   - As much as I always could
   - Not quite so much now
   - Definitely not so much now
   - Not at all

2) I have looked forward with enjoyment to things:
   - As much as I ever did
   - Rather less than I used to
   - Definitely less than I used to
   - Hardly at all

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Parents Self-Compassion During Pregnancy
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>I have blamed myself unnecessarily when things went wrong:</td>
</tr>
<tr>
<td></td>
<td>Yes, most of the time</td>
</tr>
<tr>
<td></td>
<td>Yes, some of the time</td>
</tr>
<tr>
<td></td>
<td>Not very often</td>
</tr>
<tr>
<td></td>
<td>No, never</td>
</tr>
<tr>
<td>4</td>
<td>I have been anxious or worried for no good reason:</td>
</tr>
<tr>
<td></td>
<td>No, not at all</td>
</tr>
<tr>
<td></td>
<td>Hardly ever</td>
</tr>
<tr>
<td></td>
<td>Yes, sometimes</td>
</tr>
<tr>
<td></td>
<td>Yes, very often</td>
</tr>
<tr>
<td>5</td>
<td>I have felt scared or panicky for no very good reason:</td>
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<tr>
<td></td>
<td>Yes, quite a lot</td>
</tr>
<tr>
<td></td>
<td>Yes, sometimes</td>
</tr>
<tr>
<td></td>
<td>No, not much</td>
</tr>
<tr>
<td></td>
<td>No, not at all</td>
</tr>
<tr>
<td>6</td>
<td>Things have been getting on top of me:</td>
</tr>
<tr>
<td></td>
<td>Yes, most of the time I haven’t been able to cope at all</td>
</tr>
<tr>
<td></td>
<td>Yes, sometimes I haven’t been coping as well as usual</td>
</tr>
<tr>
<td></td>
<td>No, most of the time I have coped quite well</td>
</tr>
<tr>
<td></td>
<td>No, I have been coping as well as ever</td>
</tr>
<tr>
<td>7</td>
<td>I have been so unhappy that I have had difficulty sleeping:</td>
</tr>
<tr>
<td></td>
<td>Yes, most of the time</td>
</tr>
<tr>
<td></td>
<td>Yes, sometimes</td>
</tr>
<tr>
<td></td>
<td>Not very often</td>
</tr>
<tr>
<td></td>
<td>No, not at all</td>
</tr>
<tr>
<td>8</td>
<td>I have felt sad or miserable:</td>
</tr>
<tr>
<td></td>
<td>Yes, most of the time</td>
</tr>
<tr>
<td></td>
<td>Yes, quite often</td>
</tr>
<tr>
<td></td>
<td>Not very often</td>
</tr>
<tr>
<td></td>
<td>No, not at all</td>
</tr>
<tr>
<td>9</td>
<td>I have been so unhappy that I have been crying:</td>
</tr>
<tr>
<td></td>
<td>Yes, most of the time</td>
</tr>
<tr>
<td></td>
<td>Yes, quite often</td>
</tr>
<tr>
<td></td>
<td>Only occasionally</td>
</tr>
<tr>
<td></td>
<td>No, never</td>
</tr>
<tr>
<td>10</td>
<td>The thought of harming myself has occurred to me:</td>
</tr>
<tr>
<td></td>
<td>Yes, quite often</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
</tr>
<tr>
<td></td>
<td>Hardly ever</td>
</tr>
<tr>
<td></td>
<td>Never</td>
</tr>
</tbody>
</table>

Partners Contact Information

If you have consented to be informed about future follow-up studies please complete the below sheet. This information will be kept confidential and only used by researchers connected to this study to contact you in the future. Researchers may contact you to invite you to take part in future follow-up studies. This does not mean that you have consented to take part, just to be contacted and invited to future follow-up studies.

Many thanks and we look forward to inviting you to take part in future follow-up studies.

Please complete in BLOCK CAPITALS:

Your participant ID is:

Name of Participant:

Contact Telephone Number:

Contact Address:

E-mail Address:

Date of Birth:

Preferred Method of Contact:

☐ Phone
☐ Postal Mail
☐ E-mail
Appendix I: Letter of Ethical Approval

NRES Committees - North of Scotland
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Telephone: 01224 558458
Facsimile: 01224 558609
Email: nreses@nhs.net

17 May 2013

Miss Fiona M Ram
Trainee Clinical Psychologist
NHS Grampian
Department of Clinical and Counselling Psychology
Plascadden Clinic
Dr Gray’s Hospital
ELGIN
IV30 1SN

Dear Miss Ram

Study title: An investigation of the effects of self-compassion on anxiety and depression in parents, when controlling for adult attachment styles, during the antenatal period.

REC reference: 13/NS/0037
IRAS project ID: 112376

Thank you for your email of 15 May 2013, responding to the Proportionate Review Sub-Committee’s request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved by the Proportionate Review Sub-Committee.

We plan to publish your research summary wording for the above study on the NRES website, together with your contact details, unless you expressly withhold permission to do so. Publication will be no earlier than three months from the date of this favourable opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to withhold permission to publish, please contact the Co-ordinator Mrs Carol Irvine, carolirvine@nhs.net.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see “Conditions of the favourable opinion” below).
Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.cftrforum.nhs.uk.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. The REC will acknowledge receipt and provide a final list of the approved documentation for the study, which can be made available to host organisations to facilitate their permission for the study. Failure to provide the final versions to the REC may cause delay in obtaining permissions.

Approved documents

The documents reviewed and approved by the Committee are:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertisement</td>
<td>2</td>
<td>11 April 2013</td>
</tr>
<tr>
<td>Covering Email</td>
<td></td>
<td>15 May 2013</td>
</tr>
<tr>
<td>Investigator CV</td>
<td></td>
<td>5 October 2011</td>
</tr>
<tr>
<td>Angus MacBeth - CV</td>
<td></td>
<td>2 April 2013</td>
</tr>
<tr>
<td>Matthias Schwannauer - CV</td>
<td></td>
<td>2 April 2013</td>
</tr>
<tr>
<td>List of Changes to Documents</td>
<td></td>
<td>15 May 2013*</td>
</tr>
<tr>
<td>Participant Consent Form: Partner</td>
<td>2</td>
<td>11 April 2013</td>
</tr>
<tr>
<td>Participant Consent Form: Mother</td>
<td>2</td>
<td>11 April 2013</td>
</tr>
<tr>
<td>Participant Information Sheet: Partner</td>
<td>2</td>
<td>11 April 2013</td>
</tr>
<tr>
<td>Participant Information Sheet: Mother</td>
<td>2</td>
<td>11 April 2013</td>
</tr>
<tr>
<td>Protocol</td>
<td>1,1</td>
<td>16 March 2012</td>
</tr>
<tr>
<td>Questionnaire: Partner Questionnaire Pack</td>
<td>2</td>
<td>11 April 2013</td>
</tr>
<tr>
<td>Questionnaire: Mothers Questionnaire Pack</td>
<td>2</td>
<td>11 April 2013</td>
</tr>
<tr>
<td>REC application</td>
<td>112376/432059/1/821</td>
<td>29 March 2013</td>
</tr>
<tr>
<td>Referees or other scientific critique report</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response to Request for Further Information</td>
<td></td>
<td>15 May 2013</td>
</tr>
</tbody>
</table>

* date received
Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review.

13/NS/0037 Please quote this number on all correspondence

We are pleased to welcome researchers and R & D staff at our NRES committee members’ training days – see details at http://www.hra.nhs.uk/hra-training/

With the Committee’s best wishes for the success of this project.

Yours sincerely

Gwen Irvine

Dr Alex Johnstone
Chair

Enclosures: "After ethical review – guidance for researchers" SL-AR2

Copy to: Ms Marianne Laird
NHSG R&D Department
Appendix J: Letter of Approval from Research and Development

Research and Development
Forres House Annex
Forres
Aberdeen
AB33 2ZB

Miss Fiona Ram
Dept. of Clinical and Counselling Psychology
PiUscharen Clinic
Dr Gray’s Hospital
Elgin
IV30 1SN

Date 24 May 2013
Our Ref 201305001
Enquiries to Dr Ritika Sharma
Extension 51113
Direct Line 01224 551113
Email grampian.randdpermissions@shs.net

Research and Development

Dear Miss Ram,

Management Permit for Non-Commercial Research

REC Ref. 12/05/007
NRS Ref.: NR113024
Project Title: An investigation of the effects of self-compassion on anxiety and depression in parents, when controlling for adult attachment styles, during the antenatal period

Thank you very much for sending all relevant documentation. I am pleased to confirm that the project is now registered with the NHS Grampian Research & Development Office. The project now has R & D Management Permission to proceed locally. This is based on the documents received from yourself and the relevant Approvals being in place.

All research with all NHS patients is subject to the Research Governance Framework for Health and Community Care (2006, 2nd edition), and as Chief or Principal investigator you should be fully committed to your responsibilities associated with this.

It is particularly important that you inform us when the study terminates.

The R&D Office must be notified immediately and any relevant documents forwarded to us if any of the following occur:

- A change of Principal Investigator, Chief Investigator or any additional research personnel
- Premature project termination
- Any amendments – substantial or non-substantial (particularly study extension)
- Any changes to funding or any additional funding

NHS/R&D/000-0/19 – V3.1 – R&D Management Permission Letter Non CTIMI
We hope the project goes well, and if you need any help or advice relating to your R&D Management Permission, please do not hesitate to contact the office.

Yours sincerely,

Susan Ridge
Non-Commercial Manager

cc: NR3 Permissions CC
Appendix K: Caldicott Approval

NHS Grampian:

Hi Fiona,
As I said I am happy for the proposal as far as Grampian patients is concerned. Any patients in Highland should be approved by the Caldicott Guardian in Highland

Dr. Roelf Dijkhuizen
Medical Director NHS Grampian
Mobile 07876258473
GMC 3199888

On 24 May 2013, at 15:02, "Ram Fiona (NHS GRAMPIAN)" <fiona.ram@nhs.net> wrote:
Dear Roelf,

Further to my last e-mail. I have attached my thesis proposal, REC form, provisional opinion, feedback to ethics and a letter confirming favourable ethical approval.

Please let me know if you need anything else,

Fiona
Fiona Ram
Trainee Clinical Psychologist

Old Age Psychiatry Team
Spynie Hospital
Duffus Road
Elgin
Moray

IV30 5PW
CALDICOTT APPROVAL FORM
FOR USE OF PATIENT IDENTIFIABLE DATA

Please return this form to
Christine Robinson, Office Manager, Public Health, Assynt House, Beechwood Park,
Inverness IV2 3BW
Email: christine.robinson7@nhs.net

Project Title
Full: An investigation of the effects of self-compassion of anxiety and depression in parents, when controlling for adult attachment styles, during the antenatal period.
Brief: Parents self-compassion and well-being during pregnancy.
13/NS/0037

Name of Applicant: Fiona Ram
Address: Department of Clinical and Counselling Psychology, Dr Gray’s, Elgin
Tel No Daytime: 07841507124
Email address: Fiona.ram@nhs.net

Name of organisation receiving data: NHS Grampian
and their Data Protection Registration Number:

What patient identifiable information are you looking to use?

| CHI Number | X |
|Forename | X |
|Surname | X |
|Initials | |
|Date of Birth | X |
|Address | |
|Postcode | |
|Other, please specify: The mother's name and DoB will be used to access the following birth outcome data: delivery method, birth weight, gestational age, sex, Apgar scores | x |

Age
Gender

Application Number .................................(for office use only) 1
Purpose for which data are to be used (principle 1)

The data is being collected to answer one of the research questions of this study: To what extent do parental coping factors, level of self-compassion and partner distress and parental antenatal attachment predict neonatal characteristics.

As such, mothers will have consented to this data being collected and provided their name and DoB within the primary data collection (questionnaire completion).

This study is being completed as my thesis for the Doctorate in Clinical Psychology, University of Edinburgh.

Requirement to use identifiable data (principle 2)

Identifiable data is required in order to locate the birth outcome data. All data will be anonymised after collection (see principle 5).

Why is each data field required? (principle 3)

The mothers name and DoB will be used to collect the birth outcome data. The birth outcome data that will be collected is required as follow up data for the research question. This data is in line with studies such as Talge et al (2006) and Field et al (2004). Studies report a small but reliable link between antenatal maternal mental health and birth outcome. As stated in Talge (2006) lower birth weight and earlier delivery are risk factors for impaired cognitive and social developments.

Outline access to information (principle 4)

The mothers maternity records will be accessed via the administrator, records are held within the maternity department, Raigmore Hospital.

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Outline action taken to ensure compliance with responsibilities and obligations to respect patient confidentiality (principle 5)

Data will be collected and stored in a database. The mothers will have been given an identification number and the data is to be stored against this. The researcher will keep the key to the identification numbers in a separate locked filing cabinet, in a locked room in NHS Grampian. Following collection of the birth outcome data the whole database will be fully anonymised by removing the identification numbers. No data will leave NHS secure networks until this has happened. All data bases will be password protected at all stages of the data collection and processing.

Only the chief investigator and the local NHS supervisor, Dr Angus Macbeth, will have access to the data base before total anonymisation.

Outline organisational compliance with legal requirements (principle 6)

All information will be collected and stored according to the NHS Confidentiality Code of Practice. The ‘accord data protection and confidentiality policy’ (sponsor base) has also been consulted. As such, all date collection and use of such information will be conducted in a manner consistent with the Data Protection Act 1998 and the Caldicott principles (1997).

The research project has been approved by the North of Scotland Ethics Committee – REC ref: 13/NS/0037. The chief investigator is bound by NHS Grampian and University of Edinburgh data protection policy. The chief investigator is supervised by a Dr Angus Macbeth (NHS Grampian) and Matthias Schwannauer (University of Edinburgh). The chief investigator has also attend GCP Training in September 2012. Following Caldicott approval the project will also be passed by NHS Highland Research and Development Department.

What have you done to establish whether anyone else has the data you require?

The decision for the researcher to collect the data themselves was made in consultation with the midwives, who felt that this would be too time consuming for them.
Please note: Copies of completed Approval Forms will be forwarded to NHS Highland's Area Information Security Manager and, if the project falls into non-research category, the Clinical Effectiveness Manager for comments.

Applicant: Fiona Ram
Job Title: Trainee Clinical Psychologist
Signature: Fiona Ram Date: 27/04/2013

Authorisation Granted Yes [ ] No [ ]
Comments:

Caldicott Guardian: Dr Margaret Somerville, Director of Public Health, NHS Highland
Signature [ ] Date: [ ]

Principle 1 – Justify the purpose(s)
Every proposed use or transfer of patient-identifiable information within or from an organisation should be clearly defined and scrutinised, with continuing uses regularly reviewed, by an appropriate guardian.

Principle 2 – Don’t use patient-identifiable information unless it is absolutely necessary
Patient-identifiable information items should not be included unless it is essential for the specified purpose(s) of that flow. The need for patients to be identified should be considered at each stage of satisfying the purpose(s).

Principle 3 – Use the minimum necessary patient-identifiable information
Where use of patient-identifiable information is considered to be essential, the inclusion of each individual item of information should be considered and justified so that the minimum amount of identifiable information is transferred or accessible as is necessary for a given function to be carried out.

Principle 4 – Access to patient-identifiable information should be on a strict need-to-know basis
Only those individuals who need access to patient-identifiable information should have access to it, and they should only have access to the information items that they need to see. This may mean introducing access controls or splitting information flows where one information flow is used for several purposes.

Principle 5 – Everyone with access to patient-identifiable information should be aware of their responsibilities.

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Action should be taken to ensure that those handling patient-identifiable information – both clinical and non-clinical staff – are made fully aware of their responsibilities and obligations to respect patient confidentiality.

Principle 6 – Understand and comply with the law
Every use of patient-identifiable information must be lawful. Someone in each organisation handling patient information should be responsible for ensuring that the organisation complies with legal requirements.

FOR OFFICE USE ONLY

Data Protection Issues Clarified

Applicant Notified

Application Number ...................... (for office use only)
Appendix L: Collinearity Statistics

Table 1: Collinearity Statistics for Mothers with Subscales

<table>
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Table 2: Collinearity Statistics for Mothers without Subscales

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### Table 3: Collinearity Statistics for Partners with Subscales

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### Table 4: Collinearity Statistics for Partners without Subscales

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