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Mind the Gap: The Role of Perfectionism in Symptoms of Common Maternal Mental Health Problems & Infantile Regulatory Difficulties During the Perinatal Period.

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Thesis for the degree of Doctor of Clinical Psychology

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Abstract

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Mind the Gap: The Role of Perfectionism in Symptoms of Common Maternal Mental & Infantile Regulatory Difficulties During the Perinatal Period.

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This thesis submission comprises of two chapters. The first chapter is a systematic review and meta-analysis exploring the association between maternal perfectionism and symptoms of common mental health problems (depression and anxiety) in the perinatal period. In the absence of a prior review and meta-analysis, we aimed to ascertain whether trait perfectionism and/or parenting specific perfectionism was associated with perinatal symptoms of depression and anxiety in mothers, estimating a weighted effect size and additionally exploring possible moderators of timing (pre or post- natal), scales used to measure constructs, infant gender, temperament and age, in this relationship. A total of 14 studies met eligibility criteria for the meta-analysis and were subject to quality assessment and review. Perfectionism as a whole and the perfectionistic concerns sub-factor were found to be moderately correlated with common maternal perinatal mental health difficulties (in particular depression). No moderators reached significance. Findings support a focus on both the early identification of perfectionism and preventative interventions for associated common mental health difficulties in perinatal mothers. Our meta-analysis revealed both methodological and conceptual limitations of included studies and there is a need for further research in this area; with consistent exploration of perfectionistic concerns and strivings factors, as well as anxiety in addition to perinatal depression required.

The second chapter sought to explore the relationships between infantile colic, perfectionism and postnatal mental health difficulties (depression, anxiety and reduced well-being). A cross-sectional design was implemented to explore whether there were associations between prolonged infantile colic, perfectionism and postnatal mental health difficulties, as well as investigate whether perfectionism moderated the relationship between colic and mental health issues. 137 women with infants between the aged of 12-26 weeks and suffering from prolonged infantile colic were recruited through two streams, including online advertisement and placement

of posters in community settings. Prevalence of clinical depression was 66.43% and anxiety 89.29% within our sample of women with a baby experiencing prolonged colic, with high comorbidity of both conditions. Hypotheses suggesting that prolonged infantile colic and all types of perfectionism (trait and parenting specific, inclusive of socially prescribed and self-oriented factors) would be correlated with postnatal depression and reduced well-being, were supported. Those in clinical groups for both depression and anxiety were found to have significantly higher scores for socially prescribed perfectionism (perfectionistic concerns). Significantly higher scores for self-oriented perfectionism (perfectionistic strivings) were found only in the clinical anxiety group. The hypotheses that perfectionism (in its different forms), would moderate the relationship between prolonged infantile colic and postnatal mental health difficulties were not supported. Perfectionism was found to have direct effects on postnatal mental health. Clinical and theoretical implications, as well future directions for research are discussed.

Keywords: perfectionism, perinatal, postnatal, mental health, depression, anxiety

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Research Thesis: Declaration of Authorship

Print name: Clare Evans

Title of thesis: Mind the Gap: The role of perfectionism in symptoms of common maternal mental health problems and infantile regulatory difficulties during the perinatal period.

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

Signature:		Date:	

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Definitions and Abbreviations

PND – Postnatal Depression

PAS – Perinatal Anxiety Scale

EPDS – Edinburgh Postnatal Depression Scale

BDI – Beck Depression Inventory

DEQ – Depressive Experience Questionnaire

STADI – State Trait Anxiety Depression Inventory

STAI – State Trait Anxiety Inventory

POMS – Profile of Mood Scale

DAS – Dysfunctional Attitudes Scale

M-DAS – Maternal Dysfunctional Attitudes Scale

CES-D – Centre for Epidemiological Studies Depression Scale

WEMWBS – Warwick & Edinburgh Wellbeing Scale

PSWQ – Penn State Worry Questionnaire

FMPS – Frost Multidimensional Perfectionism Scale

PS – Personal Standards

COM – Concern Over Mistakes

DAA – Doubt About Actions

PE – Personal Expectations

HMPS – Hewitt Multidimensional Perfectionism Scale

SOP – Self-Oriented Perfectionism

SPP – Socially Prescribed Perfectionism

OOP – Other Oriented Perfectionism

Definitions and Abbreviations

SPP-OHS – Socially Prescribed Perfectionism – Others High Standards

SPP-CA – Socially Prescribed Perfectionism – Conditional Acceptance

CPQ – Clinical Perfectionism Questionnaire

DP – Dysfunctional Perfectionism

MPPQ – Multidimensional Parenting Perfectionism Questionnaire

IBQ – Infant Behaviour Questionnaire

IBQSURG – Infant Behaviour Questionnaire - Surgency

IBQNEG/ IBQNEGAFF – Infant Behaviour Questionnaire – Negative Emotionality

IBQEFFCON – Infant Behaviour Questionnaire – Effortful Control

Chapter 1 Systematic Review & Meta-analysis

What is the association between mothers' perfectionism and symptoms of common mental health problems in the perinatal period?

1.1 Introduction

1.1.1 Impact of the Perinatal Period

The perinatal period spans from pregnancy up to one year postpartum (O'Hara & Wisner, 2014) and is characterised by significant changes in multiple domains of a new mothers' lives (Leifer, 1977). New parents commonly hold significant expectations (Biehle & Mickelson, 2012), and are required to make swift and important role transitions (Miller & Sollie, 1980). The perinatal period is accompanied by changes in partner relationships and satisfaction levels (Mitnick, Heyman, & Smith Slep, 2009), significant rises in hormone levels (Hendrick, Altshuler, & Suri, 1998), increased economic demands (McLanahan & Adams, 1987), a need for rapid skill acquisition (Ventura & Boss, 1983) and shifts in personal identity (Rubin, 1984). Mothers who successfully adapt to the upheaval, navigate the realisation and shifting from "this isn't my life anymore" to being "in a certain tune" with their baby; while also managing inevitable feelings of loss, loneliness and physical and emotional drain (Rogan, Shimed, Barclay, Everitt, & Wylli, 1997).

With such profound physical, emotional, cognitive and developmental transitions it is unsurprising that the perinatal period represents one of high vulnerability for mental ill health. While prevalence of mental health difficulties outside the perinatal stage are comparable (Gavin et al., 2005), a more rapid proliferation of symptoms is observed during perinatal versus non-perinatal periods (O'Hara, Zekoski, Philipps, & Wright, 1990).

1.1.2 Prevalence and Impact of the Perinatal Mental Health

Between 10-20% of women are estimated to develop a mental illness during the perinatal period (Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014). With 657,076 births in England and Wales in 2018 (Office of National Statistics, 2018), mental health difficulties are estimated to have affected somewhere between 65,707 and 131,415 new mothers in these countries alone. Perinatal mental

health conditions are wide ranging, referring to prevalent psychiatric conditions during pregnancy and/or up to one year postpartum; with individual variability in time of onset (O'Hara & Wisner, 2014). Conditions include depression, anxiety, mania and psychosis (O'Hara & Wisner, 2014). Difficulties encompass both disorders that have remitted before the perinatal period and then re-occurred, and those of first onset (O'Hara & Wisner, 2014).

Failure to identify and intervene early with perinatal mental ill health can result in significant cost implications for the mother, foetus and infant, the mother-infant dyad, parental relationships and society. For mothers, perinatal mental illness can result in significant lifetime productivity loss (Bauer, Knapp, & Parsonage, 2016), poor quality of life (Emmanuel & Sun, 2014), inter-parent conflict, increased risk of domestic violence (Howard, Oram, Galley, Trevillion, & Feder, 2013), as well as playing a significant role in future childbearing decisions (Robertson & Lyons, 2003). The mother-infant dyad can also pay a significant price with multiple areas impacted, including breastfeeding longevity (Dennis & McQueen, 2009), parenting quality (O'Mahen, Boyd, & Gashe, 2015), understanding of infant emotions (Henshaw, Fried, Teeters, & Siskind, 2014) and attachment styles (Misri & Kendrick, 2008). The wider impact of maternal perinatal mental illness, for example on partners' wellbeing (Paulson & Bazemore, 2010 & Wong et al., 2016), family bonding (Marrs, Cossar, & Wroblewska, 2014) and wider family support (Taylor, Billings, Morant, Bick, & Johnson, 2019), can be equally harmful.

Recent enquiries into maternal deaths reveal that mental ill health is a leading cause of mortality in perinatal women (Oates & Cantwell, 2011). Despite evident need, disparity in service provision and availability of support has historically existed (MMHA, 2014). Enquiries (MMHA, 2014 & Knight et al., 2015) have now placed perinatal mental health firmly on the government agenda, helping to secure substantial funding for the development of community perinatal services. However, the majority of services remain in their infancy and understanding still lacks; leaving sufferers at continued risk of being undetected (Warner, Appleby, Whitton, & Faragher, 1996) and unsupported (Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014).

Economic costs of perinatal mental health indicate that the NHS alone pays out roughly £1.2 billion each year, with long term costs to society for each one-year cohort of births reaching an overwhelming £8.1 billion (Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014). As much as 72% of this cost relates to adverse long-term impacts on the child (Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014). Research indicates that pre-natal mental illness is associated with higher risk of pre-term delivery (Grigoriadis et al., 2013; Grote et al., 2010) and negative changes in brain development (Lebel et al., 2016). Longitudinal studies have indicated that there are associations with delays in infant attainment of developmental milestones (Letourneau, Tramonte, & Willms,

2013), dysregulated sleep and feeding (Sharkey, Iko, Machan, Thompson-Westra, & Pearlstein, 2016), and prospective impacts on child IQ (Barker, Jaffee, Uher, & Maughan, 2011) and executive functioning (Buss, Davis, Hobel, & Sandman, 2011). The social and emotional development of children has also been associated with these maternal difficulties, with longitudinal studies indicating increased risk of internalising disorders (such as depression), externalising difficulties (such as conduct problems and ADHD) and educational problems (Conroy et al., 2012; Kersten-Alvarez et al., 2012; Velders et al., 2011). Infants of mothers with perinatal mental health difficulties are also at greater risk of being subject to care orders (Howard, Thornicroft, Salmon, & Appleby, 2004) and, in the most extreme cases, death (Sanderson et al., 2002). Perinatal mental illness poses a significant global health concern and its immeasurable adverse consequences both for individuals and systemically, necessitates research that fully deciphers the wide ranging risk factors to facilitate appropriate early interventions.

1.1.3 Definition and Identification of Common Perinatal Mental Health Conditions

Anxiety and depression are the most common psychiatric disorders in the perinatal period (Howard et al., 2014). Systematic reviews indicate a prevalence of perinatal depression of 11% in antenatal and 13% in postnatal periods (Gavin et al., 2005), with potentially considerably higher rates in low to middle income countries of between 5-50% (Parsons, Young, Rochat, Kringelbach, & Stein, 2012). Anxiety disorders have been found to be equally common, with perinatal prevalence of 13% (Vesga-Lopez et al., 2008). Perinatal anxiety is commonly overlooked by both researchers and clinicians, with identification of depression an evident clinical priority (Howard et al., 2014). Some studies indicate that compared to depression, pre-existing anxiety disorders pose a greater risk of perinatal mental illness (Matthey, Barnett, Howie, & Kavanagh, 2003). Prevalence of both perinatal depression and anxiety, as well as indications that women rarely experience one in the absence of the other (Breslau, Schultz, & Peterson, 1995), provides rationale for the exploration of both conditions during this vulnerable period.

Perinatal depression is diagnosed using the DSM-5, and is characterised by the presence of at least five of the nine symptoms (including at least one of the first two essential symptoms), present for a minimum of two weeks. Symptoms include persistence of; depressed mood, anhedonia, changes in appetite, changes in sleep, changes in psychomotor activity, loss of energy or fatigue, feelings of worthlessness or excessive guilt, problems concentrating or making decisions and recurrent thoughts of harm or suicide (APA, 2013). The DSM-5 has introduced a peri-partum specifier; indicating that the onset of depression be during pregnancy or in the first

four weeks postpartum (APA, 2013). However, clinicians continue to identify postpartum depression occurring any time within the first year postpartum (Stuart-Parrigon & Stuart, 2014). The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) is the most commonly used screening tool for perinatal depression, with other tools also validated for the use in perinatal populations (Spitzer, Kroenke, Williams, & Group, 1999; Tandon, Cluxton-Keller, Leis, Le, & Perry, 2012). An understanding of the relevance, applicability and role of varied scales in accurately identifying perinatal mental health is still needed.

Anxiety disorders both within and outside the perinatal period encompass difficulties of; generalised worry, panic, specific phobias, obsessive compulsive difficulties and social anxiety (Bystritsky, Khalsa, Cameron, & Schiffman, 2013). Symptoms include; excessive worry, agitation, restlessness, fatigue, difficulty concentrating, tense muscles, increased heart rate, shaking, clouded thinking, sweating, dizziness, irritability and trouble sleeping, resulting in the avoidance of certain activities (Wenzel & Stuart, 2011). Additional thinking has been given to anxiety presentations in perinatal women, recognising that some degree of pregnancy-related and postpartum worry (particularly in primiparous women) is to be expected, making accurate recognition of difficulties more complex (Weisberg & Paquette, 2002). A recent review purports that perinatal anxiety often takes the form of worries around four general themes; (1) fears about fetal/infant wellbeing, (2) maternal wellness, (3) illness in the parent's partner, and (4) parental mortality. When these worries become recurrent, intrusive and cause impairment to the woman's life, symptoms are indicative of anxiety difficulties (Misri, Abizadeh, Sanders, & Swift, 2015). Perinatal specific anxiety screening tools have not been investigated on the same scale as depression measures (Misri et al., 2015), with no one tool consistently used in the literature and many non-perinatal specific measures validated for use within the childbearing population (Misri et al., 2015).

1.1.4 Risks of Perinatal Mental Health Conditions

Effective screening protocols are instrumental in both the early identification and treatment of perinatal mental health conditions (Gaynes et al., 2005; Meltzer-Brody & Stuebe, 2014), however, identifying risk factors for perinatal depression and anxiety could improve the utility and relevance of these.

The risk literature has focused on genetic, environmental (including stressful life events), obstetric, social, and more recently psychological factors (O'Hara & Wisner, 2014). In terms of genetic risks, a systematic review revealed positive associations between postnatal depression and particular genes (HMNC1, COMT, MAOT, PRKCB, ESR1, SLC6A4, OXT, OXTR, BDNF), with

varying effect sizes (Elwood et al., 2019). Other studies also highlight the relevance of both withdrawal of hormones at birth (Bloch et al., 2000) and hereditary factors (Mahon et al., 2009). Obstetric risk factors include; premature birth and labour complications (O'hara & Swain, 1996), admittance to neonatal intensive care (Farr, Dietz, O'Hara, Burley, & Ko, 2014), breastfeeding difficulties (Donaldson-Myles, 2011; Shakespeare, Blake, & Garcia, 2004), excessive infant crying (Vik et al., 2009), unintended pregnancy (Lancaster et al., 2010) and having a baby of undesired sex (Philip Boyce & Hickey, 2005). Research purports that individuals experiencing environmental stresses including; monetary concerns and recent life stresses (O'hara & Swain, 1996), own parental relationship difficulties, history of or current sexual, physical or emotional abuse (Buist, 1998), are also at significantly higher risk of perinatal mental health difficulties. Social support can be a major buffer for perinatal mental health difficulties, with a lack of both social and partner support, as well as relationship dissatisfaction, increasing risk (O'hara & McCabe, 2013; Boyce & Hickey, 2005; Fitch, 2002; Misri, Kostaras, Fox, & Kostaras, 2000; & Cox, 1996). Reviews have consistently found associations between perinatal mental health difficulties and; low self-esteem, a history of depression and, for postnatal mothers, an episode of depression or anxiety during pregnancy (Beck, 2001; Lancaster et al., 2010; O'hara & McCabe, 2013; Robertson, Grace, Wallington, & Stewart, 2004).

1.1.5 Specific Personality Risk Factors

The link between general psychopathology and personality in mental health conditions is well established (Lamers, Westerhof, Kovács, & Bohlmeijer, 2012), with high neuroticism, low conscientiousness and low extraversion consistently linked with symptoms of depression (Allen et al., 2018; Kotov, Gamez, Schmidt, & Watson, 2010), and high neuroticism with anxiety disorders (Watson, Gamez, & Simms, 2005). Interpersonal sensitivity, obsessionality and dysfunctional attributional style have also been identified as playing a central role in both perinatal depression and anxiety (Boyce, 1994). Perfectionism has been conceptualised as a multidimensional personality trait, with qualities that contribute both adaptively and maladaptively (Hill, McIntire, & Bacharach, 1997). Trait perfectionism has been closely associated with high neuroticism (Ulu & Tezer, 2010), and is understood to lead to dysfunctional attributional styles that are associated with mental health difficulties both in general (Kuiper, Olinger, & Martin, 1988) and perinatal populations (O'Hara et al., 1982).

1.1.6 Origins & Definition of Perfectionism, & Risk Properties in General Psychopathology

Theories surrounding the developmental origins of perfectionism have identified that it has its roots in interactions between temperament (namely high levels of emotionality) and parenting approaches characterised by criticalness, excessive expectations, potential lack of care, over control and overprotectiveness (Enns, Cox, & Clara, 2002; Flett, Hewitt, Oliver, & Macdonald, 2002). Self-critical forms of perfectionism develop in children who interpret and learn that approval from parents is contingent upon meeting harshly expressed parental expectations (Blatt, 1995). Difficulties with perfectionism can therefore, also be seen from an attachment theory perspective. When a relationship is under threat due to disapproval, the individual strives for perfection in order to preserve the relationship and gain acceptance (Greenspon, 2008).

Perfectionism can be understood as setting exceptionally high standards leading to overly critical self-evaluation (Frost, Marten, Lahart, & Rosenblate, 1990). Cognitive behavioural theories of perfectionism suggest difficulties stem from and are maintained by, self-imposed dysfunctional standards, continued striving and adverse consequences of not meeting said standards (Shafran, Cooper, & Fairburn, 2002).

A recent meta-analysis of perfectionism and psychopathology, demonstrated associations with various mental health conditions (Limburg, Watson, Hagger, & Egan, 2017). Relationships with psychological disorders can potentially be explained through Beck's three stage cognitive model of vulnerability (Beck, 1967), wherein negative childhood experiences (in this case harsh parenting) lead to the development of dysfunctional beliefs (in this cases perfectionistic beliefs), leading to a vulnerability of psychological difficulties (Beck, 1967).

Previously seen as a unidimensional construct (Burns; 1980), more recently perfectionism has been both conceptualised and measured using multi-dimensional tools (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991), although debate remains as to whether these measures are true to the classical conceptualisation of perfectionism (Shafran & Mansell, 2001). The two most commonly used multi-dimensional scales are; 1) Frost's Multidimensional Perfectionism Scale (FMPS; Frost, Marten, Lahart, & Rosenblate, 1990) and 2) Hewitt & Flett's Multidimensional Perfectionism Scale (HMPS; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991). However, other scales have been used and an understanding of how the measurement of perfectionism impacts observed relationships is required.

Confirmatory factor analysis has shown that perfectionism measures have two common factors; perfectionistic strivings and perfectionistic concerns (Bieling, Israeli, & Antony, 2004; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Perfectionistic strivings is understood as ceaselessly

demanding perfection of oneself, and is associated with the following sub-scales of the multi-dimensional scales; personal standards, organisation, other-oriented and self-oriented perfectionism. Perfectionistic concerns is understood as a preoccupation with mistakes, excessive concerns over others expectations and excessive negative reactions to perceived failures (Smith, Saklofske, Yan, & Sherry, 2015), and is associated with the following sub-scales of the multi-dimensional scales; concern over mistakes, doubt about actions, parental criticism, parental high expectations and socially prescribed perfectionism (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993).

Evidence from a large cross-sectional study of students found evidence that perfectionistic strivings and perfectionistic concerns, mapped on to adaptive and maladaptive forms of the trait respectively (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Perfectionistic concerns have been associated with mental health symptoms and disorders with considerable frequency (Hewitt et al., 1991). Despite a paucity of research identifying relationships between perfectionistic strivings and mental health conditions, positive correlations with both depression and eating disorders have led to a move away from the simplistic understandings of perfectionism factors. Several researchers now oppose the view that there are maladaptive and adaptive forms of perfectionism in favour of a position puporting that varying loads of either perfectionism factor, may increase the likelihood of mental health difficulties (Stoeber & Otto, 2006; Limburg et al., 2017).

Within the general psychopathology literature (consisting of empirical studies and theoretical essays), perfectionism factors have been positively associated with depression (Hewitt, Flett, & Ediger, 1996), low self-esteem (Rice, Ashby, & Slaney, 1998), eating disorders (Fairburn, Shafran, & Cooper, 1999), anxiety disorders (Antony, Purdon, Huta, & Swinson, 1998) and increased suicidal ideation (Hamilton & Schweitzer, 2000). Although perfectionism is often conceptualised as a personality trait (Hill, McIntire, & Bacharach, 1997), research suggesting that it may be implicated across disorders reinforces the understanding that it is also a trans-diagnostic issue, with certain qualities of the trait impacting cognitions and/or behaviour that are key to the aetiology, maintenance and course of multiple psychological disorders (Egan, Wade, & Shafran, 2011). Further exploration of perfectionism is warranted due to its trans-diagnostic qualities (Egan, Wade, & Shafran, 2011), amenability to change (Lowndes, Egan, & McEvoy, 2019; Rozental et al., 2018) and to increase our understanding of the relative role of both perfectionistic concerns and strivings factors (Stoeber & Otto, 2006).

1.1.7 Perfectionism as a Risk for Common Perinatal Mental Health Difficulties

Perfectionism is likely to have particular relevance in the perinatal period, given commonly held expectations regarding parenthood (Biehle & Mickelson, 2012). The modern world, now awash with media representations of "ideal" parenting styles and practices, is likely to contribute to unrealistic ideals and romanticised views of motherhood (Douglas & Michaels, 2004), with existing perfectionist traits at heightened risk of being triggered.

Despite the potential relevance of perfectionism to the perinatal period, a relative lack of research remains. Existing research does however support a correlation between perfectionism and common perinatal mental health conditions, with greater focus on the postnatal compared to pre-natal period, and an emphasis on investigating depression as opposed to anxiety (Egan, Kane, Winton, Eliot, & McEvoy, 2017; Gelabert et al., 2012; Grazioli & Terry, 2000; O'Hara, Rehm, & Campbell, 1982; Thompson & Bendell, 2014). A lack of consensus around the size of observed relationships indicates a need for research to summarise this effect. Effect sizes for the association between perfectionistic concerns and postnatal depression range between 0.13 – 0.56 (Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002; Oddo-Sommerfeld, Hain, Louwen, & Schermelleh-Engel, 2016). For perfectionistic strivings, some research suggests non-significant associations with postnatal depression, while other studies have reported both small significant positive and negative correlations (Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002; Mazzeo et al., 2006; Maia et al., 2012). Similarly, associations comparing the role of perfectionism in mental health difficulties in the antenatal versus postnatal period are inconsistent. Some studies show stronger association pre-natally (Oddo-Sommerfeld et al., 2016) but others fail to show such marked differences (Maia et al., 2012). In light of the present lack of clarity regarding these relationships, as well as the overall dearth of research both for the perinatal period as a whole and exploring anxiety in addition to depression; a systematic review of the association between perfectionism and common perinatal mental health symptoms (depressions and anxiety), with estimated effect sizes explored through meta-analysis, is warranted.

Although research is limited, a review suggests that there is a higher prevalence of maternal depression among mothers of male infants (Tronick & Reck, 2009). There are also empirical studies indicating associations between infant temperament (Britton, 2011), as well as foetal age (onset in 1st trimester; Kitamura, Shima, Sugawara, & Toda, 1993), infant age (with significant rates at two months and reductions by six; Campbell & Cohn, 1997), and perinatal mental health. These factors, as well as the plethora of measures used to examine constructs of both perinatal mental health and perfectionism (pre and post-natally), may change the strength of the relationship between perfectionism and perinatal mental health. In addition to investigating the

association between perfectionism and common perinatal mental health conditions, exploring possible moderators of this relationship is warranted.

1.1.8 Study Aims & Objectives

We aim to systematically review and meta-analyse the literature on the association between perfectionism and common perinatal mental health conditions (depression and anxiety). Our primary objective is to ascertain whether trait perfectionism and/or parenting specific perfectionism are associated with perinatal symptoms of depression and anxiety in mothers. Examination of this objective will also include the division of perfectionism (both trait and parenting forms) into perfectionistic strivings and perfectionistic concerns factors (Bieling, Israeli, & Antony, 2004), exploring factorial associations with perinatal common mental health difficulties. We will examine whether associations between perfectionism (trait and parenting specific) and common perinatal mental health conditions (depression and anxiety) are also moderated by time of measurement (antenatal or postnatal), infant gender, infant temperament, infant age, and the measures used to assess perfectionism and mental health outcomes.

1.2 Method

1.2.1 Search strategy

We adhered to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidance (Moher, Liberati, Tetzlaff, & Altman, 2009) and registered our review on PROSPERO (protocol number: CRD42019143369; appendix A). We searched six electronic databases: Psychinfo (via the EBSCO interface), Cumulative Index of Nursing Allied Health Literature (CINAHL, through EBSCO), Medline (through EBSCO), EMBASE (via Ovid), Web of Science and PubMed on the 10th of October 2019 for relevant published literature. We applied no time limitations or methodological search filters on any databases, in order to capture a wide range of literature.

1.2.2 Search Terms

We chose our search terms in consultation with a University Psychology Research Engagement Librarian and focused on the PICOS criteria (participant, intervention, comparison, outcome, and study design; Harris, Quatman, Manring, Siston, & Flanigan, 2013). Table 1 details the full search syntax used for each database. Each search term was expanded to include as many possible cited variations of the construct. Medical Subject Headings (MeSH) terms were used in the Medline,

Psychinfo, CINAHL and Embase databases, but not in PubMed or Web of Science due to lack of availability. MeSH terms were designed to help retrieve results on our concepts, despite variability in terms used by authors. We hand searched the references of papers maintained for full text review (through a process of backward chaining), to identify other relevant papers to be assessed for inclusion in our review (see figure 1).

We used three main groups of terms to capture our main concepts; 1) perinatal period, 2) common mental health issue and 3) perfectionism (see appendix B for full explanation of terms). Once the three terms had been searched and results returned individually, the Boolean operator "AND" was used to combine all three searches.

Table 1. Database Search Syntax

Database	Syntax
Medline	postpartum OR postnatal OR perinatal OR antenatal OR prenatal OR prebirth OR "post partum" OR "post natal" OR puerperium OR "peri natal" OR "maternal" OR "post pregnancy" OR "ante natal" OR "pre natal" OR "pre birth" OR "pregnant wom#n" OR pregnan* OR "expect* mother*" OR (MH "Peripartum Period") OR (MH "Postpartum Period") AND depress*" OR "mood disorder*" OR "affect* N1 disorder*" OR "anxiety" OR "anxiety disorder*" OR anxi* OR (MH Depression) OR (MH "Depression, Postpartum") OR (MH "Depressive Disorder") OR (MH Anxiety) OR (MH "anxiety disorders") AND perfection* OR "high standard*" OR "high expectat*" OR "concern N1 mistake*" OR "parental perfection*" OR ((parental N2 high) N2 (standard* OR expectat*)) OR "personal standard*" OR perfor* N1 (qualit* OR doubt* OR fear*) OR (MH "Perfectionism")
Psychinfo	postpartum OR postnatal OR perinatal OR antenatal OR prenatal OR prebirth OR "post partum" OR "post natal" OR puerperium OR "peri natal" OR "maternal" OR "post pregnancy" OR "ante natal" OR "pre natal" OR "pre birth" OR "pregnant wom#n" OR pregnan* OR "expect* mother*" OR (DE "Perinatal period") OR (DE "Antepartum period") OR (DE "Postnatal period") AND depress*" OR "mood disorder*" OR "affect* N1 disorder*" OR "anxiety" OR "anxiety disorder*" OR anxi* OR (DE Anxiety) OR (DE "anxiety disorders") OR (DE "Major Depression") OR (DE "Depression (Emotion)") OR (DE "postpartum depression") AND perfection* OR "high standard*" OR "high expectat*" OR "concern N1 mistake*" OR "parental perfection*" OR ((parental N2 high) N2 (standard*OR expectat*)) OR "personal standard*" OR perfor* N1 (qualit* OR doubt* OR fear*) OR (DE Perfectionism)
CINAHL	postpartum OR postnatal OR perinatal OR antenatal OR prenatal OR prebirth OR "post partum" OR "post natal" OR puerperium OR "peri natal" OR "maternal" OR "post pregnancy" OR "ante natal" OR "pre natal" OR "pre birth" OR "pregnant wom#n" OR pregnan* OR "expect* mother*" OR (MH "Postnatal Period") AND depress*" OR "mood disorder*" OR "affect* N1 disorder*" OR "anxiety" OR "anxiety disorder*" OR anxi* (MH "Depression, Postpartum") OR (MH "Depression") OR (MH "Depression, Reactive") OR (MH "Anxiety Disorders") OR (MH "Anxiety") AND perfection* OR "high standard*" OR "high expectat*" OR "concern N1 mistake*" OR "parental perfection*" OR ((parental N2 high) N2 (standard*OR expectat*)) OR "personal standard*" OR perfor* N1 (qualit* OR doubt* OR fear*) OR (MH "Perfectionism")

Database	Syntax
Embase	postpartum OR postnatal OR perinatal OR antenatal OR prenatal OR prebirth OR "post partum" OR "post natal" OR puerperium OR "peri natal" OR "maternal" OR "post pregnancy" OR "ante natal" OR "pre natal" OR "pre birth" OR "pregnant wom#n" OR pregnan* OR "expect* mother*" OR (exp "perinatal period/") OR (exp pregnancy/) OR (exp puerperium/) AND depress* OR "mood disorder*" OR "affect* ADJ disorder*" OR anxiety OR "anxiety disorder*" OR anxi* OR (exp anxiety/) OR (exp "anxiety disorder/") OR (exp depression/) OR (exp "major depression/") AND perfection* OR "high standard*" OR "high expectat*" OR "concern ADJ mistake*" OR "parental perfection*" OR ((parental ADJ2 high) ADJ2 (standard*OR expectat*)) OR "personal standard*" OR perfor* ADJ (qualit* OR doubt* OR fear*) OR (exp perfectionism/)
PubMed	postpartum OR postnatal OR perinatal OR antenatal OR prenatal OR prebirth OR "post partum" OR "post natal" OR puerperium OR "peri natal" OR maternal OR "post pregnancy" OR "ante natal" OR "pre natal" OR "pre birth" OR "pregnant woman" OR "pregnant women" OR pregnan* OR "expect* mother*" AND depress* OR "mood disorder*" OR "affect* disorder*" OR anxiety OR "anxiety disorder*" OR anx* AND perfection* OR "high standard*" OR "high expectat*" OR "concern mistake*" OR "parental perfection*" OR "parental high standard*" OR "parental high expectat*" OR "personal standard*" OR "doubt quality* performan*" OR "fear* quality* performan*"
Web of Science	postpartum OR postnatal OR perinatal OR antenatal OR prenatal OR prebirth OR "post partum"OR "post natal" OR puerperium OR "peri natal" OR maternal OR "post pregnancy" OR "ante natal" OR "pre natal" OR "pre birth" OR "pregnant wom$n" OR pregnan* OR "expect* mother*" AND depress* OR "mood disorder*" OR affect* NEAR/1 disorder* OR anxiety OR "anxiety disorder*" OR anx* AND perfection* OR "high standard*" OR "high expectat*" OR "concern NEAR/1 mistake*" OR "parental perfection*" OR "parental high standard*" OR "parental high expectat*" OR "personal standard*" OR "perfor* NEAR qualit*" OR "perfor* NEAR doubt*" OR "perfor* NEAR fear*"

Note. *DE or ME or MH or exp / captures MeSH headings or explosion of terms, * indicates truncation to include all possible variations following the symbol, # denotes a wildcard (any letter can replace it), N or ADJ or NEAR indicates near to (/ followed by a number denotes how near), "" indicating two words to be searched together.*

1.2.3 Eligibility

Two researchers (the lead author and main supervisor), independently screened titles and abstracts, with any conflicts discussed between them, until consensus was reached. Following a conservative approach, any papers that the team were unclear on at screening stage were put through to full text review. Full text screens were again carried out independently by the lead author and main supervisor, supported by the third member of the review team who made the final decision if consensus could not be reached. This protocol of double screening all papers

(both at initial and full text stages) was in accordance with the current PRISMA guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009), designed to minimise bias and errors in review methods. We screened all studies against pre-determined eligibility criteria (detailed in both the PROSPERO submission and Table 2), designed by all three members of the review team.

We excluded unpublished data and dissertations given the lack of clarity over peer review status, risk of retrieving duplicate effect sizes, and recognised difficulties in searching systematically (Egger et al., 2003). Book chapters, conference papers, posters and reviews were also excluded; ensuring data was derived from individual published, peer-reviewed, empirical studies.

We stipulated that all measures of depression, anxiety and perfectionism included were from validated self-report measures; decisions on this were made through expert consensus by the two (and if required three) researchers carrying out the screening process. Measures of perfectionism could either be trait or parenting specific measures but needed to map on to the perfectionist concerns and/or strivings dimensions (see 1.2.5 for more details). Given data was to be synthesised through meta-analysis, we did not extract qualitative data from studies' results sections; all data needed to be reported in a statistical format allowing for computation of Pearson's *r* (see table 2 - full eligibility details).

Table 2. Eligibility criteria for papers included in the review

Inclusion criteria	Exclusion Criteria
Patient Population - Participants are human, female, at least 18 years - Participants in perinatal period	- Participants with co-existing severe mental health issues (psychosis, bipolar) - Studies recruiting infants with additional needs (such as prematurity, congenital heart or problems or complex physical health needs)
Interventions - Studies using any intervention; baseline data must be available.	
Comparators -Studies using any comparison groups but data of interest only perinatal women.	
Outcomes - Studies reporting depression &/or anxiety & perfectionism - Measures of perfectionism (either general or parenting specific) - Validated measures of above - Data to be in format whereby Pearson's *r* can be computed.	- Solely qualitative measures
Study design - Studies including all designs (except retrospective) - Written in English, German, Spanish or translation - Published in peer reviewed journal	-Conference papers, posters and reviews - Translated article unavailable - Unpublished research or book Ch. - Solely qualitative measures

1.2.4 Data Extraction & Coding

The following data was extracted and coded for each eligible study; reference, country, sample size, sample type (clinical or community), recruitment time point (pregnancy or postnatal), mean maternal age, infant or foetal age, infant/foetal gender, study design & timing (cross-sectional or prospective, antenatal and/or postnatal measure points), measure of temperament, depression

measure, anxiety measure, perfectionism measures and high order perfectionism factor indicated (perfectionistic concerns or strivings). Data was extracted by the lead researcher and cross checked by the research team. This stage included (where necessary), seeking additional data from authors that could then be used for analysis.

1.2.5 Devising Perfectionistic Strivings and Perfectionistic Concerns Categories for Meta-analysis

Decisions on the inclusion of measures and different dimensions (mapping on to perfectionistic strivings and concerns) were made through the expert consensus of the research team, on the basis of suggestions made in both a review of the conceptualisations of perfectionism (Stoeber & Otto, 2006) and a recent meta-analysis on perfectionism and psychopathology (Limburg, Watson, Hagger, & Egan, 2017).

In accordance with Stoeber & Otto's (2006) recommendations; Frost's Multidimensional Perfectionism Scale - organisation and Hewitt's Multidimensional Perfectionism Scale other-oriented perfectionism were removed from analyses, because these domains do not map consistently on to perfectionistic strivings or concerns factors (Stoeber & Otto, 2006). FMPS-parental expectations and criticism were also removed because while potentially relevant to the formation of perfectionistic traits (Shafran & Mansell, 2001), they are unlikely to reflect core aspects of the stable trait (Stoeber & Otto, 2006). Studies using the Dysfunctional Attitudes Scales (DAS; Weissman & Beck, 1978) or versions of (both trait and parenting specific), were included on the basis of Limburg and colleagues' review (Limburg et al., 2017). Studies using the Maternal Attitudes Questionnaire (Warner, Appleby, Whitton, & Faragher, 1997) were excluded, due to lack of clarity over how the measure maps on to perfectionism. Details of the perfectionism measures included in our meta-analysis, and how they map on to Perfectionistic Strivings and / or Concerns can be found below (Table 3).

Table 3. Measures mapping on to two Major Dimensions of Perfectionism.

Measure	Perfectionistic concerns	Perfectionistic strivings
Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990). Including variations of.	Concern over Mistakes (COM) Doubts About Actions (DAA)	Personal Standard (PS)
Multidimensional Perfectionism Scale (HMPS; Hewitt et al., 1991). Including variations of.	Socially prescribed perfection (SPP); tendency to expect others to have high standards of them. Including sub-scales for SPP of: Conditional Acceptance (SPP-CA); being loved and accepted is contingent on achievement, Others High Standards (SPP-OHS); others hold high standards or Expectations for the self (Campbell & Paula, 2002)	Self-oriented perfection (SOP); set high standards for self, with motivation to reach.
Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978). Including variations more recent shortened versions.	Self- critical perfectionism	
Multidimensional Parenting Perfectionism Questionnaire (Snell et al., 2005)	Societal prescribed parenting perfectionism (SPPP); beliefs that society expects them to be a perfect parent.	Self-oriented parenting perfectionism (SOPP); belief that should be a perfect parent.
Maternal dysfunctional Attitudes Scale (M-DAS; Grazioli & Terry, 2000)	Performance Evaluation & Approval by Others	
Almost Perfect Scale-Revised (APS-R; Ashby et al., 2001)	Discrepancy	High standards
Clinical Perfectionism Questionnaire (CPQ; Fairburn, Cooper, & Shafran, 2003))	Perfectionism	

1.2.6 Quality Assessment

We assessed the quality of the *k* (the number of studies included) retained for review using the QualSyst appraisal tool (Kmet, Cook, & Lee, 2004; see appendix C). We selected this tool because it can be used to systematically score studies with a variety of designs, producing a reproducible quantitative assessment of quality. This tool provided a good fit with our review which made no methodological exclusions beyond stipulating that studies collected quantitative data. The tool ensures identification of papers that meet the minimum quality standard for inclusion in systematic review (Kmet, Cook, & Lee, 2004).

The checklist contains fourteen items (three of which focus on intervention trials, so were irrelevant to the present study) rated either 0 (no, not met), 1 (partially met) and 2 (yes, met), and a summary score is then produced. Items include questions on; clarity of question/objective, appropriateness of study design, appropriate method and description of variables, description of subject characteristics, random allocation, blinding in random allocation (both subjects and investigators), definition and measurement of outcomes, appropriateness of sample size, analytic methods used, estimates of variances reported, controls for confounders, detail of results and conclusions appropriate. Quality assessments were carried out by two researchers, with discussion and resolution. Quality assessment summary scores can be found in Table 4, with full score breakdowns in Table 6.

1.2.7 Data Analysis

Data was synthesised through two methods. First, a systematic qualitative description of included studies was performed, providing both a narrative and table summary of studies (Table 4). The second step involved collating statistics and carrying out meta-analyses. Given our aim of understanding the relationship between perfectionism and common perinatal mental health symptoms, we chose zero-order correlation coefficients (*r*) as our effect size (ES). Correlation coefficients reported in studies were extracted where possible and, where source papers did not include the data in the format required, we contacted their authors to request data. For the purpose of this type of meta-analysis, standardisation of correlation coefficient *r* is recommended to obtain summary effects, confidence intervals and account for variance (Borenstein, Hedges, Higgins, & Rothstein, 2009). Fisher's transformation of effect size *r* to z was performed for analyses, and then, to help with interpretability, results were transformed back to *r* for inclusion in this report (Borenstein, Hedges, Higgins, & Rothstein, 2009).

We used the Rstudio (Rstudio Team, 2015) to conduct analyses; specifically the 'metafor' package for meta-analysis, the 'weightr' package for weighted sensitivity analyses and the 'robumeta'

package for meta-analyses of dependent effect sizes (Viechtbauer, 2010). Two sets of analyses were conducted. The first analysis looked to obtain weighted effect sizes for the relationship between perfectionism and perinatal (antenatal and postnatal) common mental health issues (depression and anxiety), in order to gain an overall understanding of the size of these effects (if any), as well as the degree of heterogeneity associated with these (I^2). The second set of analyses involved further exploring the relationship through meta-regression, examining the influence of moderators (see 1.1.8 for list).

The nature of the data was such that studies largely reported more than one outcome often belonging to the same sub-category, indicating data dependencies and cases of nested effect sizes. To address data dependencies, two meta-analytic methods were applied. First, conventional random effects modelling (Hedges & Olkin, 1985) was used to explore aggregated data for each study, whereby a single non-nested effect size (mean of individual primary outcomes) was generated and analysed for the purposes of understanding heterogeneity, carrying out sensitivity analysis and performing tests for publication bias. Second, we used the robust variance estimation model to take into account within-study dependencies by introducing an estimate of the mean correlation (ρ) between nested effect sizes, occurring due to multiple outcomes within studies belonging to the same subcategory. Robust variance estimation does not require information on true correlation and thus, in line with recommendations (Tanner-Smith, Wilson, & Lipsey, 2013), τ^2 was estimated with ρ = 0.80 in all analyses. Robust variance estimation was used to understand both i) the overall weighted mean effect size of the association between perfectionism (as a whole) on common perinatal mental health symptoms, ii) the weighted mean effect for the different dimensions of perfectionism (trait perfectionistic concerns, trait perfectionistic strivings, parenting perfectionistic concerns and parenting perfectionistic strivings) on common perinatal mental health symptoms, and iii) whether hypothesised moderators played a significant role in these associations.

We assessed for publication bias with Egger's test (Egger, Smith, Schneider, & Minder, 1997) and visual inspection of funnel plot to detect asymmetry (Borenstein, Hedges, Higgins, & Rothstein, 2009).

We estimated heterogeneity in effect sizes using Q; I^2 and τ^2 to examine the impact of heterogeneity. Evaluation of possible moderators included three categorical variables (timing: pre or post-natal, infant gender and psychometric measure used) and two continuous (infant temperament and age). Meta-regression using robust variance estimation was used to explore possible moderators (Hedges, Tipton, & Johnson, 2010).

1.3 Results

1.3.1 Study Selection

The process of study identification and selection is displayed in Figure 1. 112 papers from six database searches were screened by title and abstract by two researchers (removed for blind review), with any disagreement around inclusion resolved by the third member of the review team (also removed for blind review). At initial screening a conservative approach was taken to studies that did not clearly define participants, outcome measures and methods in the abstract. Caution was applied at this early stage to ensure no relevant research was accidentally excluded.

Forty-seven studies were excluded where participants were not women in the perinatal period or because research was either unpublished or in the form of a systematic review. This left 65 studies for full text review. We identified seventeen additional papers via a manual search of reference lists (using backward search citation chaining), resulting in 82 papers for full text review. Reviewers excluded 63 papers (reasons detailed within figure 1 PRISMA chart), leaving 19 studies. Reviewers initially disagreed on three papers but, after discussion, agreed to exclude all of these (k =3) because, two had unclear measurements of perfectionism and the other used a retrospective design.

We extracted data directly from eleven studies and requested data from the authors of the eight remaining papers. Two authors (of three papers) responded with additional data, leading to a total of 14 studies eligible for meta-analysis. The remaining five papers were excluded due to non-response of authors, following multiple attempts to contact (note: full data extraction from all nineteen studies, can be found in appendix D).

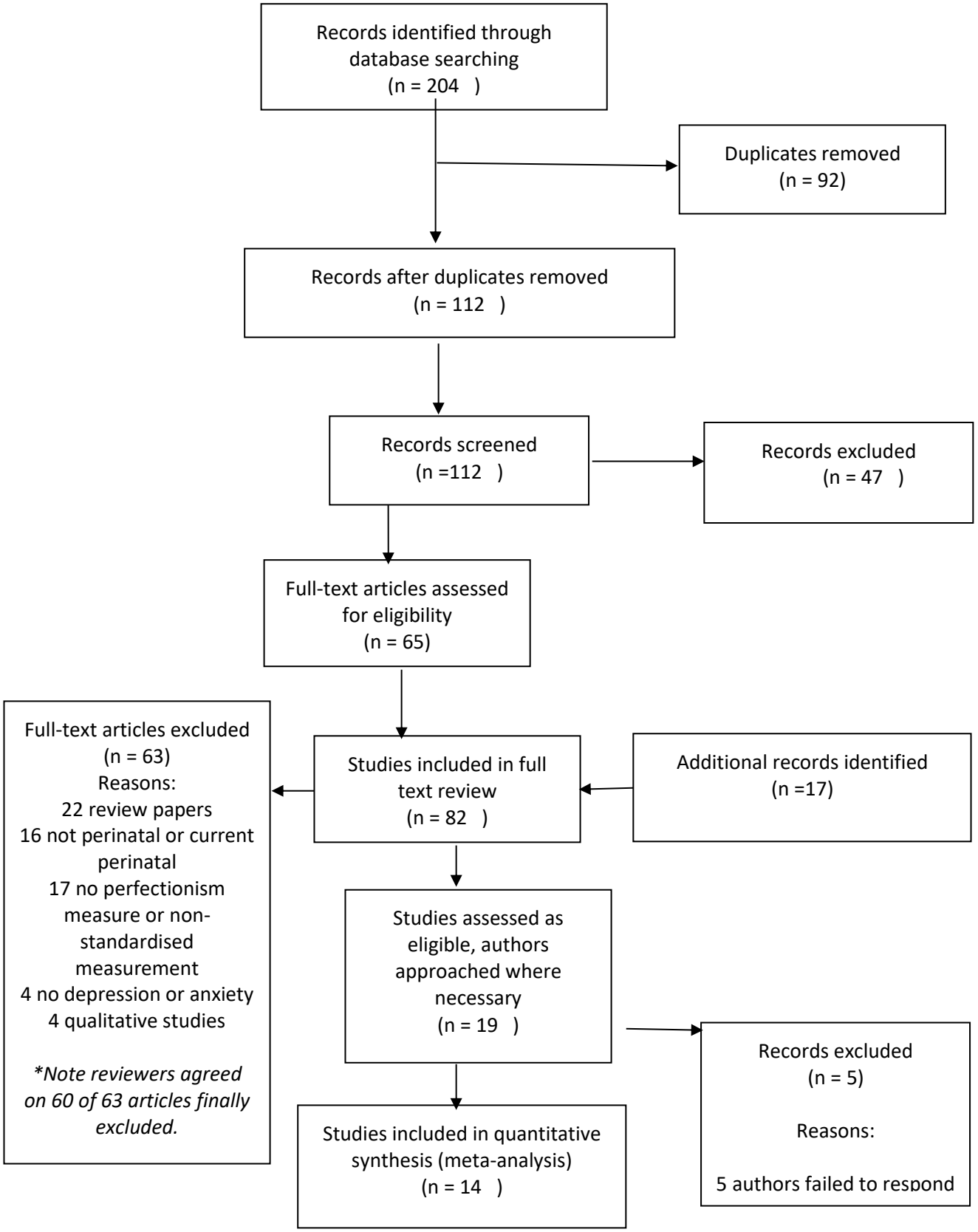


Figure 1. PRISMA flowchart for study selection.

1.3.2 Description of Included Studies

Tables 4 and 5 show full details of data extracted for the purpose of analysis. Table 4 provides details of study characteristics and table 5, gives details of measures and effect sizes. In total, 14 studies (*k= 14*) containing 15 independent samples and a total of *n*= 2988 perinatal female participants were included in our meta-analysis. A total of 40 effect sizes were used for analysis, although a further three were also extracted. Two studies, recorded data at two postnatal time points (providing three additional effect sizes; one study including measures of both perfectionistic concerns and strivings and the other just the former), in these cases we opted to use effect sizes from the earliest postpartum point, excluding effect sizes from 32 and 40 weeks. Rationale for this decision was based on the DSM-5 peripartum specifier, indicating that onset of postnatal depression is likely to be in the first four weeks (APA, 2013); earlier effect sizes were seen as most relevant and comparable to findings in other studies.

The mean sample age across studies was 30.12 years (SD = 4.84[1], mean age ranging from 24.6 years to 33.7 years). Sample sizes ranged from 65 to 421 participants, and research was conducted across nine different countries (see figure 2); Israel (*k*= 1), Czech Republic &Thailand (*k*=1, two samples one study), United States (*k*=3), Korea (*k*=1), Australia (*k*=3), Spain (*k*=2), Portugal (*k*=2) and Germany (*k*=1).

Recruitment took place through various means including from; birth registers (*k*=1), antenatal classes (*k*=3), inpatient obstetric units (*k*=1), inpatient psychiatric unit (*k*=1), obstetric hospital/clinic (including private) or health centre (*k*=7) and antenatal classes, and additional advertisement (*k*=1). Apart from one study, that randomly selected participants from the birth register (*k*=1), all other studies used non-probability sampling methods; namely opportunity (*k*=9) and convenience (*k*=4) sampling. Twelve of the fourteen samples came from the community (non-clinical) and the remaining two from inpatient (clinical samples: one inpatient obstetric and the other a psychiatric ward).

Eight of the fourteen studies (57%) were prospective longitudinal studies and the remaining six (43%) were cross-sectional. Two of the prospective longitudinal designs spanned the postnatal period only (one of which recorded perfectionism only at the last time point; once postnatal depression had remitted). Two studies examined antenatal mental health difficulties (*n*=560), six studies (seven samples) looked at postnatal difficulties (*n*= 1351) and six studies looked at both antenatal and postnatal period (*n*=1077). All fourteen studies examined depression but only two

[1] Note mean and standard deviation across studies generated from combining all studies, however three studies could not be included in this calculation as two failed to provide standard deviations and one only indicated the number of participants over, or under, the age of 30 years.

of the fourteen (14%), also examined anxiety. None of the studies included information regarding foetal or infant gender, and only one had a measure of infant temperament.

In terms of measures, six different depression measures were used including; the Edinburgh Postnatal Depression Scale, three different versions of the Beck Depression Inventory, the Depressive Experiences Questionnaire and Center for Epidemiological Studies Depression Scale[2]. Two different measures of anxiety were used; the Profile of Mood States and the State-Trait Anxiety Depression Inventory.

[2] Note in some instances two different measures of depression were used. We chose to extract and report only the most commonly used measure for analysis, opting for Beck Depression Inventory (as a validated and widely used tool) over Profile of Mood States measure of depression.

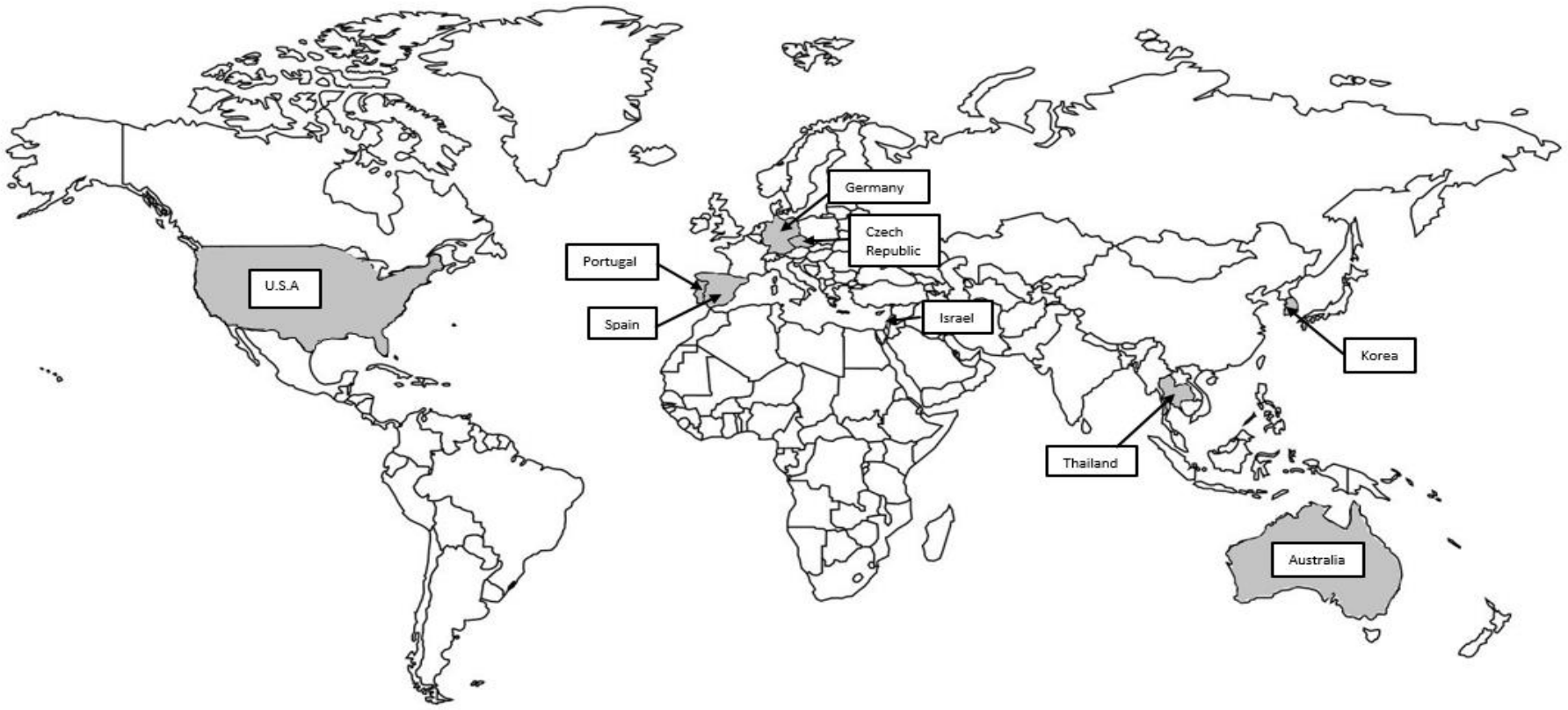


Figure 2. Map of the World with Shaded Areas Indicating Countries Generating Research Included within Meta-analysis.

Seven different perfectionism measures were used, some studies using more than one measure. Measures included; the Dysfunctional Attitudes Scale (*k*= 5, 4 different versions of), Hewitt's Multidimensional Perfectionism Scale (*k* =4, different elements used in different studies), Frost's Multidimensional Perfectionism Scale (*k* = 3), Clinical Perfectionism Questionnaire (*k*= 1), Dysfunctional Perfectionism (*k* =1), Maternal-Dysfunctional Attitudes Scale (*k*= 1) and the Multidimensional Parenting Perfectionism Questionnaire- Societal Prescribed Perfectionism dimension (*k*=1). All fourteen studies included measures which mapped on to the Perfectionistic Concerns dimension, and six studies reported Perfectionistic Strivings. This translated to 34 of the 40 effect sizes (85%) for Perfectionistic Concerns, and only 6 (15%) for Perfectionistic Strivings.

Table 4 Study Characteristics

Table 4 *Study Characteristics.*

Reference	Country	N	Age (M, Sd or range)	Infant Gender	Source	Design	Measurement Points	Temperament	Quality Score
Dimitrovsky, Levy-Shiff & Schattner-Zanany, 2002	Israel	100	m = 27.9 (no sd)	Not Reported	Community	Cross-sectional	Antenatal	Not Reported	0.9
Hassert, Sharon, Payakkakom, & Kodysova, 2018 [a]	Czech Rep	126	m= 30.30 (sd= 3.99)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.8
Hassert, Sharon, Payakkakom, & Kodysova, 2018 [b]	Thailand	161	m= 25.83 (sd= 3.46)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.8
Schoppe-Sullivan et al., 2017	United States	127	m = 27.80 (sd = 3.77)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.77
Choi & Hyun, 2019	Korean	150	Range: < 30 n= 53, ≥30 n =97	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.7
Grazioli & Terry, 2000	Australia	65 & 57 follow up	m = 28. 81 (sd= 3.36)	Not Reported	Community	Prospective	Antenatal & Postnatal	Bates 7 item (m= 3.44, sd =0.97)	0.77
O'Hara, Rehm, & Campbell, 1982	United States	170	m= 26.6 (no sd)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.73
Church, Brechman-Toussaint, & Hine, 2005	Australia	406	m =29.2 (sd=5.07)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.85
Egan, Kane, Winton, Eliot, & McEvoy, 2017	Australia	71	m = 32.3 (sd= 3.74)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.9

Table 4 (continued).

Reference	Country	N	Age (M, Sd or range)	Infant Gender	Source	Design	Measurement Points	Temperament	Quality Score
Gelabert et al., 2011	Spain	309	m =31.6 (sd=4.7)	Not Reported	Inpatient Obstetric	Prospective	Postnatal – 3 points	Not Reported	0.73
Gelabert et al., 2012	Spain	122	m= 33.7 (sd=4.10)	Not Reported	Inpatient Psychiatric	Prospective	Postnatal – perf when PND remitted.	Not Reported	0.95
Macedo et al., 2009	Portugal	421	m=29.8 (sd=4.48)	Not Reported	Community	Cross-sectional	Antenatal	Not Reported	0.86
Maia et al., 2012	Portugal	386	m= 30.08 (sd = 4.21)	Not Reported	Community	Prospective	Antenatal & postnatal	Not Reported	0.9
Oddo-Sommerfeld Hain, Louwen, & Schermelleh-Engel, 2016	Germany	297, 266 follow up	m= 32.35 (sd = 4.46)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.95
Thompson & Bendell, 2014	United States	77	m= 24.6 (sd = 4.72)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.85

Hassert, Sharon, Payakkakom, & Kodysova, 2018 [a] & Hassert, Sharon, Payakkakom, & Kodysova, 2018 [b], same study but two different cohorts
sd = standard deviation

Table 5: Study Outcomes.

Table 5: *Study Outcomes*

Reference	Key Outcomes	Type of Perfectionism Measured	Mental Health Measurement	Correlation (Effect Size *r*)
Dimitrovsky, Levy-Shiff & Schattner-Zanany, 2002	HMPS, DEQ (Anaclitic & Introjective)	Perfectionistic Concerns & Strivings	Depression	DEQ Anaclictic &: SOP MPS (r=-.15, ns), & SPP (r=.13, ns). DEQ Introject & SOP (r =-.13, ns), SPP (r=.40***)
Hassert, Sharon, Payakkakom, Kodysova, 2018 [a]	DAS-A-17 (11-items), EPDS	Perfectionistic Concerns	Depression	DAS-A-17 & EPDS (r=.636**) [1]
Hassert, Sharon, Payakkakom, Kodysova, 2018 [b]	DAS-A-17 (11-items), EPDS	Perfectionistic Concerns	Depression	DAS-A-17 & EPDS (r=0.392**) [1]
Schoppe-Sullivan et al., 2017	SOPP subscale MPPQ, CES-D	Perfectionistic Concerns	Depression	SOPP &EPDS @ 3 months:(r= .23*) @9 months: (r= .02,ns)
Choi & Hyun, 2019	FMPS: COM, DAA & EPDS.	Perfectionistic Concerns	Depression	EPDS &: COM (r= .49**), DAA (r=.40**)
Grazioli & Terry, 2000	DAS-A (25 items) PE & AO, M-DAS PE & AO & EPDS	Perfectionistic Concerns	Depression	DAS-PE &EPDS antenatal (r= .21, ns), postnatal= (r=.34*), DAS-A0 & EPDS antenatal (r= .23*), postnatal (r= .37**), M-DAS-PE & EPDS antenatal (r = .17, ns), postnatal (r= .18, ns),M-DAS-AO & EPDS, antenatal (r= .02, ns) , postnatal (r= .16, ns)
O'Hara, Rehm, & Campbell, 1982	DAS 40 item, BDI	Perfectionistic Concerns	Depression	DAS & BDI (r = - .283****) [2]

Table 5: Continued.

Reference	Key Outcomes	Type of Perfectionism Measured	Mental Health Measurement	Correlation (Effect Size *r*)
Church, Brechman-Toussaint, & Hine, 2005	DAS 24 item, EPDS	Perfectionistic Concerns	Depression	EPDS & DAS (r =.52**)
Egan, Kane, Winton, Eliot, & McEvoy, 2017	EPDS, CPQ	Perfectionistic Concerns	Depression	EDPS & CPQ antenatal (r= .36**), EPDS & CPQ postnatal (r= .27*).
Gelabert et al., 2011	EPDS, FMPS scales: PS, COM, DAA	Perfectionistic Concerns & Strivings	Depression	EPDS week 8 &: PS (r=.271**), COM (r=.423**), DAA (r=.348**), EPDS week 32 &: PS (r=.325**), CM (r=.452**), DAA (r=.424**)[3]
Gelabert et al., 2012	EPDS, FMPS	Perfectionistic Concerns & Strivings	Depression	EPDS week 8 &: PS (r=.131, ns), COM (r=.098, ns), DAA (r=.178*)[4]
Macedo et al., 2009	BDI-II & POMS Anxiety, HMPS SOP and SPP subscales (SPP divided SPP-OHS, SPP-CA)	Perfectionistic Concerns & Strivings	Depression & Anxiety	SPP &: POMS anxiety (r=.24**), BDI-II (r=.23**). SOP &: POMS anxiety (r=.16**), BDI-II ns. SPP-OHS &: POMS Anx (r=.20**), BDI-II (r=.19**). SPP-CA &: POMS anxiety (r=.18**), BDI-II (r=.18**).

Table 5: Continued.

Reference	Key Outcomes	Type of Perfectionism Measured	Mental Health Measurement	Correlation (Effect Size *r*)
Maia et al., 2012	BDI-II & HMPS SOP, SPP subscales (SPP divided SPP-OHS, SPP-CA)	Perfectionistic Concerns & Strivings	Depression	Antenatal BDI-II-&: SOP(r=.135**), SPP-OHS (r= .201**), SPP-CA (r=.148**). Postnatal BDI &: SOP (r= .072 ns), SPP-OHS (r= .212**), SPP-CA (r= .212**)
Oddo-Sommerfeld Hain, Louwen, & Schermelleh-Engel, 2016	BDI-V, EPDS, STADI, DP (Sum FMPS COM & DAA)	Perfectionistic Concerns	Depression & Anxiety	Antenatal DP &: BDI-V (r= .56**), STADI Anx (r= .44**).Postnatal DP &: EPDS (r= .37**), Anx (r= .33**).
Thompson & Bendell, 2014	EPDS, HMPS SPP	Perfectionistic Concerns	Depression	EPDS & HMPS SPP (r=.354**)

[1, 3, 4] Correlational data received on request. [2] Correlation x-1, as DAS scale reverse scored (higher scores equalled higher functioning).
Abbreviations for Mental Health Measures: 1) DEQ (Depressive Experiences Questionnaire), 2) EPDS (Edinburgh Postnatal Depression Screener), 3) BDI (Beck Depression Inventory) various versions, 4) POMS (Profile of Mood States), 5) STADI (State-Trait Anxiety Depression Inventory), 6) CES-D (Center for Epidemiological Studies Depression Scale).
Abbreviations for Perfectionism Measures: 1) HMPS (Hewitt Multidimensional Perfectionism Scale): SOP (Self-Oriented Perfectionism), SPP (Socially Prescribed Perfectionism), SPP-OHS (Socially Prescribed Perfectionism- Others High Standards), SPP-CA (Socially Prescribed Perfectionism- Conditional Acceptance), 2) FMPS (Frost's Multidimensional Perfectionism Scale): PS (Personal Standards), COM (Concern Over Mistakes), DAA (Doubt About Actions), 3) DAS (Dysfunctional Attitudes Scale), various versions including 11 items, 40 items and 25 items (including Performance Evaluation and Approval of Others elements), 4) M-DAS (Maternal Dysfunctional Attitudes Scale) including PE (Performance Evaluation) and AO (approval of Others) , 5) SOPP MPPQ (Societal Prescribed Parenting Perfectionism of the Multidimensional Parenting Perfectionism Questionnaire) 6) CPQ (Clinical Perfectionism Questionnaire), 7) DP (Dysfunctional Perfectionism scale-includes elements of both FMPS COM & DAA).

1.3.3 Quality Assessment of Included Studies

The final studies selected for the review (*k* =14), were quality assessed for bias using the QualSyst appraisal tool (Kmet, Cook, & Lee, 2004). Given the absence of randomised controlled trials, we excluded items 5, 6 & 7, which relate to random allocation and blinding. In the case of cross-sectional designs, item 12 ('were confounders controlled for?') was also excluded. This meant total scores were either out of 20 or 22 depending; quality scores between 0.00-1.00 were then generated from total scores. All studies were scored as good quality; ranging from 0.7-0.95. The quality rating of one study was based on the English translation (Choi & Hyun, 2019). Two studies rated as 0.95, had strong methodological rigour. A summary of quality ratings can be found in Table 6.

Table 6. Quality Ratings.

References	Question/objective sufficiently described?	Study design evident and appropriate?	Method of subject/group selection is described and appropriate?	Subject and comparison group characteristics described sufficiently?	If interventional and random allocation possible, was it described?	If interventional and blinding of investigators possible, was it reported?	If interventional and blinding of subjects possible, was it reported?	Outcome measures well defined and robust to measurement bias?	Sample size appropriate?	Analytic methods described/justified and appropriate?	Some estimate of variance is reported for the main results?	Controlled for confounding?	Results reported in sufficient detail?	Conclusions supported by the results?	TOTALS	SUMMARY SCORE
Dimitrovsky et al; 2002	2	2	2	1	N/A	N/A	N/A	1	2	2	2	N/A	2	2	18/20	0.9
Hassert et al; 2018	2	1	2	1	N/A	N/A	N/A	2	2	1	2	N/A	1	2	16/20	0.8
Schoppe-Sullivan et al; 2017	2	2	1	1	N/A	N/A	N/A	2	1	2	2	0	2	2	17/22	0.77
Choi & Hyun; 2019	1	1	1	1	N/A	N/A	N/A	2	1	2	2	N/A	2	1	14/20	0.7
Grazioli & Terry, 2000	1	2	2	2	N/A	N/A	N/A	1	1	2	1	1	2	2	17/22	0.77
Church et al; 2005	1	1	2	2	N/A	N/A	N/A	1	2	2	2	N/A	2	2	17/20	0.85
Egan et al; 2017	2	2	2	2	N/A	N/A	N/A	2	1	2	2	1	2	2	20/22	0.9
Gelabert et al; 2011	1	1	1	2	N/A	N/A	N/A	1	2	2	2	1	1	2	16/22	0.73
Gelabert et al; 2012	2	2	1	2	N/A	N/A	N/A	2	2	2	2	N/A	2	2	19/20	0.95
Macedo et al; 2009	2	2	2	2	N/A	N/A	N/A	1	2	1	2	1	2	2	19/22	0.86
Maia et al; 2012	2	2	2	2	N/A	N/A	N/A	1	2	2	2	1	2	2	20/22	0.9
Oddo-Sommerfield et al; 2016	2	2	2	2	N/A	N/A	N/A	2	2	2	2	1	2	2	21/22	0.95
Thompson & Bendell, 2014	2	2	1	2	N/A	N/A	N/A	2	2	2	1	N/A	2	1	17/20	0.85
O'Hara, Rehm, & Campbell, 1982	1	2	1	2	N/A	N/A	N/A	2	2	2	1	1	2	0	16/22	0.73

1.3.4 Weighted Average Effects

The robust variance estimation model was applied to take into account within-study dependencies between nested effect sizes and multiple outcomes belonging to the same subcategory. The overall weighted mean effect size for the association between perfectionism and common perinatal mental health symptoms (that is, not distinguishing between perfectionism dimensions, nor between depression or anxiety symptoms, nor pre- or post-natal timing), was r= 0.31 (k =14, p< 0.01, 95% Confidence Interval (CI) = 0.22 to 0.39). Effect sizes (z scores) and confidence intervals for studies can be seen in the forest plot presented in figure 3; multiple effects for both perfectionistic concerns (con) and perfectionistic strivings (strive) in each study, have been used to calculate the weighted average effect size and confidence interval.

We used random effects meta-analysis to investigate the presence of heterogeneity. First, we calculated mean effect sizes for each study (without distinguishing between perfectionism dimensions). The Q test revealed the presence of heterogeneity (Q = 73.43, p < .0001), with an I^2 of 79.9% and τ^2 = 0.015 (Standard error = 0.0081), indicating the presence of significant heterogeneity. We used influence plots (figure 4) to examine whether individual studies were outliers, and found none was.

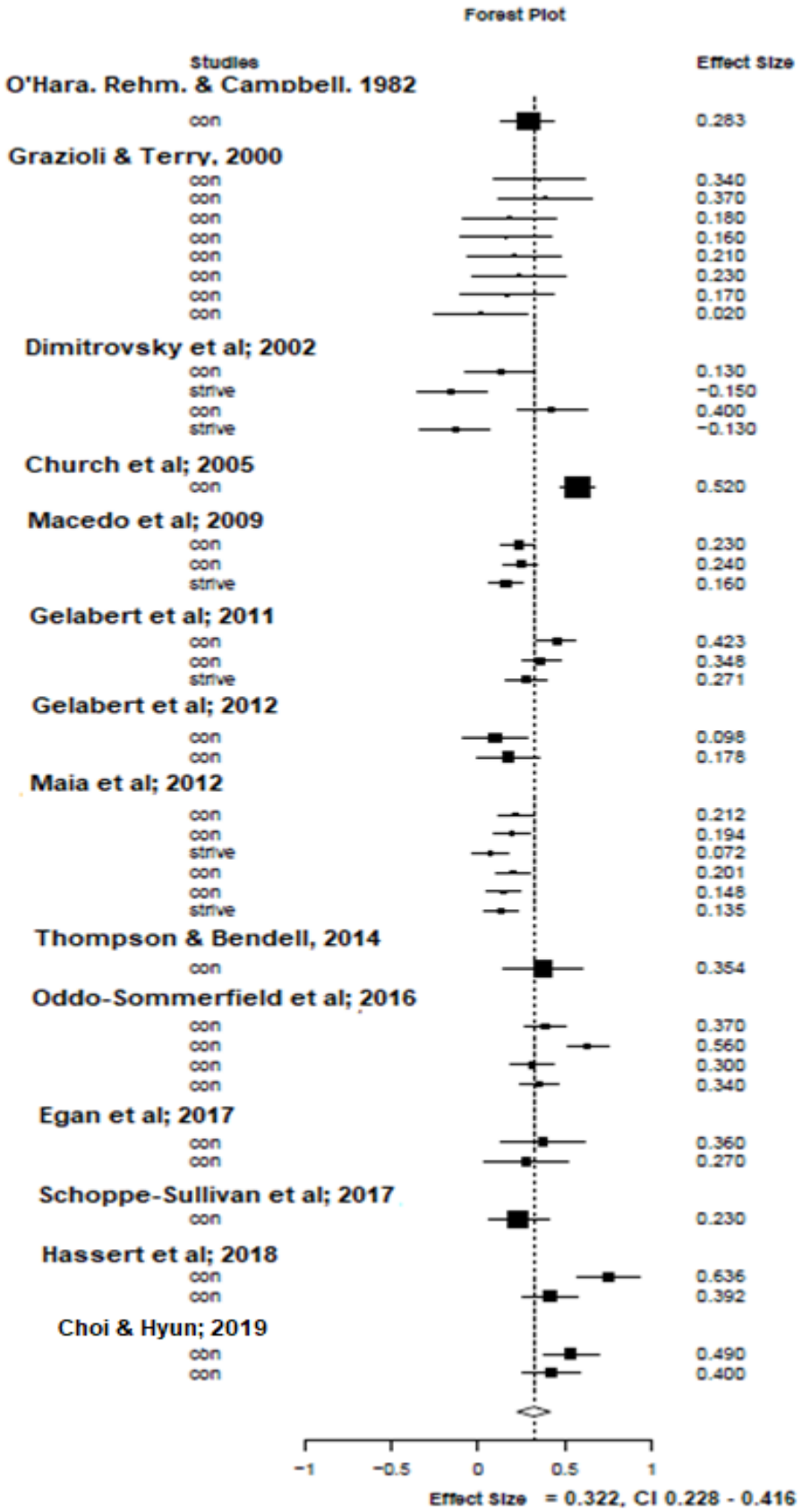


Figure 3. Forest Plot of Individual Study Effect Sizes & Mean Effect Size using z scores (converted to r in report).

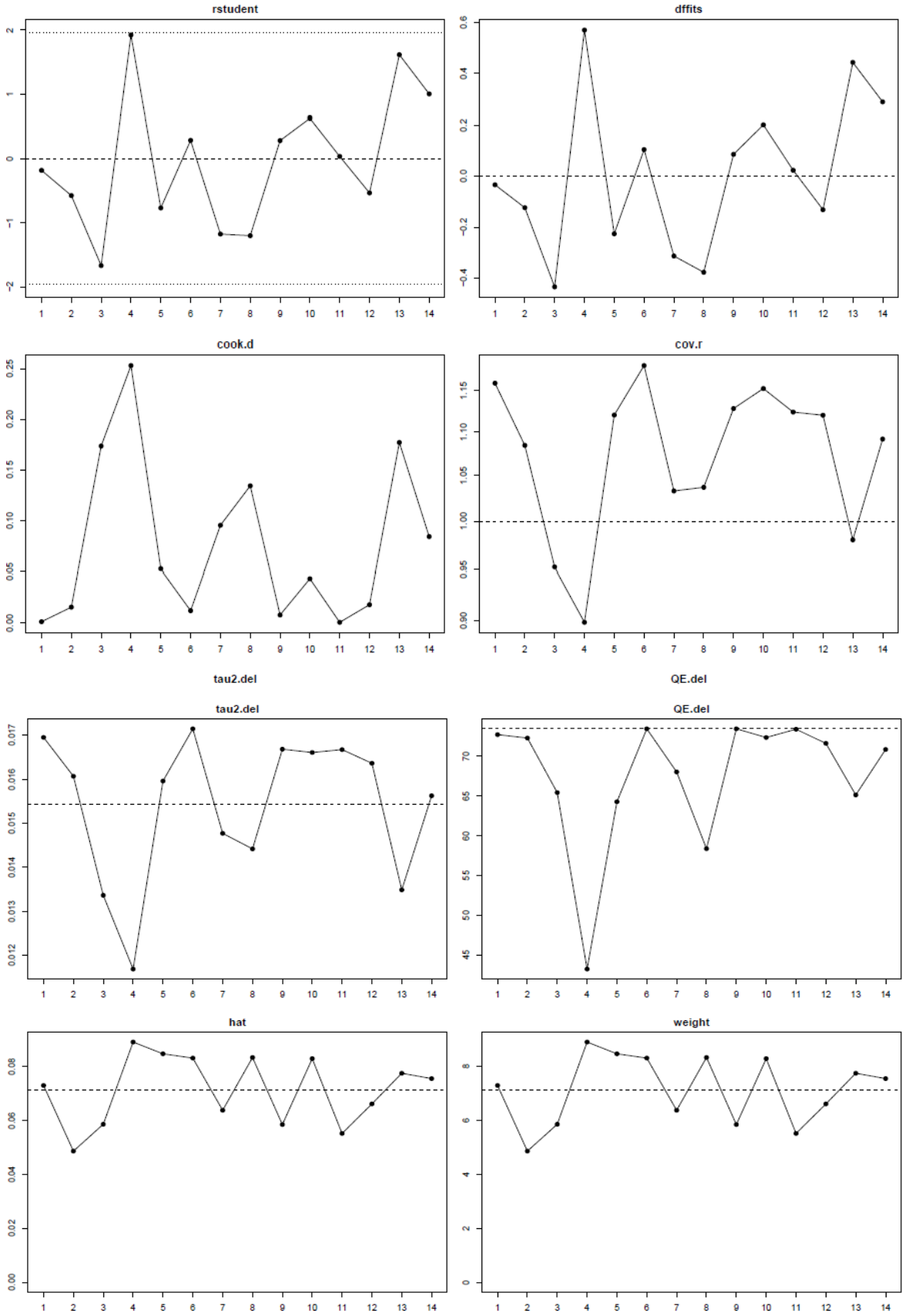


Figure 4. Influence Plots Showing No Outliers.

1.3.5 Sensitivity Analysis

Presence of significant heterogeneity supported the need for sensitivity analysis, whereby one study at a time was removed from meta-analysis, in order to understand individual study influences on effect size estimates. Sensitivity analysis of all studies was carried out. The smallest effect size (Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002), as well as the largest (Church, Brechman-Toussaint, & Hine, 2005), were removed to try to understand their relative impact on weighted average effects. Leave-one-out sensitivity analyses yielded a smallest effect size of; r = 0.28 (p< 0.001, 95% CI = 0.21 to 0.35, I^2 of 72.13%) and a largest effect size of; r = 0.31 (p< 0.001, 95% CI = 0.25- 0.38, I^2 of 78.18%); indicating that no single study had a notable impact on the overall effect size.

1.3.6 Publication Bias

We used visual inspection of a funnel plot of all studies to test for publication bias (see figure 5). This suggested that it may be partially asymmetric, with effect sizes ranging beyond pseudo 95% confidence intervals, and a lack of study effect sizes in the bottom right area, suggesting that there were fewer small studies with large effect sizes than we might expect. However, Egger's test for asymmetry indicated an absence of significant asymmetry (z = -1.59, p = 0.112).

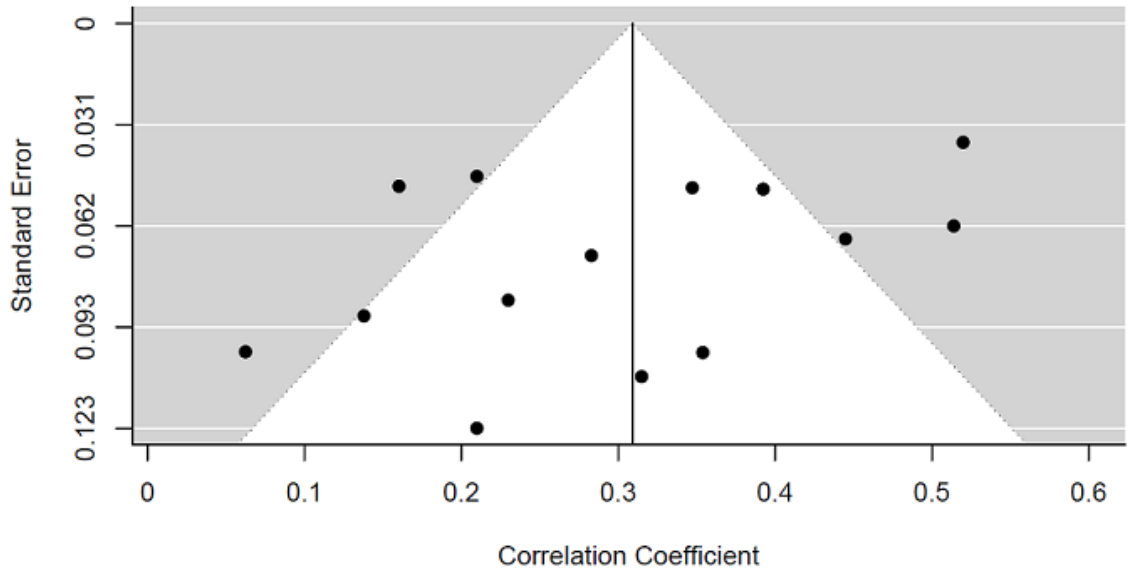


Figure 5. Funnel Plot of Standard Error and Effect Sizes.

1.3.7 Perfectionism Dimension Analysis

One of our objectives was to examine the associations of perinatal common mental health difficulties with each of the two central dimensions of perfectionism - perfectionistic concerns and perfectionistic strivings (Bieling, Israeli, & Antony, 2004), for trait and parenting specific perfectionism. Subgroup meta-analysis was performed and weighted effect sizes generated using robust variance estimation. We conducted four analyses: trait perfectionistic concerns, trait perfectionistic strivings, parenting perfectionistic concerns, parenting perfectionistic strivings. The weighted average effect (converted from *z* scores to r effect sizes) for trait perfectionistic concerns was $r = 0.34$ ($k = 13$, $p < 0.01$, 95% CI = 0.26 to 0.42), for trait perfectionistic strivings was $r = 0.12$ ($k = 4$, $p = 0.203$, 95% CI = -0.12 to 0.34) and, for parenting perfectionistic concerns was $r = 0.19$ ($k = 2$, $p = 0.203$, 95% CI = -0.55 to 0.77). A weighted average for parenting perfectionistic strivings was not computable, as no outcomes were reported in this area. Figure 6 shows the forest plot for trait perfectionistic concerns.

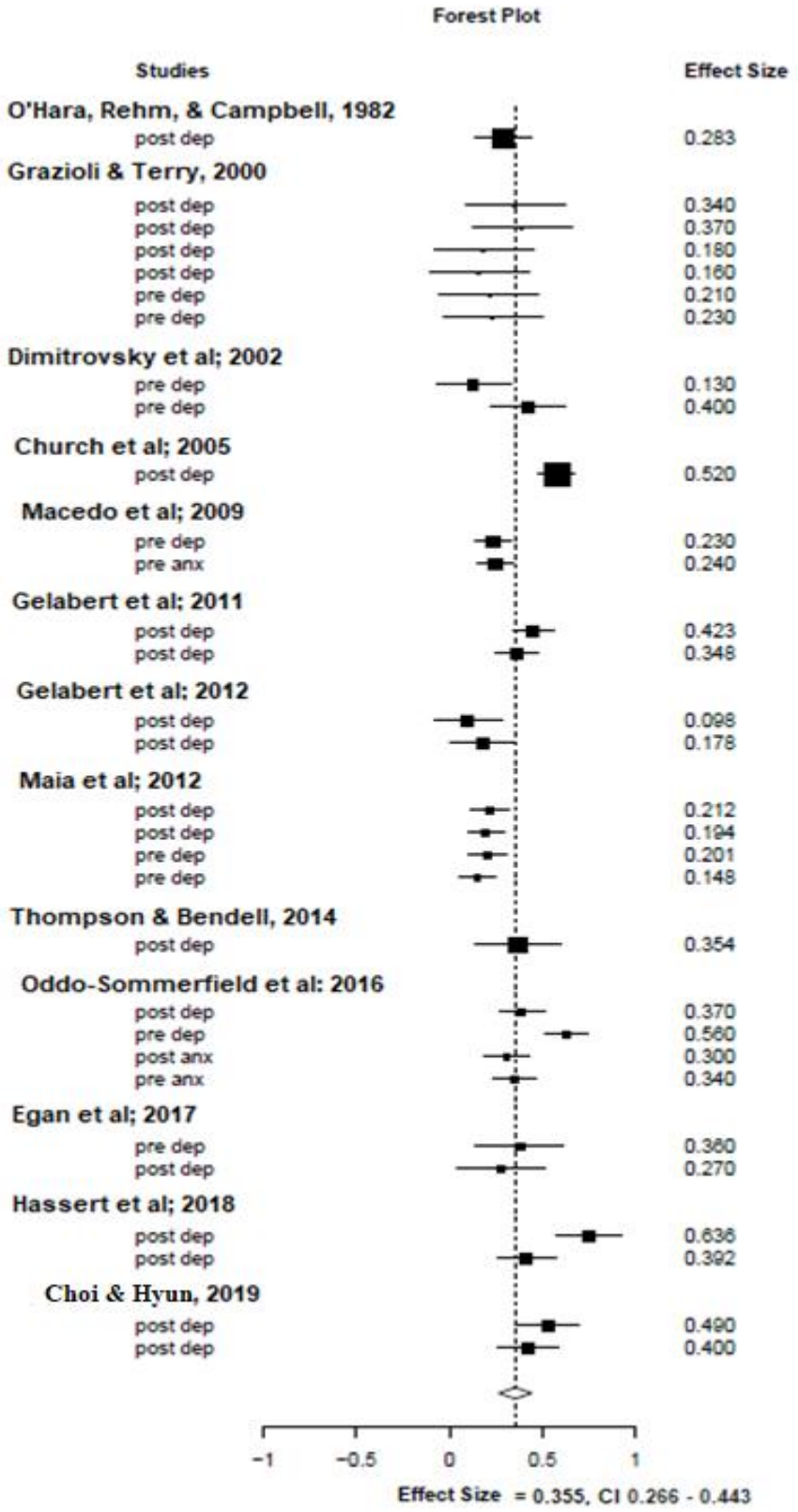


Figure 6. Forest Plot of Study Effect Sizes & Mean Effect Size for Trait Perfectionistic Concerns as z scores (NB, we converted z to r for reporting in the text).

1.3.8 Moderator Analyses

To examine the influences that may have led to the observed heterogeneity, we used meta-regression analyses, specifically examining whether associations between perfectionism and common perinatal mental health were moderated by timing of measurement (pre- or post-natal), infant gender, infant/foetal age, infant temperament and the measures used to assess perfectionism and mental health outcomes. Meta-regressions were performed using the robust variance estimation model, first to understand if moderators had a significant impact on the associations between perfectionism (as a whole) and common perinatal mental health issues. We intended then to divide perfectionism according to its two dimensions and further into trait and parenting specific perfectionism. However, given the lack of available data, meta-regression testing of moderators was only possible for perfectionism as a whole and trait perfectionistic concerns. In accordance with best practice guidelines for meta-regression (Borenstein, Hedges, Higgins, & Rothstein, 2009), at least ten measurements for each moderator were required. Thus, only two moderators: timing (pre- or post-natal) and type of psychometric measure used were eligible for analyses; infant/foetal age, infant/foetal gender and temperament were not.

In order to analyse the moderation effects of measures used for common mental health problems and perfectionism, we needed to create reference categories for both moderator variables because degrees of freedom were below four and according to the robust variance estimation analyses parameters, were likely to be unreliable (Tanner-Smith, Tipton, & Polanin, 2016). By creating reference categories, we were able to conduct reliable analyses (that is, with df >4), with *t*-distribution assumptions holding. We were able to create a theoretically coherent reference category for measurement of mental health; coding it as 'EPDS' or 'Other'. 'Other' included all other measures of depression but excluded anxiety (due to insufficient data), meaning that this moderation analysis could only examine whether the type of mental health measure used moderated the association between perfectionism and perinatal depression. We were unable to create a coherent reference category for the measure of perfectionism because no single tool was used in more than $k = 5$ studies. We therefore examined two moderators: first, timing (pre- or post-natal) on the association between a) perfectionism and common perinatal mental health issues and b) trait perfectionistic concerns and common perinatal mental health issues; and second, mental health measure (EPDS or Other) on the association between a) perfectionism and perinatal depression and b) trait perfectionistic concerns and perinatal depression. The results of the moderator analyses are shown in Table 7. None of the associations was significantly moderated.

Table 7. Moderator Analysis exploring Perfectionism (All or Trait Perfectionistic Concerns), and common perinatal mental health symptoms. Moderators of timing and scales used in measurement of depression.

	Perfectionism (All)					Trait Perfectionistic Concerns				
Moderator	k	β	SE	t	95% CI	k	β	SE	t	95% CI
Timing (pre/post)	14	.138	.077	1.79	-.044, .319	13	.094	.063	1.48	-.057, .245
Depression Measure (EPDS or Other)	14	-.144	.083	-1.74	-.326, .037	13	-.115	.08	-1.44	-.292, .063

Significance $p < .01$ *** $< .05$ ** $< .10$ *

1.4 Discussion

1.4.1 Summary of Evidence

The purpose of this paper was to systematically review and meta-analyse the published literature on the association between perfectionism and common perinatal mental health conditions (depression and anxiety); examining perfectionism as a whole and the two high order perfectionism dimensions (concerns and strivings) for both trait and parenting measures separately, as well as examining possible moderators. Fourteen studies were included within the systematic review and meta-analysis.

We achieved our primary objective of ascertaining whether perfectionism as a whole (both perfectionistic concerns and strivings, as well as trait and parenting), was associated with perinatal mental health difficulties, with studies indicating an overall $r = 0.31$ (95% CI = 0.22 - 0.39), indicating a medium correlational effect size (Cohen, 1992). High heterogeneity (I^2 of 79.9%, $\tau^2 = 0.015$) meant proposed moderator analysis was warranted. We were unable to examine many proposed moderators due to insufficient data. Our moderator analyses were limited to the examination of the impact of timing (pre vs post-natal) and mental health measure used (categorised as EPDS or other, examining only depression measures and outcomes). Neither moderator had a significant impact on the association between perfectionism as a whole and maternal mental health.

We attempted to examine perfectionistic concerns and strivings separately for both trait perfectionism and parenting perfectionism. The weighted average effect size for trait perfectionistic concerns was significant $r = 0.34$ ($k = 13$, $p < 0.01$, 95% CI = 0.26 to 0.42), indicating a medium effect size. Weighted average effect sizes for trait perfectionistic strivings and parenting perfectionistic concerns were non-significant. We had too little data to calculate a weighted average effect size for parenting perfectionistic strivings. Meaningful examination of moderators was only possible for the association between trait perfectionistic concerns and maternal mental health, specifically for the variables of timing and mental health measure (EPDS or Other). Neither variable significantly moderated the association.

A cautionary approach to the interpretation of generated effect sizes within our meta-analysis needs to be taken due to limited number of studies available for inclusion, lack of effect sizes available for all dimensions of perfectionism (namely for trait perfectionistic strivings and all parenting perfectionism factors) and high levels of heterogeneity which could not then adequately be explained through moderator analysis.

1.4.2 Links to Published Research

Findings support the relevance of perfectionism during the perinatal period. The perinatal period is a time of transition (Miller & Sollie, 1980), with new challenges. At this time, perfectionistic traits may lead mothers to be concerned about their ability to be a good mother and to worry about babies' "imperfections"(Buist, 2006), possibly increasing vulnerability to mental ill health. Our meta-analysis is consistent with studies that found significant associations between perfectionism and perinatal mental health (Church, Brechman-Toussaint, & Hine, 2005), including studies beyond the scope of our analysis, that found relationships both retrospectively (Mazzeo et al., 2006) and through single-item screens (Milgrom et al., 2008).

More specifically, our findings support the particular relevance of the perfectionistic concern dimension and its positive associations with perinatal mental health difficulties (Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002; Oddo-Sommerfeld et al., 2016; Maia et al., 2012). Perfectionistic concerns - understood to encompass a preoccupation with mistakes, excessive concerns over others' expectations and excessive negative reactions to perceived failures (Smith, Saklofske, Yan, & Sherry, 2015), is a dimension at heightened risk of being triggered during the perinatal period. The perinatal period is characterised by the need to rapidly acquire new skills (Ventura & Boss, 1983), during which those high in the perfectionistic concerns dimension are likely to possess a heightened awareness of societal standards and are more likely to compare

themselves to others; as a result subjecting themselves to more negative personal evaluation, potentially culminating in perceived failure and resultant distress.

Our findings suggest a non-significant association between perfectionistic strivings and perinatal maternal mental health. Due to a dearth of studies measuring the perfectionistic strivings factor, we are unable to draw firm conclusions regarding its role in perinatal mental health. Although a non-significant association was found in the present study, the broad confidence interval (-0.118 to 0.34) prevents us from conclusively interpreting the role of trait perfectionistic strivings in perinatal mental health conditions. We cannot therefore support evidence that infers that perfectionistic strivings are either positively (Macedo et al., 2009; Maia et al., 2012) or negatively associated with perinatal mental health difficulties (Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002; Mazzeo et al., 2006). It also prevents us from supporting the assertion that perfectionistic strivings represent either an adaptive form of perfectionism (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993), or alternative views arguing that it may play a role in various mental health difficulties according to coexisting loads perfectionistic concerns (Stoeber & Otto, 2006), instead suggesting that further research is needed.

Timing of measurement (pre- vs post-natal), did not significantly moderate the association between maternal perfectionism and mental health. While one study (Oddo-Sommerfeld et al., 2016) reported that the association between perfectionism was greater ante-natally than post-natally, our findings are consistent with studies that support the existence of similar associations between perfectionism and perinatal mental health, both in antenatal and postnatal periods (Maia et al., 2012). Our findings provide rationale for further research into perfectionism and mental health, spanning the whole perinatal period.

While this meta-analysis underscores the need for more exploration of the role of personality traits in perinatal mental health (Boyce, 1994), it particularly highlights the relevance of perfectionism, suggesting it is likely to play a role in psychopathologies in across developmental and transitional periods (Shafran & Mansell, 2001). Our meta-analysis included studies of both depression and anxiety but only two of the fourteen studies included measures of anxiety. Therefore, our findings provide little further information about whether, perfectionism is associated with multiple mental health difficulties during the perinatal period (as is the case in more general adulthood psychopathologies; Limburg et al., 2017), meaning that evidence suggesting it constitutes a trans-diagnostic issue during this transition, is limited. The perinatal period is however, a distinct time of change and vulnerability, with symptoms and course of common mental health difficulties distinguishable at this transition time compared to any other (Bernstein et al., 2008; O'Hara & Wisner, 2014), therefore indications of the role of perfectionism

in this unique period may constitute evidence to further support the literature regarding its trans-diagnostic properties more generally. Irrespective of this argument, there is a need to study the role of perfectionism in anxiety, as opposed to exclusively in depression during the perinatal period, this will support a better understanding of its independent and combined contribution to common perinatal mental health difficulties, integral to associated prevention and intervention strategies.

1.4.3 Critical Review of Included Studies

Studies included in this systematic review and meta-analysis fairly consistently indicated positive correlations between perfectionism and perinatal mental health. Studies illustrated good methodological quality (0.7 – 0.9), despite differences between studies in design, sample size and measures used. Quality points were lost on the following indices; sample size, lack of clearly specified objectives, description of subject selection and definition, and robustness of outcome measures.

Studies more frequently reported data for trait perfectionism (*k =13*) over parenting perfectionism (*k=2*), preventing an understanding of the relevance of this period specific measure to perinatal mental health. Subscales measuring perfectionistic strivings were also missing from many studies (only *k=4* studies reported perfectionistic strivings), limiting our understanding of this dimension and its relevance to perinatal mental health. Failure of many studies to include the perfectionistic strivings factor, is inconsistent with more current literature arguing for measurement of both, and indicating the relevance of both perfectionistic concerns and strivings in mental health difficulties (Bieling, Israeli, & Antony, 2004; Limburg et al., 2017; Stoeber & Otto, 2006).

Observational designs and sample sizes of included studies were likely to have caused some variability in findings. Not only were some sample sizes relatively small (with participant numbers ranging from 65- 421) but participants were all self-selecting, limiting external validity (Schouten, Cobben, & Bethlehem, 2009). Although our eligibility criteria meant that language restrictions were in place, we were open to translations and did not limit our search criteria. Studies were derived from only nine countries, with multiple studies from Australia, United States, Spain and Portugal, indicating (with the exception of Korea) continued domination of the literature by Western samples (Adair, Coělho, & Luna, 2002) and limiting generalisability.

Six of the fourteen studies used cross-sectional designs, limiting the inferences that could be made about the role of perfectionism as a risk or maintaining factor in perinatal mental health. Although eight of the fourteen studies employed prospective longitudinal designs (a more robust design through which conclusions around the role of perfectionism in the onset of perinatal mental health may have been feasible), we neither analysed 'design' as a moderator nor did all the prospective studies span from ante to post-natal periods (two were postnatal only), hence both our exploration and the data itself was limited, with potential variance introduced due to study design. Although seven of the eight prospective studies attempted to record a score of individual stable perfectionism (either trait or parenting), obtaining these measurements during either pregnancy or in one case once postnatal depression had remitted, is unlikely to provide a 'true' bias free score. Although perfectionism scores were obtained in distinct periods, significant shifts occur in women both during pregnancy (Leifer, 1977) or as a result of an experience of mental health difficulties (Bagby, Quilty, & Ryder, 2008), thus measurements of perfectionism at these points are likely to be impacted by these life changes. In order to gain a true measure of individual perfectionism, measurements should be taken from women prior to having or being pregnant with a child, requiring longitudinal designs following women from early adulthood into motherhood.

Despite rigorous meta-analytic techniques employed in order to gain a summary effect sizes, variation in sampling techniques, with the majority of studies employing non-purposive approaches and only one study using random allocation, researchers ability to draw inferences from findings about perinatal women as a population are limited due to the predominance of non-random samples (Etikan, Musa, & Alkassim, 2016). The plethora of different measures used to understand perfectionism, depression and anxiety, as well as the potential impact on sensitivity and specificity as a result translating tools, was likely to have impacted effect sizes across included studies too.

1.4.4 Strengths & Limitations of the Review

Strengths of our study included the use of a comprehensive literature search of multiple databases, clear inclusion and exclusion criteria (with particular attention paid to the conceptualisation and measurement of the perfectionism construct), blinded screening and quality rating by two reviewers, and the adoption of meta-analytic techniques designed to more systematically estimate effect size associations. A further advantage of our meta-analysis was that it used the comprehensive method of random effects modelling with robust variance estimation

(Hedges, Tipton, & Johnson, 2010), allowing us to use multiple effects from each study while controlling for data dependencies and variance due to independent sample characteristics. Within our meta-analysis, we chose to use continuous variables instead of clinical cut offs. By not dichotomising depression or anxiety we hoped to avoid misclassification, as well as examine tendencies toward difficulties too (as even subclinical manifestations of difficulties are relevant to prevention and treatment approaches).

A limitation of this meta-analysis was that we were only able to include 14 of the 19 originally identified studies. Although repeated efforts were made to contact the authors of these five studies, lack of response meant that our findings only reflect studies with outcomes made available in computable format. We opted to exclude unpublished data given the lack of clarity over peer review status and risk of retrieving duplicate effect sizes. In their meta-analysis, Limburg et al. (2017) queried the electronic Perfectionism Network Mailing List to identify studies that were accepted to a peer-reviewed journal but not published at the time of the literature search. This approach might have increased our study pool.

Exclusion of both retrospective studies, and research using single item and shortened measures of perfectionism, may have changed weighted effect sizes observed. A large retrospective study, including a sample of 1,119 women, designed to understand the relationship between eating disorders, perfectionism and postpartum depression (Mazzeo et al., 2006), found that severity of depressive symptoms was likely to have been accounted for by specific aspects of perfectionism, primarily concern over mistakes (perfectionistic concerns). Inclusion of such a large scale retrospective study is likely to have had a bearing on our effect sizes, however we opted to exclude such designs, focusing on those currently in the perinatal period so that measurements of constructs of perfectionism and mental health, participant selection and potential confounders were clear.

Despite the predominance of Western samples, this meta-analysis still captured data derived from samples coming from nine different countries. Each country represented in the meta-analysis is likely to have its own distinct cultural idiosyncrasies around social support, beliefs and perinatal practices (Onoye, Goebert, & Morland, 2016). These cultural differences are likely to introduce variability in maternal adjustment during this period, as well as variations in how distress is conceptualised (Oates et al., 2004). It is also important to recognise that perfectionism as a dimension; formed through the interaction between parenting approaches and temperament (Flett, Hewitt, Oliver, & Macdonald, 2002), may too, be impacted by cultural practices. Although cross-cultural research into perfectionism is somewhat limited, anecdotal evidence implies that

perfectionism is more pervasive in individualistic Western societies that value individual achievement (Walton, Hibbard, Coughlin, & Coyl-Shepherd, 2020). Thus studies deriving from Eastern cultures (inclusive of the one study from Korea presented here) may indicate quite different findings. Our meta-analysis did not unpick cultural differences that may have introduced variation in individual study effect sizes.

Self-criticism measures appear to load on to perfectionism (Dunkley, Blankstein, Zuroff, Lecce, & Hui, 2006), however our study was focused on measures found to load specifically on to the perfectionistic concerns and strivings factors (Limburg et al., 2017). We included the Dysfunctional Attitudes Scale measure of self-criticism (Weissman & Beck, 1978) because it has been previously used to examine the link between perfectionism (the dimension now seen as perfectionistic concerns) and perinatal mental health difficulties (O'Hara et al., 1982). However, we excluded studies which used only the Depressive Expressions Questionnaire (DEQ; Blatt, D'Afflitti, & Quinlan, 1976) as a measure self-criticism (Priel & Besser, 1999; Vliegen & Luyten, 2008, 2009) because it is not a questionnaire found to conclusively map on to either the perfectionistic concerns or strivings factors (Limburg et al., 2017). Where the DEQ was used to measure depression, however, we included the study (Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002). In accordance with this rationale, studies using the measure of Maternal Attitudes Questionnaire (Warner, Appleby, Whitton, & Faragher, 1997) were also excluded. The vast number of perfectionism measures (both included and excluded), supports not only the need for a more coherent definition of perfectionism but also further research into scales measuring overlapping concepts such as self-criticism and expectations.

The number of different tools in our pool of final studies, data collection methods and sampling method (as mentioned previously), were likely to have introduced methodological variance and sensitivities in accurately detecting significant associations. Self-report rather than interviewer based measures are likely to have introduced common method bias, inflating relationships (Conway & Lance, 2010). Measures designed to understand perfectionism and perinatal mental health constructs provided varied levels of internal consistency, ranging from acceptable to excellent. Some measures used were quite dated (e.g. the Depressive Experiences Questionnaire; Blatt, D'Afflitti, & Quinlan, 1976 and the Dysfunctional Attitudes Scale; Weissman & Beck, 1978); since their development significant revisions and critiques of proposed sub-types have been posed (Brown & Silberschatz, 1989; Miranda & Persons, 1988).

1.4.5 Implications of Review

Indications that perfectionism, and in particular the dimension of perfectionistic concerns, are associated with common perinatal mental health issues (namely depression), have both clinical and research implications.

In terms of clinical implications, our findings support a focus on both early identification and preventive interventions. A brief screening tool for trait perfectionism, administered at the first appointment with midwives may help to identify those at risk for common perinatal mental health difficulties. Early identification of perfectionism may help focus resources for intervention, reducing the current prevalence of perinatal mental health difficulties which is as high as 20% of new mothers (O'Hara & Wisner, 2014), and in turn mitigating negative long term consequences on both infant development and maternal wellbeing (Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014).

In terms of support provided to women high in perfectionism, our findings support preventive interventions (both through self-help and guided interventions), targeting perfectionism ante-natally. There is a strong literature base for the success of CBT for perfectionism (Handley, Egan, Kane, & Rees, 2015; Shafran, Egan, & Wade, 2018), with a recent randomised controlled trial of perinatal women indicating that the CBT intervention had a significant indirect effect on post-treatment depression and anxiety (Lowndes et al., 2019).

In terms of research implications, our meta-analysis revealed both methodological and conceptual limitations of current studies that need to be addressed. Our study calls for empirical studies to include subscales that map on to the perfectionistic strivings dimension, to more rigorously understand whether a relationship between this factor and common perinatal mental health conditions exists. Studies should also consider examining parenting specific perfectionism, to help understand any unique characteristics and contributions of this concept to perinatal mental health.

In line with NICE guidelines, that support the inclusion of anxiety screening in addition to depression (National Institute of Clinical Excellence, 2014), future studies should not only focus on understanding the relationship between perfectionism and perinatal depression but also anxiety, given its high prevalence and comorbidity with depression (Breslau, Schultz, & Peterson, 1995). Investigation of possible moderators of this relationship such as infant temperament, gender and age is also warranted, as these may provide additional information regarding the context and

specific stressors in which traits are triggered, and individuals become vulnerable to mental health difficulties (Beck, 1976).

1.4.6 Conclusions

This meta-analysis provides the first quantitative systematic analysis of the association between perfectionism and common perinatal mental health difficulties. Significant heterogeneity, methodological variance and non-significant moderators prevent us from categorically confirming the strength of the association between perfectionism and perinatal maternal mental health. However, we can make cautionary conclusions that there are moderate associations between maternal perinatal mental health difficulties and perfectionism as a whole (r =0.31, 95% CI = 0.22-0.39) and perfectionistic concerns (r = 0.34, 95% CI = 0.26 - 0.42). Further research into the association of both perfectionistic concerns and strivings factors on perinatal depression and anxiety, is warranted.

Chapter 2 Empirical Paper

Mental Health Outcomes in Mothers of Colicky Babies. An Investigation of Possible Moderators.

"There is no such thing as a baby ... if you set out to describe a baby, you will find you are describing a baby and someone." (Winnicott, 1947)

2.1 Introduction

2.1.1 Context for Postnatal Mental Health Difficulties

Commonly perceived as a joyous period, the transition to motherhood is also a significant life event requiring momentous systemic, personal and psychological shifts (Bailey, 1999; Brotherson, 2007), thus making it a time of heightened vulnerability to mental health difficulties (O'Hara & Wisner, 2014). Coupled with the need to provide care and love to new life, mothers have to grapple with significant hormonal changes (Hendrick, Altshuler, & Suri, 1998), increased economic demands (McLanahan & Adams, 1987), as well as changes in levels of autonomy, self-concept and an increased awareness of societal norms around gender roles and motherhood (Cowan & Cowan, 1992). Some mothers, for many different reasons, struggle with this transition, with as many as 20% of mothers experiencing postnatal depression (Dennis & Dowswell, 2013), 9.9% anxiety disorders (Dennis, Falah-Hassani, & Shiri, 2017) and up to 66% of those with difficulties, experiencing both depression and anxiety (Wisner et al., 2013).

2.1.2 Common Postnatal Mental Health Difficulties & their Distinctive Qualities

Depression and anxiety are recognised as common postnatal mental health issues (O'Hara & Wisner, 2014). Both pose additional complexities in their identification compared to occurrences outside the perinatal period, due to the relatively normative experiences associated with new

motherhood of fatigue, appetite changes, sleep disturbances and a degree of worry (Cox, Holden, & Sagovsky, 1987; Weisberg & Paquette, 2002) which, at other times, are distinctive symptoms of depression and anxiety. The postpartum transition seems to also act as a catalyst to mental health difficulties among many without previous issues (Cooper & Murray, 1995).

Postnatal depression is recognised as distinct from postpartum blues (incidence of between 40-80%), characterized by mild and transient mood drops which occur in the first three to five days following childbirth (Buttner, O'Hara, & Watson, 2012). Postnatal depression is understood as a persistent drop in mood and is diagnosed when individuals experience symptoms for 2 + weeks (O'Hara & Wisner, 2014).

Postnatal anxiety encompasses several different physical symptoms, alongside heightened threat attribution and a sense of diminished ability to cope, culminating in increased avoidance (Wenzel & Stuart, 2011). Identification relies on tools developed for general population use (Zigmond & Snaith, 1983; Spitzer, Kroenke, Williams, & Löwe, 2006), despite the more recent development of perinatal specific tools (Somerville et al., 2014).

2.1.3 Impact of Postnatal Mental Health Difficulties

Postnatal mental health conditions present a significant global economic and health problem, with long term consequences for mothers, infants, families and wider society (Atif, Lovell, & Rahman, 2015). Globally, maternal mortality resulting from untreated postnatal mental health conditions is as high as 400 per 100,000 births (AbouZahr, 2003). Those who do not commit suicide, often experience symptoms that persist for several months, and at times years (Goodman, 2004).

Detrimental effects occur beyond the individual level, with significant adverse impacts on family relationships (Boath, Pryce, & Cox, 1998), infant development and wellbeing (O'hara & McCabe, 2013), mother-infant bonding (Brockington et al., 2001), and attachment (Dubber et al., 2015). Postnatal mental health problems are associated with a range of long term child behavioural, mental health, and educational difficulties (Goodman et al., 2011), as well as predicting poorer language and IQ development (Brand & Brennan, 2009), and impacting growth and physical health (Ertel et al., 2010; Gump et al., 2009).

The consequences of conditions such as postnatal depression and anxiety beyond the affected individual have been acknowledged both clinically and politically. In the UK, a cross-party manifesto acknowledging the key role of the first 1001 days (from conception to 2 years) in infant development and wellbeing (for which mothers provide the critical context; O'hara & McCabe,

2013) has been written, alongside postpartum specific red flags for the identification of emergency mental health cases (Leadsom et al., 2013; Cantwell et al., 2011). Increased awareness has highlighted the need for appropriately directed support. More effective support will be aided by better understanding the risk factors for postnatal mental health difficulties and their interplay.

2.1.4 Risk Factors for Postnatal Mental Health Difficulties

Risk factors for postnatal mental health difficulties can be categorised as genetic, obstetric, environmental and psychological. Genetic risk factors include the presence of certain genes (Elwood et al., 2019), hormonal shifts (Bloch et al., 2000) and hereditary difficulties in mood (Séjourné et al., 2011). Obstetric risk factors include premature birth (Korja et al., 2008), unwanted pregnancy (Beck, 2002), previous pregnancy loss (Blackmore et al., 2011), breastfeeding difficulties (Brown, Rance, & Bennett, 2016) and birth complications (Rowan, Bick, & Bastos, 2007). Environmental risk factors range from a lack of social support (Dennis & Ross, 2006), relationship difficulties (Dennis & Ross, 2006), stressful life events (Chojenta, Loxton, & Lucke, 2012) and economic strains (Seimyr et al., 2004), to difficulties with infant regulation (Bayer, Hiscock, Hampton, & Wake, 2007) and temperament (Britton, 2011). Psychological risk factors include previous mental health difficulties (Chojenta, Loxton, & Lucke, 2012), maternal attachment difficulties (Warfa et al., 2014), childhood sexual abuse (Plaza et al., 2010), antepartum anxiety (Austin, Tully, & Parker, 2007) and the presence of certain personality traits, including perfectionism (Boyce & Mason, 1996; Maia et al., 2012).

2.1.5 Infantile Colic as a Specific Risk Factor for Postnatal Mental Health Difficulties

Excessive crying (as it is conceptualised within the research), is synonymous with what is often referred to clinically as infantile colic (Barr, Rotman, Yaremko, Leduc, & Francoeur, 1992), and poses a significant risk to both parental and infant wellbeing. Diagnostic criteria remains questionable (Reijneveld, Brugman, & Hirasing, 2001), and the condition has traditionally been identified using the 'rule of three' categorisation: crying for more than 3 hours a day, more than 3 days a week, for more than 3 consecutive weeks (Wessel, Cobb, Jackson, Harris, & Detwiler, 1954). Symptoms tend to begin two weeks postpartum, peaking around 6 weeks, significantly falling at 9 weeks and largely remitting at around 3 months (Barr, Rotman, Yaremko, Leduc, & Francoeur, 1992; Wolke, Bilgin, & Samara, 2017). The aetiology of colic remains unclear (Savino, 2007) but with as many as one in five infants experiencing this problem (Wake et al., 2006), the

difficulty is seen as a relatively normative experience. There is however a lack of consistent advice given by primary care practitioners to parents on how to manage infantile colic (Douglas & Hiscock, 2010). However, acknowledgement of its detrimental impact has been identified within the research field, culminating in the development of evidence based support packages (St James-Roberts, 2016).

Colic that persists beyond three months is seen as a prolonged form of the difficulty, is less common and likely to have different aetiology (Vik et al., 2009). Long term prognosis of infantile colic on infant development on the whole appears to be good (Rao, Brenner, Schisterman, Vik, & Mills, 2004). However, for those families experiencing forms of colic that persist beyond 3 months (prolonged colic), with the addition of inconsolability (Radesky et al., 2013), worse longer term outcomes for mother and child are likely to be associated (Vik et al., 2009; von Kries, Kalies, & Papoušek, 2006; Wolke, Rizzo, & Woods, 2002).

Infantile colic has also been implicated in postnatal mental health conditions (Petzoldt, 2018). Studies consistently show that, compared to mothers of infants without infantile colic, mothers of infants who cry excessively are more likely to experience symptoms of depression and/or anxiety (Clifford et al.,2002; Murray, Stanley, Hooper, King, & Fiori-Cowley, 1996; Pinyerd, 1992; Vik et al., 2009). Whether the effects on maternal wellbeing are lasting is unclear (Clifford et al., 2002; Vik et al., 2009). However, a multicentre prospective study of 1015 mothers and infants found that colic was associated with high depression scores at 2 months (OR: 4.4; 95% CI: 2.4–8.2) and 6 months postpartum (OR: 10.8; 95% CI: 4.3–26.9), with mothers of infants with infantile colic with increased odds of high depression scores, even after the colic difficulties had resolved at 6 months (OR: 3.7; 95% CI: 1.4–10.1; Vik et al., 2009). An estimated 45.2% of women with babies with infantile colic, also suffer from symptoms of depression (Maxted et al., 2005). While significant, this also raises questions about the remaining 54.8%, who experience infantile colic but without reporting additional mental health difficulties.

A recent meta-analysis underscores the complexity of the relationship between infantile colic and both maternal depression and anxiety (Petzoldt, 2018). While a significant positive association between infantile colic and both maternal depression and anxiety existed, aggregation analysis revealed that maternal depression was more likely to be concurrent (indicated by 68.8% of studies) and proceed to colic (indicated by 66.6% of studies), whereas maternal anxiety appeared to both precede (indicated by 70.59% of studies) and occur concurrently (indicated by 58.33%; Petzoldt, 2018). Petzoldt, despite evidencing interesting temporal differences between the occurrence of depression and anxiety amongst those with infantile colic, did not examine the strength of the association between the prolonged form of infantile colic (and the impact of

inconsolability) and maternal postnatal mental health. The importance of examining prolonged colic is particularly relevant given the worse long term outcomes for mother and child including; premature weaning (Barr, 1998), exhaustion and stress impacting on the mother-infant dyad (Kurth, Kennedy, Spichiger, Hösli, & Stutz, 2011), significant healthcare costs (Morris, St James-Roberts, Sleep, & Gillham, 2001) and infant maltreatment (Barr, Trent, & Cross, 2006).

Equivocal findings regarding the impact of infantile colic and its more prolonged forms, as well as purported temporal complexities in the associations with depression and anxiety suggest there may be something further impacting the relationship between colic and postnatal mental health. In order to mitigate potential negative implications of prolonged colic, an understanding of additional risk factors and the interplay with colic is warranted.

2.1.6 Perfectionism as an Additional Vulnerability

A new mother's ability to cope with the strains of infantile colic may potentially be moderated by maternal perfectionism. As a trait, perfectionism is likely to be particularly relevant during the postnatal period when both societal and individual expectations of parenthood are high (Cowan & Cowan, 1992; Douglas & Michaels, 2004). Perfectionism has been defined as setting overly high standards, leading to an overly critical self-evaluation (Frost, Marten, Lahart & Rosenblate, 1990). Although debate around its definition and adaptive versus maladaptive qualities exists (Hewitt, Flett, & Ediger, 1996; Rice & Dellwo, 2002; Stoeber & Otto, 2006), perfectionism has been associated with a number of different psychopathologies (Hewitt & Flett, 1996), reinforcing the assertion that it possesses trans-diagnostic qualities (Egan, Wade, & Shafran, 2011).

Perfectionism is most commonly measured using one of two multidimensional tools (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991) and has two high-order factors: perfectionistic strivings and perfectionistic concerns (Bieling, Israeli, & Antony, 2004; Stoeber & Otto, 2006). Perfectionistic strivings is understood as ceaselessly demanding perfection of oneself. Perfectionist concerns is a preoccupation with mistakes, excessive concerns over others' expectations and excessive negative reactions to perceived failures (Smith, Saklofske, Yan, & Sherry, 2015). Perfectionistic strivings was previously seen as the adaptive form of the trait and perfectionistic concerns, the maladaptive (Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). However, it is now recognised that varying loads of either factor may have a negative impact on mental health conditions (Stoeber & Otto, 2006; Limburg et al., 2017).

A recent meta-analysis has helped to summarise the relationship between perfectionism and psychopathology (Limburg et al., 2017). Perfectionistic concerns and strivings were both significantly associated with the symptoms of several mood disorders and eating disturbances. The strength of the associations of perfectionistic concerns, compared to perfectionistic strivings, were substantially larger for most pathologies, with the exception of disordered eating presentations (Limburg et al., 2017). Limburg et al (2017) did not, however, examine the associations specifically in the post-natal period.

Perfectionism (both strivings and concerns forms), is at risk of being activated in the postpartum period when concerns about one's ability to be a good mother, teamed with worries about having a "perfect" baby (Buist & Steiner, 2006), have potential mental health implications. According to Snell and colleagues, the relevance of perfectionism to parenting is central, and likely to impact parenting styles, satisfaction and bonding (Snell Jr, Overbey, & Brewer, 2005). The meta-analysis presented in the first chapter of this thesis indicates a positive association between perfectionism (and in particular perfectionistic concerns) and common perinatal mental health difficulties (namely depression).

2.1.7 Rationale for Perfectionism as a Moderator between Infantile Colic & Postnatal Mental Health

To date no study has directly examined whether the relationship between prolonged infantile colic and postnatal mental health difficulties is moderated by perfectionism. Theoretically, this proposed relationship provides a good fit with both the cognitive vulnerability model proposed by Beck (Beck, 1967) and the later diathesis-stress model (Beck, 1976). Individuals with depressogenic cognitive styles/schemas (which include perfectionistic styles), originating from early experineces (Beck, 1967) are at greater vulnerability to mental health difficulties. According to the diathesis stress model, these cognitive styles are likely to interact with situational stressors (of which infantile colic is a key contributor during the postnatal period), leading to depression (Beck, 1976 & Barnett & Gotlib, 1988). Given the high rates of comorbidity of depression and anxiety (Breslau, Schultz, & Peterson, 1995), the combination of both cognitive styles (e.g. perfectionism) and situational stressors (in this case colic), may by this logic, also lead to anxiety.

Independently both perfectionism and infantile colic are positively associated with postnatal mental health difficulties (Petzoldt, 2018; Macedo et al., 2009). They are also both amenable to change with the right support (St James-Roberts, 2016; Lowndes, Egan, & McEvoy, 2019). Therefore understanding whether these risk factors operate additively or interact, could contribute to identifying and understanding how to best treat some of the most vulnerable to

postnatal mental health difficulties. Controlling for infant temperament is warranted when studying these relationships, given significant associations of infant temperament with both depression (r= .20, p < .005) and anxiety (r=.24, p < .001) during the postnatal period (Britton, 2011).

2.1.8 Study Aims

The current study aims to test whether perfectionism (both trait and parental; perfectionistic concerns and strivings), has an impact on the relationship between prolonged infantile colic (beyond the first three months; Vik et al., 2009), and postnatal depression, with a secondary focus on postnatal anxiety and maternal well-being (see figure 6).

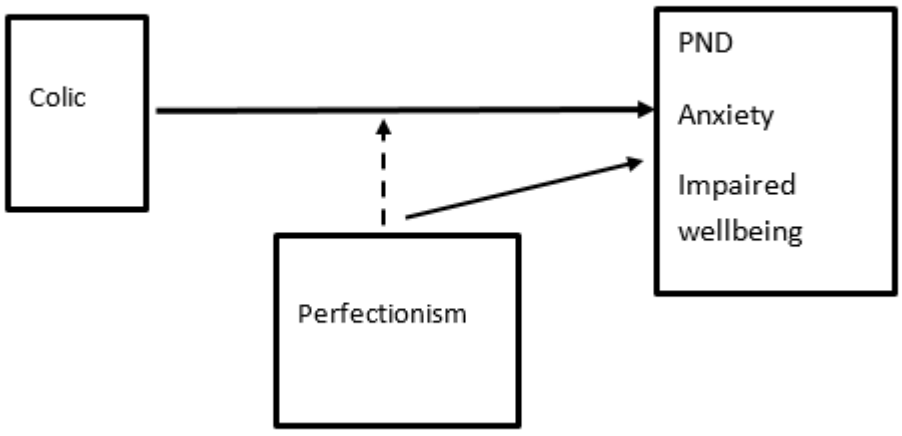


Figure 7: Conceptual diagram of moderation model (solid lines show established relationship, dotted line indicates possible moderation effect) PND = postnatal depression.

2.1.9 Hypotheses

Specifically, we hypothesise that:

1. Severity of infantile colic will be positively associated with maternal postnatal depression and anxiety symptom severity.
2. Severity of infantile colic will be negatively associated with maternal postnatal well-being.
3. Socially-prescribed trait and parenting perfectionism (perfectionistic concerns) will be positively associated with maternal postnatal depression and anxiety symptom severity.

4. Self-oriented trait and parenting perfectionism (perfectionistic strivings) will be positively associated with maternal postnatal depression and anxiety symptom severity.
5. Socially-prescribed trait and parenting perfectionism (perfectionistic concerns) will be negatively associated with maternal postnatal well-being
6. Self-oriented trait and parenting perfectionism (perfectionistic strivings) will be negatively associated with maternal postnatal well-being
7. Socially-prescribed trait and parenting perfectionism (perfectionistic concerns) will moderate the relationships between infantile colic on the one hand and, on the other hand, postnatal depression, postnatal anxiety and postnatal wellbeing.
8. Self-oriented trait and parenting perfectionism (perfectionistic strivings) will moderate the relationships between infantile colic on the one hand and, on the other hand, postnatal depression, postnatal anxiety and postnatal wellbeing.

2.2 Method

2.2.1 Participants

Participants were mothers of 12-26 week old infants, recruited from the community. Secondary participants were partners or a significant other, who provided informant data on temperament (where possible). Participants (including secondary participants), were all able to understand and respond to written English, but access was not restricted to any countries.

Participants all had an infant meeting the criteria for prolonged infantile colic. Screener questions were used to check this, firstly using the ≥ 3 hours a day, ≥ 3 times per week and ≥ 3 weeks colic metric (Wessel, Cobb, Jackson, Harris, & Detwiler, 1954) and secondly using infant age as an indicator of prolonged colic (difficulties persisting beyond 12 weeks; Vik et al., 2009). Infants were no older than 26 weeks (6 months) to ensure that colic difficulties were being captured as opposed to infant attachment behaviours; with research indicating that at approximately six months, infants begin to anticipate caregiver responses and shape their responses accordingly (Ainsworth, Blehar, Waters, & Wall, 1978).

Participants were excluded if they were receiving or had received treatment for puerperal psychosis, had given birth (on that occasion) to more than one baby , their infant was born

prematurely (defined as before the 37th week of gestation; Engle, 2006), required neonatal intensive care, weighed <2500g or had a congenital abnormality/significant physical illness. These exclusion criteria were designed to reduce confounders of already established risk factors for postnatal mental health difficulties.

Participants were recruited through purposive opportunity sampling using two recruitment methods: 1) social media adverts on parenting, breastfeeding and colic forums and a call for participants advertising website (https://www.callforparticipants.com/), 2) poster advertisements (with links to the online survey) were given out or emailed to community centres and churches serving the target population (see appendix E). Recruitment spanned from June 2019 to Feb 2020, with regular progress checks and re-advertisement of the study. Transparency in design, hypotheses and data collection was promoted through registration of our study on the Open Science Framework site (see appendix F).

2.2.2 Design

A cross-sectional design, recruiting participants with babies experiencing prolonged infantile colic was implemented. We had three predictor variables: prolonged infantile colic, perfectionism (including four domains - trait self-oriented, trait socially-prescribed perfectionism, and trait self-oriented and socially-prescribed parenting perfectionism) and the interaction between colic and perfectionism. We had three outcome variables: postnatal depression, well-being and anxiety. Our primary outcome was postnatal depression.

Prior calculations indicated that in order to achieve 90% power, and detect a moderate effect size (Cohen' f^2 = 0.02) with three predictors of PND, we needed 167 participants (G*Power; Faul, Erdfelder, Lang, & Buchner, 2007).

2.2.3 Materials

Mothers completed self-report measures regarding mother and baby demographics, infant temperament, perfectionism and maternal mental health (see table 8). These self-report measures were collated and administered through an online survey using the iSurvey platform (see link and questionnaire schedule in appendix G). Where modified versions of measures were used, permissions for these formats were sought from the authors who had amended them. Informal Patient Public Involvement (PPI) was conducted prior, meeting with a group of local

mothers. Useful feedback regarding study aims, suitability of measures and the time to complete them was gained.

2.2.3.1 Screener Questions

An initial screener questionnaire was used to ensure participants met inclusion criteria (aged over 18 years, no current or pervious diagnosis of puerperal psychosis, able to understand written English, meeting the 'rule of 3' for colic, infant aged between 12 -26 weeks without significant existing health conditions and not born prematurely). The screening tool included questions seeking further clarity regarding the severity of prolonged colic (beyond the simple 'rule of three' colic specifier) including; precise number of hours a day, days per week, number of weeks, and proportion of the time crying was deemed as inconsolable. Based on responses to these questions (providing a more specific understanding of difficulties); an overall colic severity score was calculated for all participants meeting minimum eligibility criteria. The severity score ranged from four to twelve, with a higher score corresponding to greater severity of colic difficulties.

2.2.3.2 Demographic Information

Following completion of the eligibility screener, a brief demographic questionnaire sought information on participants including participant age, ethnicity, marital status, education level, employment status, mode of delivery, infant age and (following an ethics and protocol amendment) infant gender.

2.2.3.3 Infant Temperament Questionnaire

A measure of infant temperament was collected, to control for in later analyses. Infant temperament was assessed using the Infant Behavior Questionnaire–Revised Very Short Form (IBQ-R) which has good internal consistency; ranging from .70 to.92 (Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014). IBQ-R assesses infant temperament according to three broad dimensions: positive affect/surgency, negative emotionality, and effortful control/ regulatory capacity. Self-report responses to thirty seven items are given on a seven-point Likert type scale from "1= Never" to "7= always"; based on experiences in the last week.

This measure was rated by both the participant and, where possible, a partner/significant other; to minimise potential informant bias. Questionnaires could also be submitted without responses from the second informant, following feedback from PPI regarding availability and time implications of collecting this additional data.

2.2.3.4 Mental Health Outcomes

The following measures of depression, anxiety and well-being were used to identify symptoms of postnatal mental health difficulties amongst participants.

Edinburgh Postnatal Depression Scale (EPDS). The Edinburgh Postnatal Depression Scale (EPDS) was used to screen for postnatal depression symptoms (Cox, Holden, & Sagovsky, 1987). It is a ten item self-report measure rated on a four point Likert type scale based on experiences in the last week, with some items reverse scored. Total scores range from 0 to 30 and higher scores are indicative of greater severity of depression symptoms. The EPDS has been validated and extensively used in the postnatal population, illustrating good internal consistency at three and six month time points (α = .85 and α = .84, respectively; Martin & Redshaw, 2018).

Penn State Worry Questionnaire (PSWQ). The Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) consists of sixteen items which are summed to create an overall score of between 16-80, with higher scores indicating greater severity. The 16 items assess the frequency and severity of worry symptoms, asking responders to rate "how typical" experiences are for them on a five point Likert type scale ranging from "1 = not at all typical of me" to "5 = very typical of me". The instrument has high internal consistency (α = .91–.95; Meyer, Miller, Metzger, & Borkovec; 1990). It has also been validated for use in the perinatal period (Brunton, Dryer, Saliba, & Kohlhoff, 2015).

Warwick-Edinburgh Mental Well-being Scale (WEMWBS). The Warwick-Edinburgh Mental Well-being Scale (Tennant et al., 2007) consists of 14 items relating to experiences in the last two weeks. These are rated on a 5-point Likert-type scale ranging from; "1 none of the time" to "5 all of the time". Questions include items on affect, interpersonal relationships and functioning. A total score is generated, ranging from 14 to 70. All items are scored positively, with high scores indicating better mental well-being. The WEMWBS has good internal consistency (α = .91; Tennant et al., 2007), with similar consistency found in perinatal populations (Russell & Lincoln, 2016). No clinical cut offs were used in analysis because the tool is not intended as a specific mental health screen but as an instrument to understand overall perceived well-being.

2.2.3.5 Perfectionism Measures

Hewitt's Multidimensional Perfectionism Scale (HMPS). A modified version of Hewitt's Multidimensional Perfectionism Scale (Hewitt et al; 1991) was used to measure trait perfectionism (Maia et al., 2012). This version includes two (self-oriented and socially-prescribed),

of the original three dimensions. Modification is based on a review of perfectionism (Stoeber & Otto, 2006), where these two sub-scales mapped on to the more unified two dimensional understanding of perfectionism (self-oriented perfectionism maps on to perfectionistic strivings and socially prescribed on to perfectionistic concerns). We have omitted the other-oriented domain, due to unclear findings regarding how it maps on to dimensions of interest (Stoeber & Otto, 2006).

Responses to thirty items relating to personal characteristics are rated on a 7-point Likert-type scale (1=Disagree, 7=Agree; with some items reversed). Higher scores are indicative of greater domain specific perfectionism, with no clear cut offs indicated. Internal consistency was found to be good for both self-oriented (α = .88) and socially-prescribed perfectionism (α = .81; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991), with comparable ratings found in the perinatal population (Macedo et al., 2009).

Multidimensional Parenting Perfectionism Questionnaire (MPPQ). Parenting perfectionism was measured using a modified version of the Multidimensional Parenting Perfectionism Questionnaire (Snell Jr, Overbey, & Brewer, 2005), which is based on HMPS but specifically measures parenting perfectionism. The modified version (Lee, Schoppe-Sullivan, & Dush, 2012) includes items that map on to socially-prescribed (known as societal-prescribed) and self-oriented parenting perfectionism domains of the HMPS. Responses to twelve statements (8 related to specific domains of interest) are given on a five point Likert-type scale ranging from; "1=Not characteristic of me" to "5= very characteristic of me". Higher scores indicate greater domain specific perfectionism, with no clear cut offs indicated. Internal consistency was good for both societal-prescribed (α = .82) and self-oriented (α = .81) domains of parenting perfectionism (Lee, Schoppe-Sullivan, & Dush, 2012).

Table 8. Included Measures and Scoring.

Measure	Description	Cut- off score
Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987)	10 item measure identifying depression severity.	Cut off to be applied in study but ≥13 for probable PND to be used.
Penn State Worry Questionnaire (PSWQ; (Meyer, Miller, Metzger, & Borkovec, 1990)	16 item measure identifying anxiety severity.	Scores indicate the following: 16-39 (low), 40-59 (moderate), 60-80 (high) worry. Clinical cut off of ≥45 to be applied.
Warwick-Edinburgh Mental Well-being Scale (WEMWBS; Tennant et al., 2007).	14 item measure of mental well-being.	No clinical cut offs – lower indicative of better mental well-being.
Hewitt's Multidimensional Perfectionism Scale Modified version (HMPS; Hewitt et al 1991)	30 item measure assessing Self-Oriented and Social-Prescribed Perfectionism.	No clinical cut offs – higher scores indicative of perfectionism.
Multidimensional Parenting Perfectionism Questionnaire -Modified version (Lee, Schoppe-Sullivan, & Dush; 2012)	12 items (8 relevant) Self-Oriented & Societal-Prescribed Perfectionism.	No clinical cut offs - higher scores indicative of perfectionism.
Infant Behaviour Q'naire Revised Very Short Form (IBQ-R; Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014)	37 items measuring temperament according to: positive affect, negative emotionality, emotional control dimensions.	No clinical cut offs – scores indicative of different temperaments.

2.2.4 Procedure

Participants were invited to complete the study through a link, taking them to the online iSurvey portal. Prior to survey questions, all participants read an information sheet and were required to consent. The survey was divided into two parts; the screener and main study, with separate prize draws for each. Participants who completed the initial screener could enter the initial prize draw to win one of two £20 amazon vouchers, irrespective of eligibility. Eligible participants were

invited to answer the remaining measures and were able to enter a prize draw to win one of ten £25 amazon vouchers. Links to prize draw entries were given to participants following completion of screening and the full study.

Participants were required to complete the questionnaire at one-time point; they could however, save completed sections and come back to them later (should competing priorities mean that they were unable to complete in one sitting). Time taken for the full study completion ranged from 14 to 80 minutes.

Winners of prize draws were randomly selected using the randomise function in excel, prizes were distributed after the data collection period was complete.

2.2.5 Ethics

Ethical approval was received from the University of Southampton School of Psychology Research Ethics committee (ERGO number: 47281; see appendix H). The information sheet (appendix G) gave generic information about the nature of the study, the aims and right to withdraw. Participants then checked an online box to indicate consent. Following completion (of either the screener or the full study depending on eligibility), participants were presented with a debrief statement which explained the rationale for the study and gave details of organisations that could offer support if participants' were experiencing distress (appendix G). No participant identifiable information was gathered within the study itself. All participants were allocated a participant number to maintain anonymity. Entry into prize draws required email address but via a separate link that could not be matched with study data. The iSurvey containing email addresses was deleted upon allocation of prize draws.

2.2.6 Analyses

Analyses were conducted using Statistical Packages for Social Sciences V25 (IBM, 2017), using the additional PROCESS add on (Hayes, 2017) for moderation analyses. Data was exported from iSurvey in csv form, cleaned and checked for missing data. Only data with computable total scores was used in analysis. For missing data, the person mean imputation method was considered in order to retain sample size (Little & Rubin, 2014), however further literature consultation suggested this may not be appropriate for dealing with missing items within single questionnaires. Searches revealed no clear guidance on strategy for dealing with missing items on the HMPS perfectionism scale or the Penn-State Worry Questionnaire (Hewitt et al., 1991; Meyer et al., 1990). Research strongly suggested that total or mean scores for EPDS and WEMWBS measures with missing items, should not be computed (Maheswaran, Weich, Powell, & Stewart-Brown,

2012; Martin & Redshaw, 2018). Given the limited number of items on the MPPQ, a similar principle was inferred. The IBQ has clear computation guidance with and without items, and was thus adopted (Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014).

Questionnaires were scored according to the scoring manuals for each measure. Data was explored for normality using histograms and Kolmogorov-Smirnov tests. Data from completers (completing all questionnaires, including maternal rating of temperament but including or excluding informant ratings on this measure) were compared with data from non-completers (participants who completed less than the full battery of demographic, mental health, perfectionism and one temperament measure). Clinical groups for depression and anxiety were computed to establish prevalence and tests were run to understand if differences existed between those in clinical versus non-clinical ranges. Initial correlations were run and moderation analyses conducted entering the three predictor variables and covariates (predictor 1: prolonged infantile colic, predictor 2: different forms of perfectionism and predictor 3: prolonged infantile colic x perfectionism, covariates included all domains of infant temperament) simultaneously. Moderation analysis was carried out through the PROCESS package in SPSS (Hayes, 2017), producing direct effects of each predictor (and not solely the interaction), despite simultaneous imputation.

2.3 Results

2.3.1 Internal Consistency

Internal consistency was computed for all variables (for complete questionnaires or sub-domains where relevant). Scores met criteria for adequate reliability (α = >.70), ranging from α = .70 - .94), with the exception of scores provided by mothers on the surgency domain of the infant temperament questionnaire (α =.69). Table 9 provides a full breakdown of computed reliability scores.

Table 9. Cronbach alpha reliability scores for included measures.

Scales	Cronbach α
Trait Perfectionism: HMPS_SOP	0.9
Trait Perfectionism: HMPS_SPP	0.89
Parenting Perfectionism: MPPQ_SOP	0.88
Parenting Perfectionism: MPPQ_SPP	0.86
Penn State Worry Questionnaire	0.91
EPDS	0.9
WEMWBS	0.94
Mother Rating: IBQ_SURG	0.69
Mother Rating: IBQ_NEGAF	0.81
Mother Rating: IBQ_EFFCON	0.82
Partner Rating: IBQ_SURG	0.71
Partner Rating: IBQ_NEGAFF	0.87
Partner Rating: IBQ_EFFCON	0.89

Note: HMPS (Hewitt Multidimensional Perfectionism Scale), MPPQ (Multi-dimensional Parenting Perfectionism Questionnaire), SOP (Self Oriented Perfectionism), SPP (Social Prescribed Perfectionism), EPDS (Edinburgh Postnatal Depression Scale), WEMWBS (Warwick & Edinburgh Wellbeing Scale), IBQ (Infant Behaviour Questionnaire), SURG (Surgency), NEGAF (Negative Affect/Emotionality), and EFFCON (Effortful Control).

2.3.2 Participants

658 participants accessed the iSurvey website and completed the initial screener. 137 participants from the 658 pool, completed the full survey (only 59 of these completers also submitted informant measures of infant temperament, however all 137 were still classed as completers). The remaining 521 participants were either ineligible based on screening, eligible but either opting to not complete, completing under 75% of the survey, or almost completing (over 75% but not the survey in its entirety). Figure 8 indicates numbers excluded at each stage.

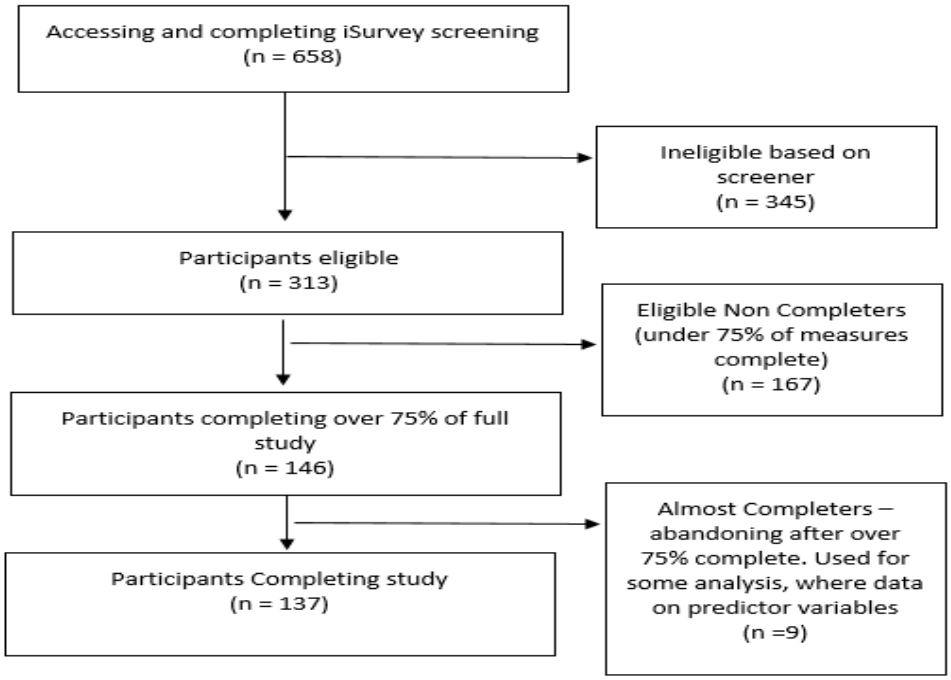


Figure 8. Flowchart showing *n*s iSurvey access and subsequent study inclusion.

2.3.3 Data Screening & Cleaning

Data were initially explored to identify missing values. The number of missing values was minimal and included; three missing values for the PSWQ, one on the EPDS, one on the WEMWBS scale and one on the HMPS (Self Oriented Perfectionism domain), from a total of six participants. These participant data sets were only excluded from specific analyses where data was missing, but included on their other completed measures.

2.3.4 Exploring Normality

Mental health, temperament (measured by mother and informant), colic severity and perfectionism variables were all explored for normality prior to further analysis. Visual inspection of histograms, alongside normality tests of Kolmogorov-Smirnov and Shapiro-Wilk, as well as calculations of skewness and kurtosis revealed that some variables were significantly non-normal and negatively skewed (see appendix I for histograms prior to transformations). Log transformations were performed on all variables, with reversing scoring carried out prior to transformations for negative skews. Normality was then re-explored. Despite some improvements

in fit, certain variables remained significantly non-normal. Rather than using transformed data in inferential tests, a decision was made to bootstrap using the recommend 2000 samples option (Wright, London, & Field, 2011).

2.3.5 Completers versus Eligible Non-Completer & Almost Completer Comparisons

Tables 10 and 11 visually show the comparison across the three groups for both categorical and continuous variables.

2.3.5.1 Completers versus Eligible Non-Completer Comparisons

Chi squared analysis only revealed significant differences between completers and non-completers on the demographic variables of infant age in weeks χ^2 (2) = 9.3, p = .01, Φ = .19 and delivery mode χ^2 (3) = 8.79, p = .03, Φ = .18. There were significantly more babies aged 17-22 weeks and 23-26 weeks in the completer sample (suggesting that mothers and infants in the completer group had been enduring prolonged crying for longer). Completers were more likely to have had an induced delivery compared to non-completers (see table 10 also). Effect sizes were both calculated to be small (see appendix J for non-significant results).

Continuous variables were explored using independent *t*-tests and Mann Whitney U tests, with non-parametric (Mann Whitney U) tests used when sample sizes and variances were unequal. Independent t-tests were conducted to examine differences between colic severity and temperament domains (as rated by mothers). *T*-tests were bootstrapped using 2000 samples (Wright, London, & Field, 2011), due to violation of normality assumptions, allowing for an estimation of sampling distribution and computation of confidence intervals to improve interpretation of significance tests. Levene's test showed that the assumption of equality of variance was not violated (all *p*s > .05), thus *t*-test equal variance output and bootstrap mean difference and confidence intervals are reported. Statistically significant differences between completers and non-completer groups were only found in; the negative emotionality domain of temperament; t (227) = 2.09, p = .04, CI =.01 to .53, d = .28 and effortful control, t (227) = -2.5, p = .01, CI = -.58 to -.06, d = .32 (see appendix I for non-significant results). Scores for negative emotionality were higher for non-completers than completers and for effortful control, the reverse. Effect sizes were found to be small.

Differences between completers and non-completers on the remaining continuous variables were computed using the non-parametric Mann-Whitney U test due to unequal variances, extreme differences in sample sizes and distributions. No significant difference was found between

completers and non-completers on all remaining measures (see appendix J for non-significant results).

2.3.5.2 Completers versus Almost Completer Comparisons

Comparisons between completers and almost-completers for categorical variables were made using exact tests (as opposed to chi-squared), due to the violated frequencies assumption (even after previous collapsed categories). Exact two sided tests indicated no significant difference in groups on any demographic variables (see appendix J). Mann-Whitney U tests were carried out on continuous variables due to unequal sample sizes, variances and non-normal distribution. A significant difference between the groups on maternal ratings of the negative emotionality domain of temperament (U = 346.5, p =.03*), with scores higher amongst almost completers than completers (see also table 11). There was also a significant difference between the groups on colic severity (U = 369, p =.04), with severity of colic rated higher amongst almost completers. All other comparisons revealed no significant differences (see appendix I).

Comparisons of these groups for the most part revealed that they were both demographically similar and that their responses on key measures were also closely aligned.

Table 10. Categorical demographic variables compared across three groups.

	Completers		Almost Completers		Non-completers	
Variables	**Mode (%)**	**N**	**Mode (%)**	**N**	**Mode (%)**	**N**
Maternal Age	26-30 yrs (42%)	137	31-35 yrs (44%) (26-30 yrs, 22%)	9	26-30 yrs (37%)	122
Infant Age Weeks	12-16 wks (40%)	137	12-16 wks (67%)	9	12-16 wks (59%)	122
Infant Gender	Female (63%) (Male, 37%)	46	Male (22%)	2	Male (54%)	43
Ethnicity Grouped[a]	White British/ White (92%)	137	White British/ White (89%)	9	White British/ White (91%)	123
Continent of completion [b]	UK, Ireland & Europe (85%)	136	UK, Ireland & Europe (78%)	9	UK, Ireland & Europe (79%)	122
Qualification	Bachelor's degree (41%)	137	Bachelor's degree (56%)	9	Bachelor's degree (30%)	123
Marital Status	Married (55%)	134	Married (67%)	9	Married (63%)	120
Employment Status	F/T on mat leave (62%)	137	F/T on mat leave (56%)	9	F/T on mat leave (58%)	123
Delivery Mode	Induced delivery (34%)	137	Induced delivery (50%)	9	Natural Birth (42%) (Induced delivery, 20%)	122

Note: Infant gender collected as an amendment, hence limited numbers.
[a] & [b] based on collapsed categories of original demographic variables. In depth breakdown given for completer participant characteristics

Table 11. Means and SDs for key continuous variables across three groups.

	Completers		Almost Completers		Non-completers	
Variables	**Mean (SD)**	**N**	**Mean (SD)**	**N**	**Mean (SD)**	**N**
EPDS-depression	15.08 (6.45)	136	12.5 (7.78)	2	14.05 (4.95)	2
WEMWBS -wellbeing	37.29 (10.94)	136	34.29 (14.3)	7	35 (2.83)	2
Penn State Worry	61.23 (12.29)	134	69 (4.83)	4	66 (2.83)	2
Colic Severity	8.35 (1.74)	137	9.56 (1.51)	9	8.45 (1.91)	157
Trait Perfectionism- Self Oriented	72.35 (17.7)	136	70.14 (22.49)	7	71.33 (10.41)	3
Trait Perfectionism- Socially Prescribed	58.02 (17.94)	137	56.57 (22.6)	7	66.67 (11.68)	3
Parenting Perfectionism- Self Oriented	15.62 (4.16)	137	13 (4.52)	6	18.33 (1.53)	3
Parenting Perfectionism- Socially Prescribed	12.15 (4.72)	137	9.33 (5.89)	6	17 (2.65)	3
Surgency -Infant Temperament	3.74 (.77)	137	4.31 (.82)	9	3.76 (.86)	92
Negative Affect -Infant Temperament	4.86 (.92)	137	5.57 (.73)	9	5.13 (.98)	92
Effortful Control -Infant Temperament	4.32 (.88)	137	4.49 (.90)	9	4.01 (1.03)	92
Partner Rating Infant Temperament - Surgency	4.11 (1.16)	65	4.54 (1.31)	2	3.31 (1.26)	8
Partner Rating Infant Temperament - Negative Affect	5 (1.97)	59	6.21 (.29)	2	4.88 (1.13)	5
Partner Rating Infant Temperament - Effortful Control	4.31 (1.05)	59	4.21 (.41)	2	4.22 (.69)	5

Note: Colic Severity 4-7 indicative of moderate difficulties, 8-9 indicative of moderately severe and 10-12 severe

2.3.6 Proportion with clinical versus non-clinical scores of postnatal depression and anxiety

In order to understand both the prevalence of depression and anxiety in our sample and whether any differences existed between those in clinical ranges and those below, we created clinical groups for comparison.

Amongst completers, 66.43% met or exceeded clinical thresholds for postnatal depression (according to the EPDS cut off ≥ 13; Cox, Holden, & Sagovsky, 1987). Those who scored in the clinical range had mean scores = 18.73 (SD = 3.58), compared to those in the non-clinical range who had mean scores = 7.72 (SD = 3.44). 89.29% met or exceeded the threshold for generalised anxiety disorder (according to the PSWQ cut off ≥ 45; Behar et al., 2003). Those who scored in the clinical range recorded a mean = 64.6 (SD= 8.5), compared to those in the non-clinical group, with a mean = 35.8 (SD = 4.93).

Clinical versus non-clinical groups were compared on perfectionism measures and either depression or anxiety (depending on group), using Mann Whitney tests due to non-normal distribution. Comparisons across clinical and non-clinical depression groups revealed significant differences between trait socially prescribed perfectionism (U = 1508.5, p =.004), parenting socially prescribed perfectionism (U = 1470.5, p =.002) and PSWQ totals (U = 919.5, p <.001), with scores significantly higher in the clinical group. No significant differences were found between the two groups on trait self-oriented perfectionism (U = 1807, p =.136) and parenting self-oriented perfectionism (U = 1784.5, p =.09).

Comparisons between those in the clinical and non-clinical anxiety groups revealed significant differences across all measures of perfectionism and depression; trait self-oriented perfectionism (U = 533, p =.008), trait socially prescribed perfectionism (U = 368, p <.001), parenting self-oriented perfectionism (U = 505.5, p =.004), parenting socially prescribed perfectionism (U = 309, p <.001) and EPDS depression totals (U = 285.5, p <.001).

Within the clinical depression group, the anxiety scores were also some way above clinical threshold (M = 65.07, SD = 9.94), and 95.7% met criteria for comorbid difficulties.

2.3.7 Correlations among Completers (Hypotheses 1 to 6)

Hypotheses 1 to 6 were tested with bivariate correlations.

Colic severity was found to have a weak positive correlation with depression and a weak negative correlation with wellbeing, but was not significantly associated with anxiety. Parenting and trait

socially prescribed perfectionism (perfectionistic concerns) were found to be moderately positively correlated with depression severity, anxiety severity and negatively associated with wellbeing. Parenting and trait self-oriented perfectionism (perfectionistic strivings) were also found to have weak positive associations with depression and anxiety and negatively associated with well-being.

Table 12. Correlational relationships between the main variables.

Variable	EPDS	WEMWBS	Penn_Worry	Trait_ PerfSOP	Trait_ PerfSPP	P_ PerfSOP	P_ PerfSPP	Colic Sev	IBQSur	IBQNeg	IBQEff
EPDS	-	-.823**	.580**	.286**	.420**	.265**	.368**	.256**	-.116	.289**	-.346**
WEMWBS	-.823**	-	-.487**	-.254**	-.446**	-.242**	-.400**	-.269**	.141	-.301**	.385**
Penn_ Worry	.580**	-.487**	-	.338**	.441**	.359**	.436**	.094	-.011	.250**	-.157
Trait_ PerfSOP	.286**	-.254**	.338**	-	.617**	.543**	.538**	-.134	-.054	-.063	-.004
Trait_ PerfSPP	.420**	-.446**	.441**	.617**	-	.539**	.712**	-.001	.098	.116	-.137
P_PerfSOP	.265**	-.242**	.359**	.543**	.539**	-	.734**	-.014	.014	-.012	.057
P_PerfSPP	.368**	-.400**	.436**	.538**	.712**	.734**	-	.035	.053	-.004	-.034
Colic Sev	.256**	-.269**	.094	-.134	-.001	-.014	.035	-	-.035	.307**	-.194**
IBQSur	-.116	.141	-.011	-.054	.098	.014	.053	-.035	-	.161*	.325**
IBQNeg	.289**	-.301**	.250**	-.063	.116	-.012	-.004	.307**	.161*	-	-.300**
IBQEff	-.346**	.385**	-.157	-.004	-.137	.057	-.034	-.194**	.325**	-.300**	-

Note * = p <0.05, ** = p <0.01, *** = p <0.001.
Abbreviations included in Table 12: EPDS= Edinburgh Postnatal Depression Scale, WEMWBS = Warwick and Edinburgh mental wellbeing scale, Penn Worry = Penn State Worry Questionnaire, Trait_PerfSOP = Trait Perfectionism Self Oriented, Trait_PerfSPP = Trait Perfectionism Socially Prescribed (All Trait Perfectionism Measured on the Hewitt Multidimensional Perfectionism Scale), P_PerfSOP (Parenting Perfection Self Oriented Perfectionism), P_PerfSPP (Parenting Perfectionism Socially Oriented)- all measures of parenting perfectionism recorded on the MPPQ (Multidimensional Parenting Perfectionism Questionnaire), Colic Sev = colic severity, IBQSur = positive affect/surgency, IBQNeg = negative emotionality, and IBQ EFF= effortful control/ regulatory capacity (dimensions of infant temperament).

2.3.8 Hypothesis 7: Socially Prescribed Perfectionism (Trait & Parenting Measures) as a Moderator of the Associations between Colic Severity and Postnatal Mental Health Outcomes

Moderation analyses were carried out to test whether socially prescribed perfectionism (perfectionistic concerns), moderated the relationship between colic severity and maternal

mental health outcomes. Separate moderation models were carried out to avoid multicolinearity from different measurements of perfectionism. Assumptions of linearity, independence of errors, multicolinearity and over dispersion were all explored and satisfied in prior exploration. Maternal ratings of infant temperament (as opposed to informant ratings, where sample was limited) on all three domains (surgency, negative emotionality and effortful control) were controlled for, based on both the literature and our findings, suggesting correlation with common postnatal mental health difficulties (Beck, 2001; Martini et al., 2017). The correlations indicated that colic severity was significantly associated with temperament dimensions; a positive weak to moderate correlation with negative emotionality and a weak negative correlation with effortful control were shown. Despite significant associations, colic and temperament were not correlated to the degree that they were likely to be tapping in to the same construct, it was therefore deemed appropriate to control for infant temperament in moderation models as planned. No other variables were controlled for to prevent over fitting.

Independent and moderator variables were mean centred to allow for direct effects (as well as interaction effects) to be interpreted (Dawson, 2014). Mean centering was adopted, to not only help clarify the regression coefficients and direct effects, but also to manage potential multicolineraity and with the understanding that doing so, would not affect the overall model fit as measured by R^2 (Iacobucci, Schneider, Popovich, & Bakamitsos, 2017). Six moderation models were run, two exploring depression, two for well-being and two for anxiety; examining trait and parenting socially prescribed perfectionism separately. There was no significant moderation effect of perfectionism (trait or parenting socially prescribed) in the relationship between colic severity and depression; wellbeing and anxiety (see Tables 13 to 18). The interaction between colic and trait socially prescribed perfectionism accounted for a proportion of variance in anxiety approaching statistical significance, $\Delta R^2 = .264$, R^2 change of interaction =.019 p = .066, CI (-.004, .118). Those with higher levels of trait socially prescribed perfectionism (but not medium or lower levels) experiencing increased colic severity reported increased anxiety ratings (see appendix K for visual depiction).

In all models both trait and parenting socially prescribed perfectionism were independent significant predictors of depression, anxiety and reduced wellbeing (all $p<.001$). Colic severity was a significant predictor of depression and reduced well-being ($p<.05$) in models where trait socially prescribed perfectionism was the moderator of interest.

Table 13. Moderation analysis exploring colic x trait socially prescribed perfectionism on depression outcome.

Predictor	B	SE	T	95% CI
Colic Severity	.587	.277	2.115*	.036, 1.135
Trait Social Prescribed Perfectionism	.138	.026	5.288***	.086, .19
Colic x Perf	.004	.015	.242	-.027, .034
Constant	17.754	3.783	4.693	10.27, 25.237

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .333, R^2 change for interaction = .0003 p =.809

Table 14. Moderation analysis exploring colic x parenting socially prescribed perfectionism depression outcome.

Predictor	B	SE	T	95% CI
Colic Severity	.415	.279	1.486	-.137, .967
Parenting Social Prescribed Perfectionism	.493	.097	5.094***	.302, .684
Colic x Perf	.009	.054	.159	-.098, .115
Constant	17.172	3.876	4.43	9.505, 24.84

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .325, R^2 change for interaction = .0001 p =.874

Table 15. Moderation analysis exploring colic x trait socially prescribed perfectionism on wellbeing outcome.

Predictor	B	SE	T	95% CI
Colic Severity	-1.003	.449	-2.232*	-1.891, -.114
Trait Social Prescribed Perfectionism	-.249	.042	-5.942***	-.331, -.166
Colic x Perf	-.016	.025	-.648	-.065, .033

Constant	29.832	6.119	4.875	17.731, 41.932

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .387, R^2 change for interaction = .002 p =.518

Table 16. Moderation analysis exploring colic x parenting socially prescribed perfectionism wellbeing outcome.

Predictor	**B**	**SE**	**T**	**95% CI**
Colic Severity	-.739	.450	-1.642	-1.63, -.151
Parenting Social Prescribed Perfectionism	-.895	.155	-5.779***	-1.201, -.589
Colic x Perf	-.048	.087	-.547	-.22, .125
Constant	29.989	6.23	4.814	17.67, 42.309

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .381, R^2 change for interaction = .001 p =.585

Table 17. Moderation analysis exploring colic x trait socially prescribed perfectionism on anxiety outcome.

Predictor	**B**	**SE**	**T**	**95% CI**
Colic Severity	.051	.554	.093	-1.043, 1.146
Trait Social Prescribed Perfectionism	.286	.052	5.499***	.183, .389
Colic x Perf	.057	.031	1.858[a]	-.004, .118
Constant	56.084	7.7	7.283	40.852, 71.316

Note * = p <0.05, ** = p <0.01, *** = p <0.001. [a] Approaching significance *p* =.066, Δ R^2= .264, R^2 change for interaction = .019 p =.066

Table 18. Moderation analysis exploring colic x parenting socially prescribed perfectionism on anxiety outcome.

Predictor	**B**	**SE**	**T**	**95% CI**
Colic Severity	-.145	.548	-.265	-1.23, .939
Parenting Social Prescribed Perfectionism	1.141	.193	5.905***	.759, 1.523
Colic x Perf	.010	.107	.096	-.201, .221

Constant	56.189	7.773	7.229	40.813, 71.565

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .266, R^2 change for interaction = .0001 p =.923

2.3.9 Hypothesis 8: Self Oriented Perfectionism (Trait & Parenting Measures) as a Moderator in Colic Severity and Postnatal Mental Health Outcomes

Moderation analyses were also carried out to explore whether self-oriented perfectionism (perfectionistic strivings), moderated the relationship between colic severity and maternal mental health outcomes. As in the previous set of analyses, separate moderations models were carried out to avoid multicolinearity from different measurements of perfectionism. Assumptions of linearity, independence of errors, multicolinearity and over dispersion were all explored and satisfied in prior exploration. Independent and moderator variables were mean centred to allow for direct effects to be interpreted (Dawson, 2014) and to manage potential multicolinearity, without impacting the fit of the interaction model (Iacobucci, Schneider, Popovich, & Bakamitsos, 2017). Maternal ratings of infant temperament were again controlled for.

Six moderation models were run, two exploring depression, two for well-being and two for anxiety; examining trait and parenting self-oriented perfectionism separately. There was no significant moderation (interaction) effect of perfectionism (trait or parenting self-oriented perfectionism) in the relationships between colic severity and depression, wellbeing and anxiety (see Tables 19 to 24).

In all models both trait and parenting self-oriented perfectionism were independent significant predictors of depression, anxiety and reduced wellbeing (all p values p<.001). Colic severity was a significant predictor of depression and reduced well-being (p<.05) in models where trait self-oriented perfectionism was the moderator of interest.

Table 19. Moderation analysis exploring colic x trait self-oriented perfectionism on depression outcome.

Predictor	B	SE	T	95% CI
Colic Severity	.696	.288	2.418*	.127, 1.265
Trait Self Oriented Perfectionism	.118	.028	4.27***	.063, .173
Colic x Perf	-.002	.017	-.127	-.036, .032
Constant	16.112	3.915	4.116	8.368, 23.857

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .29, R^2 change for interaction = .0001 p =.899

Table 20. Moderation analysis exploring colic x parenting self-oriented perfectionism on depression outcome.

Predictor	B	SE	T	95% CI
Colic Severity	.508	.289	1.76	-.063, 1.079
Parenting Self Oriented Perfectionism	.450	.116	3.897***	.222, .679
Colic x Perf	-.052	.069	-.76	-.189, .084
Constant	17.98	3.963	4.537	10.141, 25.82

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2=.276, R^2 change for interaction = .003 p =.449

Table 21. Moderation analysis exploring colic x trait self-oriented perfectionism on wellbeing outcome.

Predictor	B	SE	T	95% CI
Colic Severity	-1.143	.48	-2.383*	-2.091, -.194
Trait Self Oriented Perfectionism	-.178	.045	-3.955***	-.267, -.089
Colic x Perf	-.008	.028	-.279	-.063, .048
Constant	31.965	6.53	4.895	19.052, 44.878

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .306, R^2 change for interaction = .0004 p =.781

Table 22. Moderation analysis exploring colic x parenting self-oriented perfectionism on wellbeing outcome.

Predictor	B	SE	T	95% CI
Colic Severity	-.859	.480	-1.791	-1.807, .089
Parenting Self Oriented Perfectionism	-.693	.191	-3.636***	-1.071, -.316
Colic x Perf	-.003	.115	-.026	-.231, .225
Constant	29.18	6.568	4.443	16.193, 42.167

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .295, R^2 change for interaction = .000 p =.979

Table 23. Moderation analysis exploring colic x trait self-oriented perfectionism on anxiety outcome.

Predictor	B	SE	T	95% CI
Colic Severity	.335	.571	.586	-.796, 1.465
Trait Self Oriented Perfectionism	.243	.055	4.417***	.134, .352
Colic x Perf	.058	.035	1.692	-.010, .127
Constant	53.545	7.963	6.724	37.791, 69.298

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .215, R^2 change for interaction = .017 p =.093

Table 24. Moderation analysis exploring colic x parenting self-oriented perfectionism on anxiety outcome.

Predictor	B	SE	T	95% CI
Colic Severity	.074	.568	.130	-1.049, 1.196
Parenting Self Oriented Perfectionism	1.13	.234	4.827***	.667, 1.593

Colic x Perf	-.114	.142	-.802	-.396, .167
Constant	58.217	8.032	7.248	42.329, 74.105

Note * = p <0.05, ** = p <0.01, *** = p <0.001, Δ R^2= .211, R^2 change for interaction = .004 p =.424

2.4 Discussion

This study aimed to investigate the role of perfectionism and infantile colic as risk factors for maternal postnatal mental health difficulties (with a particular focus on postnatal depression). The main aim was to gain an understanding of whether there is an interaction between prolonged infantile colic (Vik et al., 2009) and perfectionism in the prediction of postnatal mental health difficulties , or whether they operate independently of each other (Egan et al., 2017; Petzoldt, 2018).

2.4.1 Summary of Findings

As predicted, this study found significant positive correlations between all forms of perfectionism (trait and parenting, for both socially prescribed and self-oriented) and postnatal depression, anxiety and also negative correlations with well-being. Correlations were stronger for measures of socially prescribed perfectionism (perfectionistic concerns) and mental health outcomes compared to self-oriented perfectionism (perfectionistic strivings). As predicted, colic severity was found to be correlated with both more severe depression and reduced sense of wellbeing. However, contrary to our hypothesis, colic severity was not associated with anxiety.

Contrary to our hypotheses, we found no significant interaction effects between any forms of perfectionism and infantile colic in the prediction of postnatal depression, anxiety or well-being. The interaction term between infantile colic and trait socially prescribed perfectionism in the prediction of anxiety severity approached significance and with larger samples, significant findings may be found. Moderation models did however indicate that perfectionism (both trait and parenting, in perfectionistic concerns and strivings dimensions) had a significant direct effect on all postnatal mental health difficulties. Colic severity was, however, only found to have a significant independent effect on postnatal mental health difficulties in some models; those examining trait perfectionism as a moderator (socially prescribed and self-oriented) in difficulties of depression and well-being.

The prevalence of participants within the clinical range for depression and anxiety in our sample was 66.43% and 89.29%, respectively. 95.7% of those with scores indicative of clinical postnatal

depression, also scored in the clinical range of anxiety severity. Prevalence in our study significantly exceeded estimated prevalence for perinatal mental health difficulties in unselected samples, where prevalence ranges from 10 to 20 % (Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014). Participants in our study, were however selected on the basis of having an infant experiencing the known risk factor of prolonged colic (Vik et al., 2009), thus frequencies were expected to be elevated. Irrespective of the presence of the known risk factor, the high prevalence of self-reported depression and anxiety is consistent with literature suggesting that postnatal mental health sufferers often experience comorbid mood difficulties (Wisner et al., 2013) and that perinatal mental health potentially remains an under-reported phenomenon (RCOG, 2017).

Compared to participants in non-clinical score ranges, those in clinical cut off groups showed significantly higher levels of both trait and parenting socially prescribed perfectionism (perfectionistic concerns). No significant differences were observed for self-oriented perfectionism (perfectionistic strivings) for depression but those in the clinical anxiety groups had significantly higher levels of self-oriented perfectionism than the non-clinical group. Findings provide further support that perfectionism (in particular perfectionistic concerns), as found in chapter 1, play a role in perinatal mental health difficulties and perhaps more prominently in depression presentations (Maia et al., 2012).

Comparisons of completers and eligible non-completers, as well as completers with almost completers demonstrated very few significant demographic differences, suggesting that our final sample was representative of all those who attempted participation. There were no significant differences across any group comparisons on measures of depression, anxiety, wellbeing or any domains of perfectionism. Comparisons did, however, indicate that there were some differences in temperament ratings and colic severity. Compared to completers, non-completers and almost completers endorsed higher scores of negative emotionality on infant temperament. In addition, almost completers scored higher than completers on colic severity. One could speculate that these differences in temperament and colic severity may have precluded participants from completing this lengthy study (due to the need to attend to their infant). Higher scores amongst non-completer groups on both colic severity and infant temperament, also raises questions about the need to support a potentially vulnerable group who are likely to be less visible or able to engage.

2.4.2 Link to Previous Research

To the author's knowledge, no prior study has directly examined the relationship between prolonged infantile colic, perfectionism and postnatal mental health difficulties.

Although no significant interactions between perfectionism and prolonged infantile colic were found in the prediction of postnatal depression, anxiety or reduced well-being, our findings support the independent associations of both factors with postnatal mental health. Our results support established links between infantile colic and maternal postnatal mental health (Maxted et al., 2005; Bayer et al., 2007; Petzoldt, 2018) but also the association between postnatal difficulties and certain personality traits (Riechler-Rosler & Rodhe, 2005) and specifically perfectionism with postnatal anxiety and depression (Maia et al., 2012). However, due to both the design of our study and the specific group of mothers investigated, causal relationships cannot be inferred.

Correlations and direct effects of perfectionism on postnatal mental health, support evidence that perfectionism is a particularly important risk factor for maternal postnatal mental health (Gelabert et al., 2012), in addition to antenatal mental health difficulties (Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002; Macedo et al., 2009). Those with high levels of perfectionism are likely to hold excessively high standards for parenting and parenthood (Snell Jr, Overbey, & Brewer, 2005). Embedded in these high standards may also be corrective scripts; desires to correct the mistakes felt to have been made by one's own parents (Byng-Hall, 1988). Those mothers entering their new role with excessively high standards and potential corrective scripts are more likely to experience a more marked discrepancy between expectations held and the realities of mothering demands (Douglas & Michaels, 2004) compared to those without execessive standards, placing them at elevated risk for mental health difficulties. Stronger correlations between perfectionistic concerns and postnatal mental health problems compared to perfectionistic strivings, is consistent with research outside the perinatal period (Limburg et al., 2017). This is indicative of distress caused by the excessive concerns over others' expectations and excessive reactions to perceived failures (Smith, Saklofske, Yan, & Sherry, 2015) which, in the context of new motherhood, may lead mothers with higher scores on the perfectionistic concerns dimension to compare themselves more frequently with others and interpret their abilities more critically.

As indicated in chapter 1, to date the majority of research examining the relationship between perfectionism and maternal perinatal mental health has focused on depression and specific areas of perfectionism; namely perfectionistic concerns (Grazioli & Terry, 2000; Dimitrovsky, Levy-Shiff, & Schattner-Zanany, 2002; Egan et al., 2017). Postnatal depression has to date been identified as

the most prevalent postpartum mood disorder (Pope, Watts, Evans, McDonald, & Henderson, 2000) and perfectionistic concerns continues to be seen as the maladaptive form of the trait (Frost et al., 1993). However, failure to acknowledge broader understandings of both the trait and common mood difficulties may prevent us from understanding the true complexity of perfectionism as a risk factor and the potential consequences it has on both depression and anxiety in this vulnerable period. Several researchers support the importance of identifying postnatal anxiety in isolation, as well as in addition to depression (Matthey, Barnett, Howie, & Kavanagh, 2003). By broadening our understanding around what constitutes postnatal distress to include exploration of anxiety as standard within research, may prevent vulnerable individuals from slipping through the net (Green, 1998). Similarly, a focus on all dimensions of perfectionism is also warranted to understand the true complexity of the risk it poses for psychopathologies (Stoeber & Otto, 2006). In comparison to perfectionistic concerns, perfectionistic strivings has not received adequate attention within research. However, meta-analysis findings (of the comparatively few studies) examining the perfectionistic strivings dimension indicated that associations with depression, worry, obsessive compulsive disorder, social phobia and disordered eating pathologies exist (Limburg et al., 2017). Unlike many previous studies of maternal postnatal mental health (Grazioli & Terry, 2000; Church et al., 2005; Thompson & Bendell, 2014; Egan, Kane, Winton, Eliot, & McEvoy, 2017), we focused on the relevance of both high order factors of perfectionism (concerns and strivings) to difficulties beyond postnatal depression. Our results showing both correlations and direct effects of perfectionistic concerns and strivings on postnatal depression, anxiety and reduced wellbeing, were consistent with evidence from outside the postnatal period where perfectionism (inclusive of both dimensions) is seen as a trans-diagnostic issue (Egan, Wade, & Shafran, 2011). Only five previous studies examining associations between postnatal mental health and perfectionism, were found to include both perfectionistic concerns and strivings factors (Gelabert et al., 2011; Macedo et al., 2011; Gelabert et al., 2012; Maia et al., 2012 & Hain et al., 2016). Two of these studies did not report correlations and of the remaining three that did, mixed results were found. One study showed perfectionistic strivings to be significantly associated with depression (Gelabert et al., 2011) and the other two showed no significant relationships (Gelabert et al., 2012 & Maia et al., 2012). Our study included the two perfectionism dimensions, with findings indicating that results were both in line with and an extension of (by its inclusion of anxiety and wellbeing measures) Gelabert and colleagues' study (Gelabert et al., 2011). Our study supports the rationale for exploring both high order factors of perfectionism in post-natal mental health research, however further research into the related

loadings of the two dimensions is needed to more accurately understand their relative contributions to mental health difficulties during this vulnerable period.

Perfectionism is likely to lead to a heightened awareness amongst new mothers of both societal and individual expectations of motherhood (Cowan & Cowan, 1992; Douglas & Michaels, 2004). According to theoretical understandings, those holding high expectations of themselves as mothers are the most at risk of feeling unprepared for the reality of their new role, leading to feelings of inadequacy and resulting in postpartum difficulties (Breen, 1975). Perceived societal and personal expectations, are likely to trigger longstanding dysfunctional attitudes that are rigid, unrealistic and perfectionistic (Weissman & Beck, 1978) which are, in turn, positively associated with postpartum difficulties of depression, anxiety and impaired wellbeing. In addition to existing research supporting the role of perfectionism to mental health conditions in the perinatal period (Oddo-Sommerfeld et al., 2016), our findings further highlight the importance of identifying perfectionistic traits as early as possible in a mother's perinatal journey, in order to mitigate the risk of postnatal mental health problems.

Findings regarding the relationship between prolonged colic and postnatal difficulties were more complex. Although correlations go some way to supporting the literature that colic may be associated with an increased risk of depression (Vik et al., 2009) and as a bi-product reduce wellbeing; inconsistent direct effects of prolonged colic were found and no correlation with anxiety was present, suggesting that further unexplored factors may be involved.

There is a notable absence of studies examining the relationship between infantile colic and maternal postnatal anxiety. This may be due, as indicated in our study, to non-significant associations and publication bias favouring significant results, however cross-sectional designs may also be failing to capture the relevance of timing in the relationship. Petzoldt's systematic review on infantile colic and its association with maternal depression and anxiety concluded that maternal depression was more likely to correlate with, or occur following, infantile colic. By contrast, anxiety was found to temporally proceed colic and, thus, serve as a putative risk factor for both colic and depression (Petzoldt, 2018). Unfortunately, the cross-sectional design of the present study did not allow for testing such temporal relationships and the complexity of possible relationships between colic and maternal mental health (particularly where anxiety is concerned), requires further exploration.

Despite a non-significant association between prolonged infantile colic and anxiety, an interaction between prolonged colic and trait socially prescribed perfectionism (perfectionistic concerns) predicting anxiety was approaching significance, posing interesting questions about what this particular dimension of perfectionism is adding to the relationship. Perfectionistic concerns are

strongly associated with measures and experiences of social anxiety (Saboonchi & Lundh, 1997). One could speculate that by collecting data on perfectionistic concerns, we may have captured symptoms of social anxiety that our measure of general anxiety failed to record thus inflating the relationship. In fact the presence of potential feelings of social anxiety is likely to be more pronounced in the context of infantile colic; where attention is drawn more overtly to both mother and baby, leading social interactions to be experienced as unpleasant and threatening. To address these questions, further research exploring relationship between perfectionistic concerns and social anxiety in postnatal mothers is needed.

2.4.3 Strengths, Limitations & Directions for Future Research

This study contributes to the broader literature on potential risk factors for perinatal mental health difficulties (O'Hara & Wisner, 2014), as well as indicating the specific role of perfectionism during the postnatal period (Oddo-Sommerfeld et al., 2016). Unlike previous studies, of which we found just two in the postnatal period (Hain et al., 2016; Oddo-Sommerfeld et al., 2016), we explored difficulties beyond postnatal depression, including a measure of anxiety and well-being. This approach enabled us to gain a broader understanding of the relationship between perfectionism and postnatal mental health difficulties, whilst also recognising the previously neglected role of anxiety in this period (Matthey, Barnett, Howie, & Kavanagh, 2003).

The study employed a rigorous recruitment strategy which made the survey accessible to a wide audience across the world. Using online recruitment allows for greater anonymity that may have increased participation in our study, despite its sensitive topic. Previous research indicates that there continues to be a large amount of stigma associated with perinatal mental health, due to experiences of shame, worries about being viewed as a 'bad mother' and a fear of repercussions following disclosure (Bilszta, Ericksen, Buist, & Milgrom, 2010; Dunford & Granger, 2017). Online recruitment may have shielded mothers from some of the feelings of shame and fear, arguably facilitating recruitment and reducing socially desirable responses. Despite this, the target number of 167 participants was not met. However, post hoc calculations (using an α of 0.05) carried out in G Power (Faul, Erdfelder, Lang, & Buchner, 2007), indicated that power for each moderation model was between 99.97% and 100%, suggesting that sample sizes were sufficiently large enough for statistical exploration. It is however, worth acknowledging that new mothers are a difficult population to recruit, with time often consumed attending to unpredictable baby needs. The addition of infantile colic to this picture is likely to have further restricted mothers' availability, thus accounting for a significant proportion of incomplete responses and an unmet

sample target. Our inclusion criteria, designed to capture a very specific group, narrowed the pool of already difficult to recruit mothers even further. Our study methods involved online recruitment alone. This methodology was opted for in order to flexibly reach a hard to recruit population and maximise the period we were able to recruit in; reducing the time spent going through necessary ethics applications in order to recruit from NHS samples. Recruiting solely through online methods, as opposed to extending recruitment to also include relevant NHS services, may have changed our sample characteristics, however our open recruitment strategy meant that did not preclude non–NHS or NHS service users from participating. Our sample was a self-selecting group, and close inspection of demographics indicated that the majority of women were white British, married, with a university degree, and holding employment; suggesting they were a largely middle class sample. Although there is evidence to suggest that on the whole research is disproportionality carried out on white, middle class participants (Graham, 1992), the generalisability of our findings remain limited by the narrow ethnic characteristics and socioeconomic status of our sample. Future research would need to consider improving sampling techniques in order to capture a more diverse sample, an issue of paramount importance given associations between both low socioeconomic status, as well as certain black and minority ethnicities, and perinatal mental health (Goyal, Gay, & Lee, 2010 & Segre, O'Hara, & Losch, 2006). Inferences made from our findings are limited to a largely white, middle class group of mothers experiencing prolonged infantile colic, rather than postnatal mothers more generally and those experiencing any form of colic. Relationships between perfectionism and postnatal mental health amongst mothers with colicky babies (of any age), recruited from a more diverse pool, are worth exploring further in future research.

Our study placed no restrictions on whether mothers were primiparous or multiparous, nor was this recorded. Scientific research tends to identify the transition to parenthood as the period of pregnancy and postpartum of the first born child (Goldberg & Michaels, 1988), suggesting that this is the time when the most profound developmental changes occur for parents; requiring positive resolution in order to prevent difficulties (Cummings, Davies, & Campbell, 2002). According to such theory, our research is flawed in its failure to control for this variable. More recent research does however suggest, that the births of subsequent babies provide the context for equally momentous changes to a family, leading to poorer quality of life, as well as slower adjustment rates in multiparous compared to primiparous women (Gameiro, Moura-Ramos, & Canavarro, 2009; Singh, Kaur, & Singh, 2015). Although future research needs to account for birth order, it may not be as relevant as previously suggested.

The present study utilised a cross-sectional design. Perfectionism and infantile colic were assessed simultaneously with mental health outcomes. Accordingly, no evidence of a temporal relationship

or inferences of causation can be made (Schmidt & Teti, 2005). Future research should adopt a longitudinal design, with perfectionism measured outside of the perinatal period, and both mental health symptoms and infantile colic measured across several time points.

A number of additional methodological limitations need to be noted. Firstly, the study was based solely on self-report measures. Accordingly, estimates of the strength of the associations reported may have been inflated by common method variance (Conway & Lance, 2010). Secondly, for each variable a single measure was used, a method that is likely to have impacted construct validity. Thirdly, our understanding of postnatal anxiety is limited because we did not use specific perinatal scales (Somerville et al., 2014). Use of a general measure of anxiety potentially led to an overestimation of anxiety prevalence, given that some degree of postpartum worry is expected (Weisberg & Paquette, 2002) and concerns in this period are distinct from other times (Misri et al., 2015).

Finally, the present study only collected information on infant gender as an amendment. Although findings from a meta-analysis did not indicate infant gender to be a significant predictor of postpartum difficulties (Beck, 2001), and the present study indicated no significant correlations between infant gender and mental health outcome variables for the sub-sample collected (n=46; completers, associations for depression, wellbeing and anxiety respectively were r = -.082 ns, r = .038 ns, r = -.070 ns), future research should aim to include this demographic variable from the offset. Future research would benefit from addressing aforementioned limitations and collecting, as well as controlling for birth order.

2.4.4 Clinical Implications

Our findings contribute to the wider literature of risk factors for postnatal mental health difficulties (O'Hara & Wisner, 2014), and have implications for both the design and planning of appropriate interventions to reduce the burden of associated consequences of postnatal mental health difficulties for mothers, infants and wider society (Atif, Lovell, & Rahman, 2015).

The prevalence of both depression and anxiety in our sample suggests that screening of difficulties among women with babies experiencing infantile colic should routinely be provided. Currently screening of postnatal mental health difficulties is routine among new mothers (NICE, 2014), taking place at booking appointment in the antenatal period and then again in the early (unspecified) postpartum period (NICE Pathway, 2020). The prevalence of probable clinically severe depression among our sample is however indicative that these protocols are inadequate

because, by definition, prolonged infantile colic is not evident until three months postpartum. Screening of both depression and anxiety using comprehensive and perinatal specific tools (Somerville et al., 2014) should occur at frequent intervals and beyond the specified "early" postpartum period for mothers with colicky infants. This approach will aid in the identification of mothers struggling due to prolonged colic difficulties, as well allowing time for therapeutic rapport to be built helping to overcome the stigma associated with disclosing perinatal mental health issues (Dunford & Granger, 2017).

Currently infantile colic is identified using the informal 'rule of three' guidelines (Wessel, Cobb, Jackson, Harris, & Detwiler, 1954). Clearer diagnostic categorisation is needed (St James-Roberts, 2016), acknowledging as our study does, both inconsolability (Radesky et al., 2013) and prolonged difficulties (Petzoldt, 2018). Through appropriate diagnostic classification, interventions can be offered in a timely fashion to prevent associated negative outcomes (St James-Roberts, 2016).

Significant correlational and direct effects of perfectionism on maternal postnatal mental health difficulties indicate the need for effective screening of the trait. High levels of perfectionism lead individuals to hold excessively high standards of themselves (Shafran & Mansell, 2001), reducing the likelihood of them reaching out for support due to perceived failure. There is a significant risk of those high in perfectionism and struggling with postnatal mental health difficulties of slipping through the net, further supporting the need for routine screening during this vulnerable postnatal transition period (Bailey, 1999; Brotherson, 2007). Multidimensional perfectionism scales detect the two high order factors of perfectionistic concerns and strivings (Frost et al., 1990; Hewitt et al., 1991). However, these measures are likely to be too long to be used consistently to screen perinatal women in primary care. The Clinical Perfectionism Scale (CPQ; Fairburn, Cooper, & Shafran, 2003) consists of just 12 items, captures both domains, and provides a possible alternative that could be incorporated into current provision. Use of this screener, alongside normalising conversations around the challenges of motherhood is central to effectively detecting individuals whose high standards may otherwise prevent them from actively seeking help.

The British Psychological Society recommends psychological input throughout the perinatal period (BPS, 2019). Clinical Psychologists have the potential to play a key role in devising psychoeducation programmes that NCT (National Children's Trust) and NHS antenatal class providers can be trained in. Programmes providing psychoeducation, to help target unhelpful features of perfectionism to support more functional expectations of the realities of infant sleep, feeding and colic difficulties (St James-Roberts, 2016), as well as vulnerabilities to mental health, shifts in identity, the need for flexibility and the benefits of self-compassion at this time, may help

prepare women for the transitions. A role for Clinical Psychologists both in training midwives and health visitors both in screening for mental health difficulties and perfectionism, as well as having presence in these primary care services to facilitate referrals and formulations, is also warranted. In terms of individual interventions, one to one therapy using CBT for perfectionism has a growing evidence base (Shafran, Egan, & Wade, 2018), with compassion focused approaches (Cree, 2010) providing a useful alternative by focusing on building self-compassion inhibited by the trait (Murtagh, 2018). Clinical Psychologists have an instrumental role to play in leading the way in developing services, helping to bridge the gap between specialist services and primary care. Services that provide an open space for peer support, where mothers can discuss worries and difficulties arising from having a new-born baby in a non-threatening context; could potentially reduce postnatal mental health difficulties and facilitate building of secure mother-infant attachments.

2.4.5 Conclusions

This was the first study to examine the interaction between prolonged infantile colic and maternal perfectionism on postnatal mental health difficulties. Approximately 66% of women with babies with infantile colic met clinical threshold for depression, and 89% anxiety. Both prolonged infantile colic and perfectionism (concerns and strivings dimensions) were positively associated with postnatal mental health difficulties (with the exception of infantile colic and anxiety). Perfectionism was not found to moderate the relationship between prolonged colic and postnatal depression, anxiety or wellbeing. Rather, perfectionism and colic appear to act additively as risks for postnatal mental health difficulties. Further research is needed to explore these relationships with large sample sizes, using longitudinal designs. Despite limitations, findings remain clinically relevant to the provision and design of services aimed at reducing long-term consequences of maternal postnatal mental health difficulties for infants, mothers, families and society.

Appendix A Application Registering Systematic Review & Meta-Analysis on Prospero

PROSPERO
International prospective register of systematic reviews

NHS
National Institute for Health Research

UNIVERSITY of York
Centre for Reviews and Dissemination

Systematic review

1. * Review title.

Give the working title of the review, for example the one used for obtaining funding. Ideally the title should state succinctly the interventions or exposures being reviewed and the associated health or social problems. Where appropriate, the title should use the PI(E)COS structure to contain information on the Participants, Intervention (or Exposure) and Comparison groups, the Outcomes to be measured and Study designs to be included.

What is the association between mothers' perfectionism and symptoms of common mental health problems in the perinatal period?

2. Original language title.

For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

3. * Anticipated or actual start date.

Give the date when the systematic review commenced, or is expected to commence.
15/08/2019

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.
01/03/2021

5. * Stage of review at time of this submission.

Indicate the stage of progress of the review by ticking the relevant Started and Completed boxes. Additional information may be added in the free text box provided.
Please note: Reviews that have progressed beyond the point of completing data extraction at the time of initial registration are not eligible for inclusion in PROSPERO. Should evidence of incorrect status and/or completion date being supplied at the time of submission come to light, the content of the PROSPERO record will be removed leaving only the title and named contact details and a statement that inaccuracies in the stage of the review date had been identified.
This field should be updated when any amendments are made to a published record and on completion and publication of the review. If this field was pre-populated from the initial screening questions then you are not able to edit it until the record is published.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	No
Piloting of the study selection process	No	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Provide any other relevant information about the stage of the review here (e.g. Funded proposal, protocol not yet finalised).

6. * Named contact.

The named contact acts as the guarantor for the accuracy of the information presented in the register record.

Clare Evans

Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

Miss Evans

7. * Named contact email.

Give the electronic mail address of the named contact.

cre1g17@soton.ac.uk

8. Named contact address

Give the full postal address for the named contact.

School of Psychology, Building 44, Highfield Campus, University of Southampton, SO17 1BJ

9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.

07988871544

10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

University of Southampton

Organisation web address:

11. * Review team members and their organisational affiliations.

Give the title, first name, last name and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong.

Miss Clare Evans. University of Southampton

Dr Jana Kreppner. University of Southampton
Dr Peter Lawrence. University of Southampton

12. * Funding sources/sponsors.

Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Include any unique identification numbers assigned to the review by the individuals or bodies listed.

None

13. * Conflicts of interest.

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.

None

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members.

15. * Review question.

State the question(s) to be addressed by the review, clearly and precisely. Review questions may be specific or broad. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS where relevant.

Primary Questions:

Is maternal general trait perfectionism associated with perinatal symptoms of depression and anxiety?

Is maternal parenting specific perfectionism associated with perinatal symptoms of depression and anxiety?

Secondary Questions:

Are associations between general trait perfectionism and symptoms of depression and anxiety different in prenatal versus postnatal periods?

Do associations between general trait perfectionism and perinatal symptoms of depression and anxiety differ according to infant gender, temperament or age?

Do associations between parenting perfectionism and perinatal symptoms of depression and anxiety differ according to infant gender, temperament or age?

Do associations between perfectionism (general trait level or parenting) and depression and anxiety differ according to measures used for either of the key variables (perfectionism and common mental health difficulties)?

*NOTE: perinatal period defined as pregnancy and up to one year post-partum

16. * Searches.

State the sources that will be searched. Give the search dates, and any restrictions (e.g. language or publication period). Do NOT enter the full search strategy (it may be provided as a link or attachment.)

Sources to include:

CINAHL (via EBSCO)

PsycINFO (via EBSCO)

Embase (via Ovid) 1974 to current week

MEDLINE

PubMed

Web of Science Core Collection

-All English, German and Spanish language papers.

17. URL to search strategy.

Give a link to a published pdf/word document detailing either the search strategy or an example of a search strategy for a specific database if available (including the keywords that will be used in the search strategies), or upload your search strategy.Do NOT provide links to your search results.

https://www.crd.york.ac.uk/PROSPEROFILES/143369_STRATEGY_20190722.pdf

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Do not make this file publicly available until the review is complete

18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.

Common mental health conditions (depression and anxiety) in the perinatal period. Severity of perfectionism in those with common mental health disorders.

19. * Participants/population.

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.

Inclusion:

1. Participants will be human, female, pregnant or having given birth in the last year, age 18 or over.

2. Studies reporting depression and/or anxiety in postnatal (up to 12 months post-partum) and/or prenatal (pregnancy) period using standardised screening tools.

3. Studies reporting general and/or specific parenting perfectionism

Exclusion:

1. Studies to be excluded if they report on participants with co-existing severe mental health conditions (such as puerperal psychosis).

2. Studies to be excluded if they report on participants with infants with additional needs (e.g. prematurity, congenital heart problems, complex physical health needs).

3. Studies to be excluded if inclusion criteria allows for reporting on mothers below the age of 18 years

4. Studies to be excluded in not published in a peer reviewed journal

20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the nature of the interventions or the exposures to be reviewed.

Interventions and exposures not under review.

The studies included will be those measuring both:

-perfectionism (general and/or parenting specific) in prenatal and/or postnatal mothers

-depression and/or anxiety in prenatal and/or postnatal mothers.

21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Not applicable.

22. * Types of study to be included.

Give details of the types of study (study designs) eligible for inclusion in the review. If there are no restrictions on the types of study design eligible for inclusion, or certain study types are excluded, this should be stated. The preferred format includes details of both inclusion and exclusion criteria.

Studies can include cross-sectional designs, randomised control trials, non-randomised trials, longitudinal studies and mixed method approaches. The restrictions being that they must all provide baseline quantitative data on perfectionism (general and/or parenting specific) and common mental health disorders in the perinatal period (depression and/or anxiety). Studies cannot use only a qualitative design, quantitative measures of either means, standard deviations or standard errors must be available or computable.

23. Context.

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

24. * Main outcome(s).

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

The main outcome of the review is to understand if an association exists between; maternal perfectionism and maternal symptoms of common mental health disorders in the perinatal period (pregnancy through to one year post-partum).

Timing and effect measures

Definition of two main constructs:

Maternal perfectionism will be seen as encompassing either or both; general (or trait) perfectionism and parenting specific perfectionism. Perfectionism can be understood using a two-factor model; including dimensions perfectionistic strivings and perfectionist concerns. Studies included will be those that measure

Definition of two main constructs:

Maternal perfectionism will be seen as encompassing either or both; general (or trait) perfectionism and parenting specific perfectionism. Perfectionism can be understood using a two-factor model; including dimensions perfectionistic strivings and perfectionist concerns. Studies included will be those that measure general and/or trait perfectionism using a measure that maps on to one or both of these dimensions.

Common mental health problems are defined here as depression and anxiety; studies measuring symptoms of both these disorders (with validated tools) will be included.

25. * Additional outcome(s).

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state 'None' or 'Not applicable' as appropriate to the review

If data is available; additional outcomes include understanding if associations between the two main outcomes of maternal perfectionism and common mental health disorders are moderated by:

age of infant/foetus- collected in the form of nominal data

age of mother- collected in the form of nominal date

gender of infant/foetus- male/ female

temperament of infant- to be measured by validated infant temperament scale

timing- pre or post natal

measure of mental health used

* Measures of effect

Please specify the effect measure(s) for you additional outcome(s) e.g. relative risks, odds ratios, risk difference, and/or 'number needed to treat.

As above.

26. * Data extraction (selection and coding).

Describe how studies will be selected for inclusion. State what data will be extracted or obtained. State how this will be done and recorded.

All returned papers/reports will have their abstracts assessed by the main researcher (CE) and one other (PL), but against inclusion criteria devised by all three reviewers. Any report's abstract assessed as meeting criteria for inclusion, will then be assessed for inclusion based on its full text.

At the full text stage the paper will be assessed by two reviewers (CE and PL), where they disagree, the third reviewer (JK) will be consulted with and agreement made about whether the paper meets inclusion criteria.

Where a report is initially unavailable to the authors, or is published in a language other than English, German or Spanish, we will contact the authors to request a copy (preferably in English).

For all included reports, data to be extracted will be:

Authors, year of publication, citation

Sample size

Study design

Number of participants

All measurements of outcome measures at prenatal and/or postnatal time points(i.e. to also include longitudinal studies that may include both)

Mother's age (mean, SD, range)

Age of foetus or infant (mean, SD, range)

Gender of infant

Temperament of infant (assessed using validated measure)

Perfectionism scores (general and/or parenting specific)- (mean, SD, standard error)

Depression and/or anxiety (correlational data r)

Correlations between perfectionism and mental health outcomes

Perfectionism, depression and anxiety scores are likely to be self-report.

27. * Risk of bias (quality) assessment.

Describe the method of assessing risk of bias or quality assessment. State which characteristics of the studies will be assessed and any formal risk of bias tools that will be used.

Study quality will be assessed using the tool developed by Kmet, Lee & Cook (2004). The link to this criteria can be found on the following site: www.ihe.ca/advanced-search/standard-quality-assessment-criteria-for-evaluating-primary-research-papers-from-a-variety-of-fields

28. * Strategy for data synthesis.

Provide details of the planned synthesis including a rationale for the methods selected. This **must not be generic text** but should be **specific to your review** and describe how the proposed analysis will be applied to your data.

Based on preliminary scoping searches of literature, it appears that there is an adequate number of studies to support a meta-analysis of the associations between mothers' perfectionism and perinatal symptoms of common mental health problems (anxiety and depression). The measures of these will be continuous, so we will take as our effect index the correlation coefficient between the measures (e.g., between maternal perfectionism and maternal symptoms of depression).

We will use Pearson's r as the effect size. For the meta-analyses we will transform the Pearson's r to Fisher's z to obtain the summary effects and confidence intervals, and we will then convert Fisher's z back to r for presentation of results (Borenstein et al., 2009).

Depending on whether the included studies report independent or dependent effects, we will use either random effects models, or robust variance estimation, respectively.

We will use meta-regressions to assess significance of moderators on the association between perfectionism and common mental health problems. There are five moderators: three categorical - timing (pre- or post-

natal), infant gender and measures used; and two continuous - infant temperament and age.

We will assess heterogeneity using the I^2 statistic, and publication bias using the Egger test.

Note: Reference: Borenstein. M., Hedges. L. V., Higgins. J. P. T., Rothstein. H. R. (2009). 'Introduction to Meta-Analysis.' John Wiley & Sons.

29. * Analysis of subgroups or subsets.

State any planned investigation of 'subgroups'. Be clear and specific about which type of study or participant will be included in each group or covariate investigated. State the planned analytic approach.

None.

30. * Type and method of review.

Select the type of review and the review method from the lists below. Select the health area(s) of interest for your review.

Type of review

Cost effectiveness
No

Diagnostic
No

Epidemiologic
Yes

Individual patient data (IPD) meta-analysis
No

Intervention
No

Meta-analysis
Yes

Methodology
No

Narrative synthesis
Yes

Network meta-analysis
No

Pre-clinical
No

Prevention
No

Prognostic
No

Prospective meta-analysis (PMA)
No

Review of reviews
No

Service delivery
No

Synthesis of qualitative studies
No

Systematic review

No

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
Yes

Public health (including social determinants of health)
No

Rehabilitation
No

Respiratory disorders
No

Service delivery
No

Skin disorders
No

Social care
No

Surgery
No

Tropical Medicine
No

Urological
No

Wounds, injuries and accidents
No

Violence and abuse
No

31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is not an English language summary

32. * Country.

Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved.
England

33. Other registration details.

Give the name of any organisation where the systematic review title or protocol is registered (such as with

The Campbell Collaboration, or The Joanna Briggs Institute) together with any unique identification number assigned. (N.B. Registration details for Cochrane protocols will be automatically entered). If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

34. Reference and/or URL for published protocol.

Give the citation and link for the published protocol, if there is one

Give the link to the published protocol.

Alternatively, upload your published protocol to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

No I do not make this file publicly available until the review is complete

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

35. Dissemination plans.

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

Study findings will be disseminated through conference presentations and peer reviewed publication.

Do you intend to publish the review on completion?

Yes

36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords will help users find the review in the Register (the words do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

perinatal; antenatal; postnatal; prenatal; maternal; depression; anxiety; perfectionism

37. Details of any existing review of the same topic by the same authors.

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

38. * Current review status.

Review status should be updated when the review is completed and when it is published. For newregistrations the review must be Ongoing.
Please provide anticipated publication date

Review_Ongoing

39. Any additional information.

Provide any other information the review team feel is relevant to the registration of the review.

40. Details of final report/publication(s).

This field should be left empty until details of the completed review are available.

Give the link to the published review.

Appendix B Supplementary Details on Search Terms Systematic Review

The first search term used words or terms designed to capture the entire perinatal period, including therefore both pre and post periods, using both two word and single word variations.

The second search was designed to capture depression and anxiety (as common mental health issues), intending to capture all variations of both words but also alternative labels used.

The third term captured perfectionism (the potential risk factor for perinatal depression and anxiety), including variants of the word but also including synonyms of this construct. All words were truncated to include as many different variations proceeding the symbol, ensuring greater sensitivity.

Each of the search terms was entered into the database separately with the Boolean operator OR used between each variation of the term. No exclusion terms were used via the Boolean function of NOT, to ensure greater inclusivity at this initial stage.

For databases searched through EBSCO (Medline, Psychinfo and CINAHL), the option of the field Abstract (AB) was made. For the database Embase (accessed via Ovid) no restrictions on search field were placed, as no Abstract option was available. For the Web of Science the broader field restriction of Topic (TS) was placed on each search and for PubMed no field restrictions were applied, these options allowed for a relevant but also broad pool of literature to be captured from our chosen databases.

Due to the absence of a prior systematic review on this subject and relative dearth of research in this specific area to date, all study designs were included in this review as long as baseline data on perfectionism and common mental health (depression and/or anxiety) during the perinatal period was provided.

Appendix C QualSyst Tool Used to Quality Assess Included Studies

Table 1. Checklist for assessing the quality of quantitative studies

Criteria		YES (2)	PARTIAL (1)	NO (0)	N/A
1	Question / objective sufficiently described?				
2	Study design evident and appropriate?				
3	Method of subject/comparison group selection or source of information/input variables described and appropriate?				
4	Subject (and comparison group, if applicable) characteristics sufficiently described?				
5	If interventional and random allocation was possible, was it described?				
6	If interventional and blinding of investigators was possible, was it reported?				
7	If interventional and blinding of subjects was possible, was it reported?				
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?				
9	Sample size appropriate?				
10	Analytic methods described/justified and appropriate?				
11	Some estimate of variance is reported for the main results?				
12	Controlled for confounding?				
13	Results reported in sufficient detail?				
14	Conclusions supported by the results?				

Appendix D Data Extraction For All 19 Eligible Studies

Table 4 *Study Characteristics.*

Reference	Country	N	Age (M, Sd or range)	Infant Gender	Source	Design	Measurement Points	Temperament	Quality Score
Dimitrovsky, Levy-Shiff & Schattner-Zanany, 2002	Israel	100	m = 27.9 (no sd)	Not Reported	Community	Cross-sectional	Antenatal	Not Reported	0.9
Hain, Schermelleh-Engel, Freitag, Louwen, & Oddo, 2016	Germany	297, 104 follow up	m= 32.35 (sd= 4.46)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.77
Hassert, Sharon, Payakkakom, & Kodysova, 2018 [a]	Czech Rep	126	m= 30.30 (sd= 3.99)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.8
Hassert, Sharon, Payakkakom, & Kodysova, 2018 [b]	Thailand	161	m= 25.83 (sd= 3.46)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.8
Schoppe-Sullivan et al., 2017	United States	127	m = 27.80 (sd = 3.77)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.77
최수영 & 현미열, 2019	Korean	150	Range: < 30 n= 53, ≥30 n =97	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.7
Grazioli & Terry, 2000	Australia	65, 57 follow up	m = 28. 81 (sd= 3.36)	Not Reported	Community	Prospective	Antenatal & Postnatal	Bates 7 item (m= 3.44, sd =0.97)	0.77
O'Hara, Rehm, & Campbell, 1982	United States	170	m= 26.6 (no sd)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.73
Church, Brechman-Toussaint, & Hine, 2005	Australia	406	m =29.2 (sd=5.07)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.85
Egan, Kane, Winton, Eliot, & McEvoy, 2017	Australia	71	m = 32.3 (sd= 3.74)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.9

Table 4 *(continued)*

Reference	Country	N	Age (M, Sd or range)	Infant Gender	Source	Design	Measurement Points	Temperament	Quality Score
Gelabert et al., 2011	Spain	309	m =31.6 (sd=4.7)	Not Reported	Inpatient Obstetric	Prospective	Postnatal – 3 points	Not Reported	0.73
Gelabert et al., 2012	Spain	122	m= 33.7 (sd=4.10)	Not Reported	Inpatient Psychiatric	Cross-sectional	Postnatal – perf when PND remitted.	Not Reported	0.95
Lowndes, Egan, & McEvoy, 2019	Australia	60	m= 32.41 (sd = 3.63)	Not Reported	Community	Cross-sectional [1]	Antenatal	Not Reported	0.82
Macedo et al., 2009	Portugal	421	m=29.8 (sd=4.48)	Not Reported	Community	Cross-sectional	Antenatal	Not Reported	0.86
Macedo et al., 2011	Portugal	386	m= 30.08 (sd = 4.21)	Not Reported	Community	Prospective	Antenatal & postnatal	Azevedo 8 item (m=13.86, sd= 5.47)	0.95
Maia et al., 2012	Portugal	386	m= 30.08 (sd = 4.21)	Not Reported	Community	Prospective	Antenatal & postnatal	Not Reported	0.9
Oddo-Sommerfeld Hain, Louwen, & Schermelleh-Engel, 2016	Germany	297, 266 follow up	m= 32.35 (sd = 4.46)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.95
Sweeney & Fingerhut, 2013	United States	46	m= 27.17 (sd = 6.59)	Not Reported	Community	Prospective	Antenatal & Postnatal	Not Reported	0.82
Thompson & Bendell, 2014	United States	77	m= 24.6 (sd = 4.72)	Not Reported	Community	Cross-sectional	Postnatal	Not Reported	0.85
Vandenberk et al., 2019	Belgium	108	Range 28-33 years	Not Reported	Community	Cross-sectional	Antenatal	Not Reported	0.64

Hassert, Sharon, Payakkakom, & Kodysova, 2018 [a] & Hassert, Sharon, Payakkakom, & Kodysova, 2018 [b], same study but two different cohorts
sd = standard deviation
[1] Cross-sectional data extracted from Randomised Control Trial

Table 5: *Study Outcomes*

Reference	Key Outcomes	Type of Perfectionism Measured	Mental Health Measurement	Correlation (Effect Size *r*)
Dimitrovsky, Levy-Shiff & Schattner-Zanany, 2002	HMPS, DEQ (Anaclitic & Introjective)	Perfectionistic Concerns & Strivings	Depression	DEQ Anaclictic &: SOP MPS (r=-.15, ns), OOP (r=-.06, ns) & SPP (r=.13, ns). DEQ Introject & SOP (r =-.13, ns), & OOP (r=-.11 ns), SPP (r=.40***)
Hain, Schermelleh-Engel, Freitag, Louwen, & Oddo, 2016	FMPS, STADI	Perfectionistic Concerns & Strivings	Depression & Anxiety	Not Reported
Hassert, Sharon, Payakkakom, Kodysova, 2018[a]	DAS-A-17 (11-items), EPDS	Perfectionistic Concerns	Depression	DAS-A-17 & EPDS (r=.636**) [1]
Hassert, Sharon, Payakkakom, Kodysova, 2018[b]	DAS-A-17 (11-items), EPDS	Perfectionistic Concerns	Depression	DAS-A-17 & EPDS (r=0.392**) [1]
Schoppe-Sullivan et al., 2017	SOPP subscale MPPQ, CES-D	Perfectionistic Concerns	Depression	SOPP &EPDS @ 3 months:(r= .23*) @9 months: (r= .02,ns)
최수영 & 현미열, 2019	FMPS- 4 of 6 scales: COM, DAA PC, PE & EPDS.	Perfectionistic Concerns	Depression	EPDS &: COM (r= .49**), DAA (r=.40**), PC (r= .42**) PE (r= .00, ns).
Grazioli & Terry, 2000	DAS-A (25 items) PE & AO, M-DAS PE & AO & EPDS	Perfectionistic Concerns	Depression	DAS-PE &EPDS antenatal (r= .21, ns), postnatal= (r=.34*), DAS-A0 & EPDS antenatal (r= .23*), postnatal (r= .37**), M-DAS-PE & EPDS antenatal (r = .17, ns), postnatal (r= .18, ns), M-DAS-AO & EPDS, antenatal (r= .02, ns) , postnatal (r= .16, ns)

Table 5 *(continued)*

Reference	Key Outcomes	Type of Perfectionism Measured	Mental Health Measurement	Correlation (Effect Size *r*)
O'Hara, Rehm, & Campbell, 1982	DAS 40 item, BDI	Perfectionistic Concerns	Depression	DAS & BDI (r = - .283****) [2]
Church, Brechman-Toussaint, & Hine, 2005	DAS 24 item, EPDS	Perfectionistic Concerns	Depression	EPDS & DAS (r =.52**)
Egan, Kane, Winton, Eliot, & McEvoy, 2017	EPDS, CPQ	Perfectionistic Concerns	Depression	EDPS & CPQ antenatal (r= .36**), PDS & CPQ postnatal (r= .27*).
Gelabert et al., 2011	EPDS, FMPS 5 scales: PS, COM, DAA, PE, PC	Perfectionistic Concerns & Strivings	Depression	EPDS week 8 &: PS (r=.271**), COM (r=.423**), DAA (r=.348**), PE (r=.114, ns), PC (r=.356**). EPDS week 32 &: PS (r=.325**), CM (r=.452**), DAA (r=.424**), PE (r=.236**), PC (r=.435**) [3]
Gelabert et al., 2012	EPDS, FMPS	Perfectionistic Concerns & Strivings	Depression	EPDS week 8 &: PS (r=.131, ns), O (r=-.033), COM (r=.098, ns), DAA (r=.178*), PE (r=.125, ns), PC (r=..071, ns).[4]
Lowndes, Egan, & McEvoy, 2019	EPDS, FMPS- 2 subscales COM & PS	Perfectionistic Concerns & Strivings	Depression	Not Reported [5]

Table 5 *(continued)*

Reference	Key Outcomes	Type of Perfectionism Measured	Mental Health Measurement	Correlation (Effect Size *r*)
Macedo et al., 2009	BDI-II & POMS Anxiety, HMPS SOP and SPP subscales (SPP divided SPP-OHS, SPP-CA)	Perfectionistic Concerns & Strivings	Depression & Anxiety	SPP &: POMS anxiety (r=.24**), BDI-II (r=.23**). SOP &: POMS anxiety (r=.16**), BDI-II ns. SPP-OHS &: POMS Anx(r=.20**), BDI-II (r=.19**). SPP-CA &: POMS anxiety (r=.18**), BDI-II (r=.18**).
Macedo et al., 2011	BDI-II & HMPS SOP, SPP subscales (SPP divided SPP-OHS, SPP-CA)	Perfectionistic Concerns & Strivings	Depression	Not Reported [6]
Maia et al., 2012	BDI-II & HMPS SOP, SPP subscales (SPP divided SPP-OHS, SPP-CA)	Perfectionistic Concerns & Strivings	Depression	Antenatal BDI-II-&: SOP(r=.135**), SPP-OHS (r= .201**), SPP-CA (r=.148**). Postnatal BDI &: SOP (r= .072 ns), SPP-OHS (r= .212**), SPP-CA (r= .212**)
Oddo-Sommerfeld Hain, Louwen, & Schermelleh-Engel, 2016	BDI-V, EPDS, STADI, DP (Sum FMPS COM & DAA)	Perfectionistic Concerns	Depression & Anxiety	Antenatal DP &: BDI-V (r= .56**), Anxiety (r= .44**).Postnatal DP &: EPDS (r= .37**), Anx (r= .33**).
Sweeney & Fingerhut, 2013	EPDS, APS-R (Discrepancy) & DP (from FMPS COM & DAA) combined.	Perfectionistic Concerns	Depression	Not reported [7]
Thompson & Bendell, 2014	EPDS, HMPS SPP	Perfectionistic Concerns	Depression	EPDS & HMPS SPP (r=.354**)
Vandenberk et al., 2019	PHQ-9, GAD-7, HMPS (SPP, SOP, OOP).	Perfectionistic Concerns	Depression & Anxiety	Not reported [8]

[1, 3, 4] Correlational data received on request. [5, 6, 7, 8] Authors approached for correlational data. [2] Correlation x-1, as DAS scale reverse scored (higher scores equalled higher functioning). Abbreviations for Mental Health Measures: 1) DEQ (Depressive Experiences Questionnaire), 2) EPDS (Edinburgh Postnatal Depression Screener), 3) BDI (Beck Depression Inventory) various versions, 4) POMS (Profile of Mood States), 5) STADI (State-Trait Anxiety Depression Inventory), 6) CES-D (Center for Epidemiological Studies Depression Scale).

Appendix E Study Advertising Poster & Social Media Post

Version 1.0 05/07/19 ERGO number: 47281

Mental Health Outcomes in Mothers of Colicky Babies.

An Investigation of Possible Moderators

What is the study about?

The study will explore whether infantile colic has associations with maternal mental health and whether there are any other factors that influence this possible relationship.

Who is being included in the study?

The study is recruiting people who are…

- Mothers aged 18 and over
- Mothers will have given birth in the previous 12-26 weeks.
- Mothers will be living with their infant
- English speaking
- Mothers with babies experiencing colic
- Mothers with babies who were born full-term and without additional needs
- Mothers who have given birth to single rather than multiple babies
- Mothers who are not receiving treatment for puerperal psychosis

What will I be asked to do?

If you are willing to participate, you will be asked to submit some information about yourself and your baby online.

How do I find out more?

To find out more and take part in this study, please submit your information via the following link:

https://www.isurvey.soton.ac.uk/32813

Who is sponsoring the study?

The study is being done as part of the researcher's doctorate in Clinical Psychology training at the University of Southampton.

Contacts

Principal Investigator: Clare Evans (C.R.Evans@soton.ac.uk)
Study supervisors: Dr Peter Lawrence (P.J.Lawrence@soton.ac.uk) & Dr Jana Kreppner (j.kreppner@soton.ac.uk)

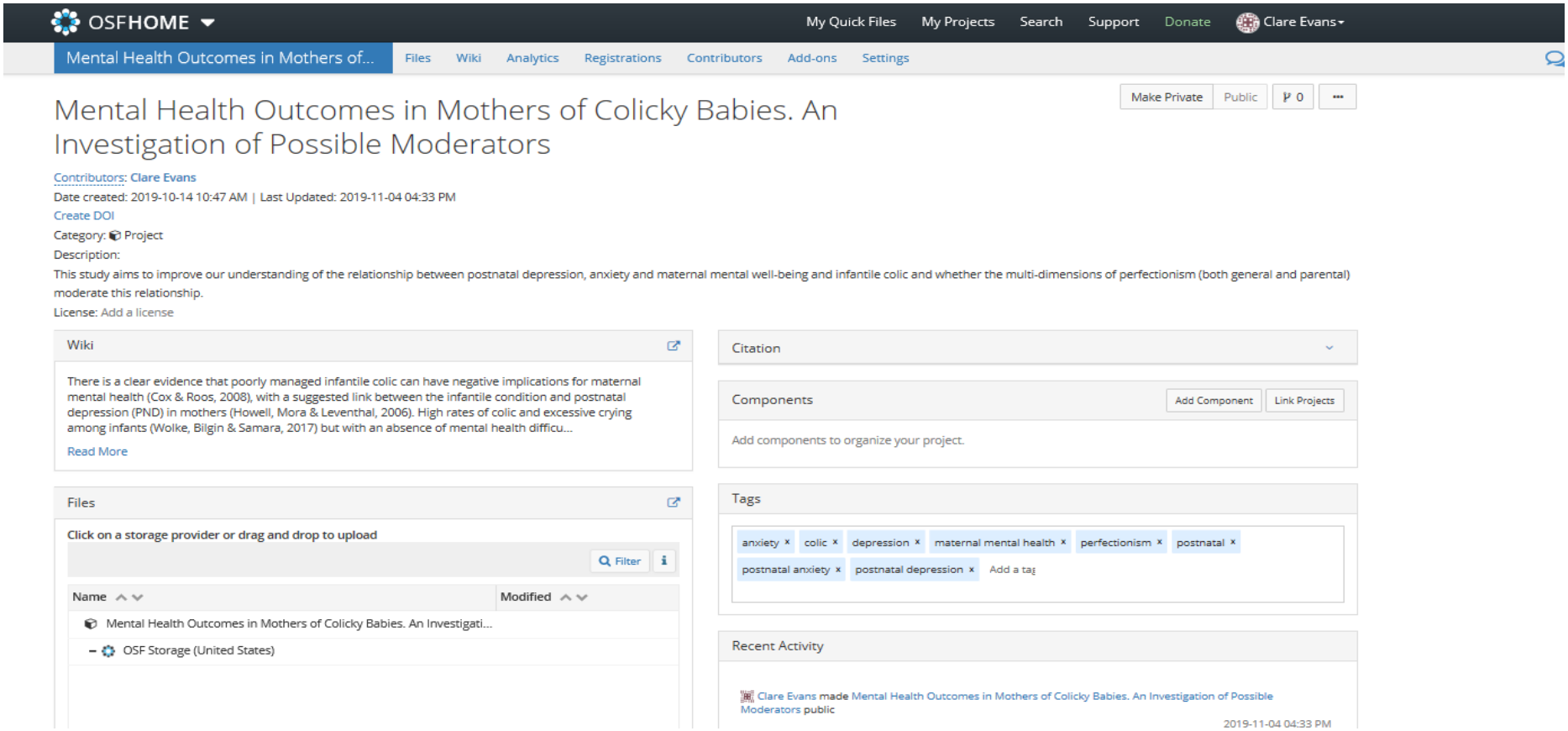
Social Media Text:

Mental Health Outcomes in Mothers of Colicky Babies. An Investigation of Possible Moderators.

To find out more and to take part in this study, please click on the following link:

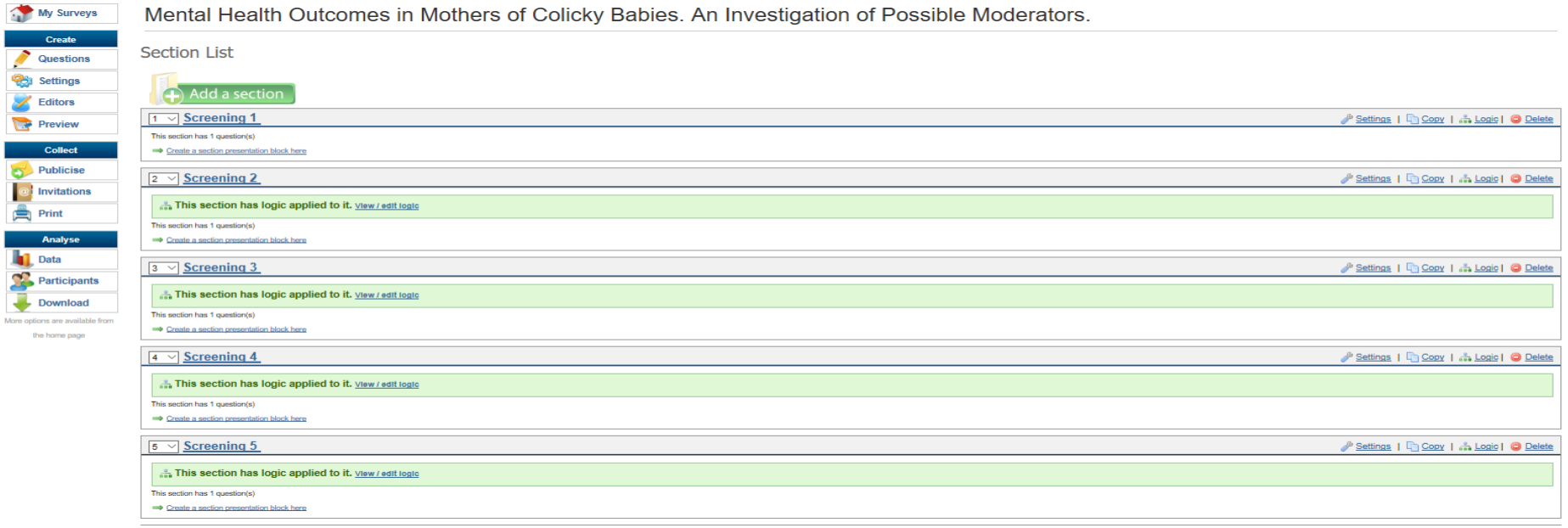
http://www.isurvey.soton.ac.uk/32813

Appendix F Registration of Empirical Study on Open Science Framework for Transparency



Appendix G Link to Online iSurvey site, Layout, Information Sheet, Full Measure Inventory & Debrief Form

http://www.isurvey.soton.ac.uk/32813



Mental Health Outcomes in Mothers of Colicky Babies. An Investigation of Possible Moderators.

Participant Information Sheet

Study Title: Mental Health Outcomes in Mothers of Colicky Babies. An Investigation of Possible Moderators.

Researcher: Clare Evans (Trainee Clinical Psychologist)

ERGO number: 47281

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and feel free to email the lead researcher if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others but it is up to you to decide whether or not to take part. If you are happy to participate, please **click the link at the bottom of the page indicating your consent.**

What is the research about?

This research project forms part of the researcher's studies toward the Doctorate in Clinical Psychology. The researcher is carrying out this thesis in order to further understand any potential mental health difficulties experienced by mothers with babies suffering from infantile colic and factors that may influence any associations observed.

Research has shown that poorly managed infantile colic can have negative implications for maternal mental health, with a suggested link between the infantile condition and postnatal depression in mothers. High rates of colic and excessive crying among infants may occur without maternal mental health difficulties, suggesting that there may be something else accounting for the association. This study will attempt to identify rates of maternal mental health difficulties in those with babies with infantile colic and whether any other factors place mothers at greater or lesser risk to struggles in this context. We hope a better understanding of possible risk factors for postnatal difficulties, in the long term, will help improve detection and treatment.

Why have I been asked to participate?

You have been invited to participate because you identify as a mother of an infant (between the age of 12-26 weeks old) suffering from colic.

What will happen to me if I take part?

You are still free to withdraw at any point during completion of this online survey by diverting away from the site. However, because it is an anonymous survey, once all questionnaires are completed and submitted, responses cannot be linked back to participants and therefore cannot be withdrawn. By clicking the consent box for the online survey, you agree to take part and for your anonymous data to be used for the purpose of this study.

Taking part will involve you completing a set of questionnaires. An initial screener of yes/no questions will help determine whether you are eligible for the study. If not, you will still be entered into an initial prize draw. We are interested in gathering data from new mothers with babies experiencing colic. Those of you who are eligible following the screening questions will be asked to complete the main body of the survey. This should take no longer than thirty to forty minutes to complete. You will then have the opportunity to enter a further prize draw.

We are interested in a wide range of factors in your life which may have an impact on your experience of the difficulties that infant colic brings, and the questionnaires will include asking about; demographic information (age, marital status, employment and education), styles of thinking, temperament of baby and your current well-being and mental health. We also ask where possible that a partner or significant other (who knows the baby well), complete two further questionnaires for us on the baby's temperament and their own well-being.

The study does not involve an intervention of any type. Data collection via survey completion will be open from April 2019 to the beginning of February 2020. From February 2020 onwards anonymised data will be analysed and findings reported in a Doctoral Research Thesis for submission in May 2020.

Are there any benefits in my taking part?

By taking part in this research you will be contributing to increasing understanding around possible needs of new mothers with colicky babies. All those completing the initial screener will be entered in to initial prize draws (two £20 amazon vouchers). Participants eligible for the main part of the research, will be invited to complete the remaining questionnaires and have the opportunity to win in the further prize draws (ten £25 amazon vouchers).

Are there any risks involved?

Risks in this study are on the whole perceived to be low, with no interventions being carried out and questionnaires aimed at just better understanding your experiences. We acknowledge that some of the questionnaires may cover issues that are sensitive and/or distressing for you, such as questions around current mental health, wellbeing and individual styles of thinking. These questions are chosen to help us understand whether people struggle with these experiences when their baby has colic and whether some individuals struggle more than others.

At the end of the study we will provide you with a debrief form to clarify which areas we are particularly interested in within this research. Within the debrief form you will also be signposted to any support services should you need them.

What data will be collected?

In the initial part of the research we will ask for some demographic data from you. This will include; your age, ethnicity, employment status, education level and marital status. This data, along with your questionnaire responses will be handled securely during the collection, analysis and storage processes. We are not asking you to provide your names; however, should you wish us to enter you into the prize draws, you will have to supply your email address. Once all data is downloaded for analysis, email

addresses will be stored in a password protected file, separate from the responses provided to the questionnaires. Both files will be password protected and be accessible only to the lead researcher. The email addresses will be stored in a way that cannot be linked to the response data and will be deleted immediately following prize draw distributions. It is not envisaged that there will be a need for hard copies of data, however should the need arise; these will be stored in a lockable cabinet.

Data will be collected from standardised and validated questionnaires on depression, mental well-being, anxiety, styles of thinking and infant temperament.

Will my participation be confidential?

Your participation and the information we collect about you during the course of the research will be kept strictly confidential.

Only members of the research team and responsible members of the University of Southampton may be given access to data about you for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations and ethical standards. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep the information you give, as a research participant, strictly confidential.

A unique participant number will be assigned to you and used throughout the data collection, analysis and reporting stages to ensure complete anonymity. As stated above, all information will be kept confidential and be stored in password protected files accessible only to the lead researcher (in the case of emails for prize draws) and by the research team only (in the case of questionnaire response data). Consent forms are completed via the isurvey site and involve a quick check box; they will not therefore include personal data requiring safe storage.

No third parties are involved in any of the activities of this study. Emails provided for prize draws will be deleted immediately after draws have been made. The data will be collected and stored in accordance with the Data Protection Act 1998, secured against unauthorised access.

Do I have to take part?

No, it is entirely up to you to decide whether or not to take part. If you decide you want to take part, you will need to complete the checkbox at the beginning of the survey, indicating you consent to take part.

It is entirely up to you to decide whether or not to take part. You may choose to ask for independent information or advice about your rights as a research participant or about being involved in this particular research study.

What happens if I change my mind?

You have the right to change your mind and can divert away from the site before submission of responses without giving a reason. Once data has been submitted it is in anonymous format and cannot be withdrawn.

What will happen to the results of the research?

Your personal details will remain strictly confidential. Research findings made available in any reports or publications will not include information that can directly identify you without your specific consent. The research should be completed by the end of 2020. The results of the study will be reported in a thesis and then published in a peer-reviewed journal, with all data completely anonymised. No individual will be identifiable from the published results. The data will not be used for any future studies.

Where can I get more information?

If you have any questions relating to this research, or concerns about participation, please contact:

Trainee Clinical Psychologist & Lead Researcher: Clare Evans; Email: cre1g17@soton.ac.uk
Project Supervisor: Dr Peter Lawrence; Email: P.J.Lawrence@soton.ac.uk
Project Supervisor: Dr Jana Kreppner; Email: J.Kreppner@soton.ac.uk

What happens if there is a problem?

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions. If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk).

Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please contact the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it.

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly. Data will be kept for 10 years after the study in accordance with the University of Southampton's data management policy. All data submitted via the survey will be anonymous format. Emails will be submitted by those who wish to enter the prize draw but will immediately be entered into a password protected database that will have no other identifiable information in it. This database will be deleted as soon as prize draws have been allocated.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page) where you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer (data.protection@soton.ac.uk).

W*e wish to thank you for taking the time to read this sheet and considering taking part in the research study.*

Part 1

Screening Questions:

1) Are you over the age of 18 years? Yes/ No

2) Did you give birth between 12-26 weeks ago? Yes/No

3) Did you give birth to just one baby? Yes/No

4) Did your pregnancy go to term (that is, 37 weeks)? Yes/No

5) Has your baby been diagnosed with any congenital abnormality or significant physical Illness?

Yes/No

6) Have you ever received or are you currently receiving treatment for puerperal psychosis? Yes/No

7) Are you living with your Infant? Yes/No

8) Is there a significant other who lives with you or knows the Infant well enough to answer simple questions about them?

9) Are you able to respond to written English?

10) Infantile Colic Questions:

- How many hours does your infant cry per day? 0-10 scale & 10+
- How many days per week do they cry that may hours? 0-7 days
- For how many weeks has this been the situation? 0-7 and 7+,
- What portion of the time would you class your infant's crying as inconsolable in a day? None, less than 30 mins, from 30 mins to 1 hour, from 1-2 hours, 2+ hours.

Yes responses to all the above questions, except for question 5 & 8 are required to meet Inclusion

Demographic Information:

-Age mother

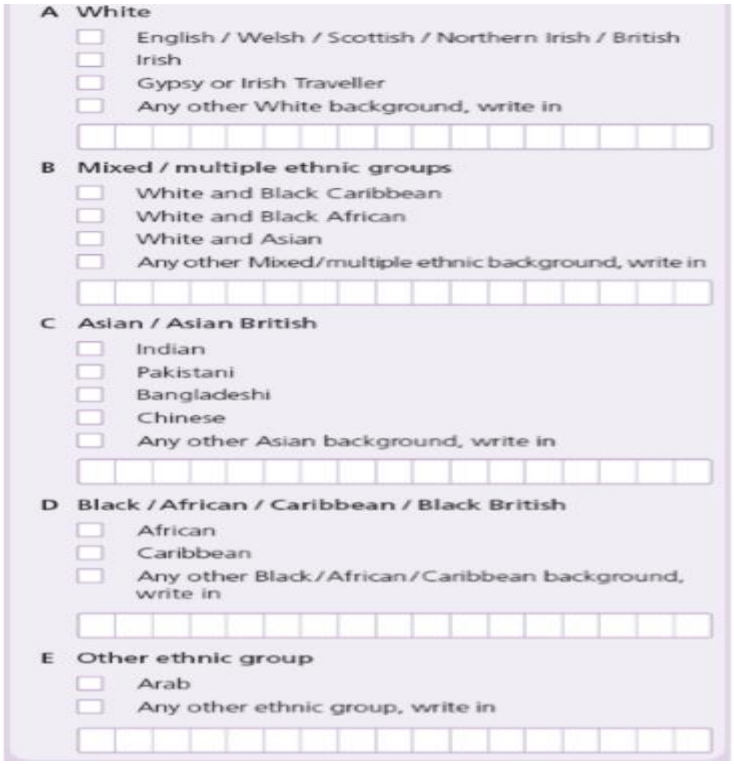
-Age infant

-Infant Gender

-Education level (select highest):

- Some high school, no QUALIFICATIONS
- GCES/O-levels or equivalent if vocational
- A-levels
- Bachelor's degree
- Postgraduate studies/ Master's degree
- Doctorate degree

Ethnicity:



Marital status:

- Single
- Living with Partner
- Married
- Separated/divorced

Information on delivery:

- Natural birth
- Induced delivery
- Delivery by C-section

Employment Status:

- Full time employment (current on maternity leave)
- Full time employment (returned to work)
- Part time employment (on maternity leave)
- Part time employment (returned to work)
- Unemployed

Infant Behavior Questionnaire – Revised
Very Short Form

Subject No. _____

Date of Baby's Birth _____ ____ ____
month. day year

Today's Date

Age of Child
mos. weeks

Sex of Child _____

INSTRUCTIONS:
Please read carefully before starting:

As you read each description of the baby's behavior below, please indicate how often the baby did this during the LAST WEEK (the past seven days) by circling one of the numbers in the left column. These numbers indicate how often you observed the behavior described during the last week.

1	2	3	4	5	6	7	NA
Never	**Very Rarely**	**Less Than Half the Time**	**About Half the Time**	**More Than Half the Time**	**Almost Always**	**Always**	**Does Not Apply**

The "Does Not Apply" (X) column is used when you did not see the baby in the situation described during the last week. For example, if the situation mentions the baby having to wait for food or liquids and there was no time during the last week when the baby had to wait, circle the (X) column. "Does Not Apply" is different from "Never" (1). "Never" is used when you saw the baby in the situation but the baby never engaged in the behavior listed during the last week. For example, if the baby did have to wait for food or liquids at least once but never cried loudly while waiting, circle the (1) column.

Please be sure to circle a number for every item.

1	2	3	4	5	6	7	NA
Never	Very Rarely	Less Than Half the Time	About Half the Time	More Than Half the Time	Almost Always	Always	Does Not Apply

1. When being dressed or undressed during the last week, how often did the baby squirm and/or try to roll away?

1 2 3 4 5 6 7 NA

2. When tossed around playfully how often did the baby laugh?

1 2 3 4 5 6 7 NA

3. When tired, how often did your baby show distress?

1 2 3 4 5 6 7 NA

4. When introduced to an unfamiliar adult, how often did the baby cling to a parent?

1 2 3 4 5 6 7 NA

5. How often during the last week did the baby enjoy being read to?

1 2 3 4 5 6 7 NA

6. How often during the last week did the baby play with one toy or object for 5-10 minutes?

1 2 3 4 5 6 7 NA

7. How often during the week did your baby move quickly toward new objects?

1 2 3 4 5 6 7 NA

8. When put into the bath water, how often did the baby laugh?

1 2 3 4 5 6 7 NA

9. When it was time for bed or a nap and your baby did not want to go, how often did s/he whimper or sob?

1 2 3 4 5 6 7 NA

10. After sleeping, how often did the baby cry if someone doesn't come within a few minutes?

1 2 3 4 5 6 7 NA

1	2	3	4	5	6	7	NA
Never	Very Rarely	Less Than Half the Time	About Half the Time	More Than Half the Time	Almost Always	Always	Does Not Apply

11. In the last week, while being fed in your lap, how often did the baby seem eager to get away as soon as the feeding was over?

1 2 3 4 5 6 7 NA

12. When singing or talking to your baby, how often did s/he soothe immediately?

1 2 3 4 5 6 7 NA

13. When placed on his/her back, how often did the baby squirm and/or turn body?

1 2 3 4 5 6 7 NA

14. During a peekaboo game, how often did the baby laugh?

1 2 3 4 5 6 7 NA

15. How often does the infant look up from playing when the telephone rings?

1 2 3 4 5 6 7 NA

16. How often did the baby seem angry (crying and fussing) when you left her/him in the crib?

1 2 3 4 5 6 7 NA

17. How often during the last week did the baby startle at a sudden change in body position (e.g., when moved suddenly)?

1 2 3 4 5 6 7 NA

18. How often during the last week did the baby enjoy hearing the sound of words, as in nursery rhymes?

1 2 3 4 5 6 7 NA

19. How often during the last week did the baby look at pictures in books and/or magazines for 5 minutes or longer at a time?

1 2 3 4 5 6 7 NA

1	2	3	4	5	6	7	NA
Never	Very Rarely	Less Than Half the Time	About Half the Time	More Than Half the Time	Almost Always	Always	Does Not Apply

20. When visiting a new place, how often did your baby get excited about exploring new surroundings?

1 2 3 4 5 6 7 NA

21. How often during the last week did the baby smile or laugh when given a toy?

1 2 3 4 5 6 7 NA

22. At the end of an exciting day, how often did your baby become tearful?

1 2 3 4 5 6 7 NA

23. How often during the last week did the baby protest being placed in a confining place (infant seat, play pen, car seat, etc.)?

1 2 3 4 5 6 7 NA

24. When being held, in the last week, did your baby seem to enjoy him/herself?

1 2 3 4 5 6 7 NA

25. When showing the baby something to look at, how often did s/he soothe immediately?

1 2 3 4 5 6 7 NA

26. When hair was washed, how often did the baby vocalize?

1 2 3 4 5 6 7 NA

27. How often did your baby notice the sound of an airplane passing overhead?

1 2 3 4 5 6 7 NA

28. When introduced to an unfamiliar adult, how often did the baby refuse to go to the unfamiliar person?

1 2 3 4 5 6 7 NA

29. When you were busy with another activity, and your baby was not able to get your attention, how often did s/he cry?

1	2	3	4	5	6	7	NA
Never	Very Rarely	Less Than Half the Time	About Half the Time	More Than Half the Time	Almost Always	Always	Does Not Apply

1 2 3 4 5 6 7 NA

30. How often during the last week did the baby enjoy gentle rhythmic activities, such as rocking or swaying?

1 2 3 4 5 6 7 NA

31. How often during the last week did the baby stare at a mobile, crib bumper or picture for 5 minutes or longer?

1 2 3 4 5 6 7 NA

32. When the baby wanted something, how often did s/he become upset when s/he could not get what s/he wanted?

1 2 3 4 5 6 7 NA

33. When in the presence of several unfamiliar adults, how often did the baby cling to a parent?

1 2 3 4 5 6 7 NA

34. When rocked or hugged, in the last week, did your baby seem to enjoy him/herself?

1 2 3 4 5 6 7 NA

35. When patting or gently rubbing some part of the baby's body, how often did s/he soothe immediately?

1 2 3 4 5 6 7 NA

36. How often did your baby make talking sounds when riding in a car?

1 2 3 4 5 6 7 NA

37. When placed in an infant seat or car seat, how often did the baby squirm and turn body?

1 2 3 4 5 6 7 NA

Multidimensional Perfectionism Scale (Hewitt, P.L., & Flett, G.L. (1990). Perfectionism and depression: A multidimensional analysis. *Journal of Social Behavior and Personality, 5,* 423-438.

INSTRUCTIONS: Listed below are a number of statements concerning personal characteristics and traits. Read each item and decide whether you agree or disagree & to what extent. **To score your responses, put the number of your response in the column that is highlighted next to this question.**

		Disagree						Agree	Self Oriented	Other Oriented	Socially Prescribed
1.	When I am working on something, I cannot relax until it is perfect	1	2	3	4	5	6	7			
2.	I find it difficult to meet others' expectations of me	1	2	3	4	5	6	7			
3.	One of my goals is to be perfect in everything I do	1	2	3	4	5	6	7			
4.	I never aim for perfection on my work	7	6	5	4	3	2	1			
5.	Those around me readily accept that I can make mistakes too	7	6	5	4	3	2	1			
6.	The better I do, the better I am expected to do	1	2	3	4	5	6	7			
7.	I seldom feel the need to be perfect	7	6	5	4	3	2	1			
8.	Anything that I do that is less than excellent will be seen as poor work by those around me	1	2	3	4	5	6	7			
9.	I strive to be as perfect as I can be	1	2	3	4	5	6	7			
10.	It is very important that I am perfect in everything I attempt	1	2	3	4	5	6	7			
11.	I strive to be the best at everything I do	1	2	3	4	5	6	7			
12.	The people around me expect me to succeed at everything I do	1	2	3	4	5	6	7			
13.	I demand nothing less than perfection of myself	1	2	3	4	5	6	7			
14.	Others will like me even if I don't excel at everything	7	6	5	4	3	2	1			
15.	It makes me uneasy to see an error in my work	1	2	3	4	5	6	7			
								SUBTOTALS Page 1	SO =	OO=	SP=
	Add up in each column the colored areas to create summary score for each dimension										
		Disagree						Agree	Self Oriented	Other Oriented	Socially Prescribed
16.	Success means that I must work even harder to please others	1	2	3	4	5	6	7			
17.	I am perfectionistic in setting my goals	1	2	3	4	5	6	7			
18.	Others think I am okay, even when I do not succeed	7	6	5	4	3	2	1			
19.	I feel that people are too demanding of me	1	2	3	4	5	6	7			
20.	I must work to my full potential at all times	1	2	3	4	5	6	7			
21.	Although they may not say it, other people get very upset with me when I slip up	1	2	3	4	5	6	7			

Multidimensional Perfectionism Scale (Hewitt, P.L., & Flett, G.L. (1990). Perfectionism and depression: A multidimensional analysis. *Journal of Social Behavior and Personality, 5,* 423-438.

INSTRUCTIONS: Listed below are a number of statements concerning personal characteristics and traits. Read each item and decide whether you agree or disagree & to what extent. **To score your responses, put the number of your response in the column that is highlighted next to this question.**

22.	I do not have to be the best at whatever I am doing	7	6	5	4	3	2	1			
23.	My family expects me to be perfect	1	2	3	4	5	6	7			
24.	I do not have very high goals for myself	7	6	5	4	3	2	1			
25.	My parent rarely expected me to excel in all aspects of my life	7	6	5	4	3	2	1			
26.	People expect nothing less than perfection from me	1	2	3	4	5	6	7			
27.	I set very high standards for myself	1	2	3	4	5	6	7			
28.	People expect more from me than I am capable of giving	1	2	3	4	5	6	7			
29.	I must always be successful at school or work	1	2	3	4	5	6	7			
30.	People around me think I am still competent even if I make a mistake	7	6	5	4	3	2	1			
								SUBTOTALS from Page 1			
								SUBSCALE TOTALS	SO =	OO=	SP=

Multidimensional Parenting Perfectionism Questionnaire (Snell, Overbey, & Brewer, 2005).

	Not at all characteristic of me		Somewhat Characteristic of me		Very Characteristic of me
1. I set very high standards for myself as a parent.	1	2	3	4	5
2. Only if I am a "perfect" parent will society consider me to be a good parent	1	2	3	4	5
3. I expect my partner to always be a top-notch and competent parent.	1	2	3	4	5
4. I must always be a successful parent.	1	2	3	4	5
5. My partner should never let me down when it comes to being a parent.	1	2	3	4	5
6. One of my goals is to be a "perfect" parent.	1	2	3	4	5
7. Most people expect me to always be an excellent parent.	1	2	3	4	5
8. I always pressure myself to be the best parent in the world.	1	2	3	4	5
9. In order for people to accept me, I have to be the greatest parent in the world.	1	2	3	4	5
10. I will appreciate my partner, but only if she/he is a perfect parent.	1	2	3	4	5
11. Most people expect me to be perfectionistic when it comes to being a parent.	1	2	3	4	5
12. I expect my partner to try to be perfectionistic when it comes to parenting behavior.	1	2	3	4	5

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts.

Please tick the box that best describes your experience of each over the last 2 weeks

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)

The Penn State Worry Questionnaire (PSWQ)

Instructions: Rate each of the following statements on a scale of 1 ("not at all typical of me") to 5 ("very typical of me"). Please do not leave any items blank.

	Not at all typical of me				Very typical of me
1. If I do not have enough time to do everything, I do not worry about it.	1	2	3	4	5
2. My worries overwhelm me.	1	2	3	4	5
3. I do not tend to worry about things.	1	2	3	4	5
4. Many situations make me worry.	1	2	3	4	5
5. I know I should not worry about things, but I just cannot help it.	1	2	3	4	5
6. When I am under pressure I worry a lot.	1	2	3	4	5
7. I am always worrying about something.	1	2	3	4	5
8. I find it easy to dismiss worrisome thoughts.	1	2	3	4	5
9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10. I never worry about anything.	1	2	3	4	5
11. When there is nothing more I can do about a concern, I do not worry about it any more.	1	2	3	4	5
12. I have been a worrier all my life.	1	2	3	4	5
13. I notice that I have been worrying about things.	1	2	3	4	5
14. Once I start worrying, I cannot stop.	1	2	3	4	5
15. I worry all the time.	1	2	3	4	5
16. I worry about projects until they are all done.	1	2	3	4	5

Edinburgh Postnatal Depression Scale[1] (EPDS)

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example, already completed.

I have felt happy:
- ☐ Yes, all the time
- ☒ Yes, most of the time — This would mean: "I have felt happy most of the time" during the past week.
- ☐ No, not very often — Please complete the other questions in the same way.
- ☐ No, not at all

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

*3. I have blamed myself unnecessarily when things went wrong
   - ☐ Yes, most of the time
   - ☐ Yes, some of the time
   - ☐ Not very often
   - ☐ No, never

4. I have been anxious or worried for no good reason
   - ☐ No, not at all
   - ☐ Hardly ever
   - ☐ Yes, sometimes
   - ☐ Yes, very often

*5 I have felt scared or panicky for no very good reason
   - ☐ Yes, quite a lot
   - ☐ Yes, sometimes
   - ☐ No, not much
   - ☐ No, not at all

*6. 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

*7 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

*8 I have felt sad or miserable
   - ☐ Yes, most of the time
   - ☐ Yes, quite often
   - ☐ Not very often
   - ☐ No, not at all

*9 I have been so unhappy that I have been crying
   - ☐ Yes, most of the time
   - ☐ Yes, quite often
   - ☐ Only occasionally
   - ☐ No, never

*10 The thought of harming myself has occurred to me
   - ☐ Yes, quite often
   - ☐ Sometimes
   - ☐ Hardly ever
   - ☐ Never

Administered/Reviewed by _____ Date _____

[1]Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786 .

2.5 Section 28. Main prize draw

Question 28.1

Thank you for taking part please follow the URL link either here or at the bottom of the page to enter into the main prize draw. Ten £25.00 amazon vouchers will be awarded:

https://www.isurvey.soton.ac.uk/32689

This link is separate from this survey, to allow all responses to remain anonymous.

Email addresses will all be deleted following allocation of prize draw and cannot at any time be linked to information provided in this survey.

2.6 Section 29. Prize draw details

Having completed the screening questions please copy the following link to submit your details for the initial prize draw. You are directed to another survey in order to keep your response here separate and anonymous from your email address provided.

https://www.isurvey.soton.ac.uk/32688

Please note that those who did not meet all the initial screening criteria are eligible for this prize draw. Those who have completed the whole survey can also enter this prize draw and will have been given the opportunity to enter the main draw also.

Question 29.1

Thank you for taking part in either the screening or both the screening and main sections of the study. **Please copy the following link to submit your details for the first prize draw, where two £20 amazon vouchers will be awarded.** You are directed to another address in order to keep your responses here separate and anonymous, from your email address provided.

Please note that all those viewing this page are eligible for this first prize draw, even if initial screening criteria was not met. Those who were eligible and have completed the main study will also have had the opportunity to enter the second prize draw but are also able to enter this one.

https://www.isurvey.soton.ac.uk/32688

NOTE: All emails provided for prize draws are stored separately from responses submitted here, keeping your answers anonymous. Once prize draws have been made, email addresses will be deleted.

Debriefing Statement *Written* (Version 1.0, 08/02/19)

Mental Health Outcomes in Mothers of Colicky Babies. An Investigation of Possible Moderator

ERGO ID: 47281

Although some of you may have only completed the screening section, we would like to make all those taking part aware of what we were aiming to look at in the main study. The aim of this research was to understand if the severity of infantile colic is associated with mothers' postnatal depression, postnatal anxiety and postnatal well-being difficulties. We were also interested in understanding whether certain types of perfectionism (socially-prescribed and/or self-oriented; both general and parenting specific types) are associated with postnatal mental health difficulties. ***Socially***-p***rescribed perfectionism*** refers to the tendency for an individual to believe that others expect ***perfection*** from them. ***Self-oriented perfectionism*** comprises beliefs that striving for ***perfection*** and being perfect are important and is characterized by setting excessively high standards for ***oneself*****.**

Our hypotheses are that:

1. Severity of infantile colic will be associated with severity of symptoms of maternal postnatal depression and postnatal anxiety symptom.
2. Severity of infantile colic will be associated with maternal postnatal well-being.
3. Socially-prescribed (general and parenting) perfectionism will be associated with maternal symptoms of postnatal depression and postnatal anxiety.
4. Socially-prescribed (general and parenting) perfectionism will be associated with maternal postnatal well-being.
5. Socially-prescribed (general and parenting) perfectionism will moderate the relationship between infantile colic severity and postnatal depression, postnatal anxiety and postnatal wellbeing
6. Self- oriented (general and parenting) perfectionism will be associated with maternal symptoms of postnatal depression and postnatal anxiety.
7. Self- oriented (general and parenting) perfectionism will be associated with maternal postnatal well-being.
8. Self- oriented (general and parenting) perfectionism will moderate the relationship between infantile colic severity and postnatal depression, postnatal anxiety and postnatal wellbeing.

Your data will help in building our understanding as to whether colic is a risk factor for postnatal mental health difficulties and whether perfectionist traits contribute to this risk or not. Once again, results of this study will not include your name or any other identifying characteristics. The research did not use deception. You may have a copy of this summary if you wish.

If you have any further questions please contact me *[Clare Evans]* at *[cre1g17@soton.ac.uk]*.

Thank you for your participation in this research.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk).

If the study has led to distress in any way or you believe you may need some help with any difficulties explored, please consult with:

Your GP for general advice and referrals for specialist mental health support

Your Health Visiting Team

Your Accident & Emergency Department in the event of an emergency, or telephone 999.

Voluntary agency support can also be sought from:

- The PANDAS foundation: support for Postnatal depression. Helpline Number: 0843 28 98 401
- The Samaritans: someone to talk to in time of need. Number: 116 123

Appendix H Ethics Application Form & Email Approval

ERGO II Ethics application form – FELS Committee

1. **Applicant Details**

1.1 Applicant name	Clare Evans
1.2 Supervisor	Dr Pete Lawrence & Dr Jana Kreppner
1.3 Other researchers / collaborators (if applicable): *Name, address, email*	

2. **Study Details**

2.1 Title of study	Mental Health Outcomes in Mothers of Colicky Babies. An Investigation of Possible Moderators
2.2 Type of project (e.g. undergraduate, Masters, Doctorate, staff)	Doctorate
2.4 Proposed start date (must match date stated in ERGO)	01/04/2019
2.5 Proposed end date (must match date stated in ERGO)	30/09/2020

2.6 Briefly describe the rationale for carrying out this project and its specific aims and objectives.
There is a clear evidence that poorly managed infantile colic can have negative implications for maternal mental health (Cox & Roos, 2008), with a suggested link between the infantile condition and postnatal depression (PND) in mothers (Howell, Mora & Leventhal, 2006). High rates of colic and excessive crying among infants (Wolke, Bilgin & Samara, 2017) but with an absence of mental health difficulties suggests that there may be something further moderating this relationship. Examination of perfectionism as a possible moderator is warranted by research demonstrating perfectionism to be a risk factor for depression. Exploration of all possible moderators is warranted; however the close links specifically between perfectionism and more general experiences of

depression (Hewitt & Flett, 1990). Perfectionism has been conceptualised as multi-dimensional, with both general and parental perfectionism scales developed (including socially prescribed and self-oriented domains).

This study aims to improve our understanding of the relationship between PND and perfectionism domains (both general and parental) in the relationship between infantile colic and PND. The specific objectives are:

- To understand if the severity of infantile colic is associated with the severity of postnatal depression (and anxiety, well-being)
- To understand whether socially-prescribed general perfectionism and parenting perfectionism are associated more closely with postnatal depression (as well as anxiety and well-being) than self-oriented perfectionism (preliminary research supports this idea; Maia et al, 2012)
- To understand whether socially prescribed and/or self-oriented perfectionism (general and parenting specific) moderate the relationship between infantile colic and post-natal depression (as well as anxiety and well-being)

2.7 Provide a brief outline of the basic study design. Outline what approach is being used and why.

We plan to use a cross-sectional design. There will be five predictor variables; infantile colic with three levels (moderate, moderate-severe and severe), perfectionism including four domains (general self-oriented, general socially-prescribed perfectionism and self-oriented and socially-prescribed parenting perfectionism) and finally, two interaction between socially-prescribed general perfectionism and colic, as well as socially-prescribed parenting perfectionism and colic. There are three outcome variables: postnatal depression, well-being and anxiety; each producing an overall score. The primary outcome is postnatal-depression.

We have opted for a cross-sectional design because we want to sample mothers of infants suffering from colic at one time point, in order to understand prevalence rates of postnatal depression (as well as postnatal anxiety and well-being difficulties), and whether any differences exist between perfectionism ratings of those who struggle with this and those who don't. Before studies on intervention can be conducted, prevalence needs first to be established through an observational design. Our study is only looking at the possible moderating role of perfectionism in the association between infantile colic and maternal mental health. The cross-sectional design allows us to collect data with relative ease, through use of questionnaires posted online. Given the ease of collection and because no participants will be lost to follow-up, we anticipate being able to collect data from an adequately large sample.

2.8 What are the key research question(s)? Specify hypotheses if applicable.

We hypothesise the following based on previous research:

1. Severity of infantile colic will be associated with maternal postnatal depression and postnatal anxiety symptom severity.
2. Severity of infantile colic will be associated with maternal postnatal well-being.
3. Socially-prescribed general and parenting perfectionism will be associated with maternal symptoms of postnatal depression and postnatal anxiety.
4. Self-oriented general and parenting perfectionism will be associated with maternal symptoms of postnatal depression and postnatal anxiety.
5. Socially-prescribed general and parenting perfectionism will be associated with maternal postnatal well-being
6. Self-oriented general and parenting perfectionism will be associated with maternal postnatal well-being
7. Socially-prescribed general and parenting perfectionism will moderate the relationship between infantile colic and postnatal depression, postnatal anxiety and postnatal wellbeing.

3. Sample and setting

3.1 Who are the proposed participants and where are they from (e.g. fellow students, club members)? List inclusion / exclusion criteria if applicable.

Mothers will be recruited from a non-clinical sample online and via poster adverts displayed in non-healthcare/clinical settings; sent to providers via post, email or in person by the researcher. The following inclusion criteria will be applied:

- Mothers will have given birth in the previous 12-26 weeks.
- Mothers will be over 18 years
- Mothers will be living with their infant
- Mothers will have a significant other who knows the infant well enough to provide a second rating of infant temperament.
- Participants (including significant other) must be able to understand and respond in written English.
- The infant will meet the criteria for infantile colic (Wessel et al., 1954: crying lasting ≥ three hours per day, on ≥ three days per week, over ≥ three weeks).
- If the colic inclusion criterion is met, details regarding severity will be collected.

Beyond the above inclusion criteria that needs to be satisfied. The following exclusion criteria will also be applied:

- Mothers will be excluded if they are receiving or received treatment for puerperal psychosis
- Mothers excluded if they had multiple births
- Mothers will be excluded if their infant was born prematurely (preterm defined as before the 37th week of gestation; Engle, 2006), required neonatal intensive care, weighed <2500g or if the infant has a congenital abnormality/significant physical illness (as these may cloud the associations we are seeking to understand).

3.2. How will the participants be identified and approached? Provide an indication of your sample size. If participants are under the responsibility of others (e.g., parents/carers, teachers) state if you have permission or how you will obtain permission from the third party).
Mothers will be recruited through purposive opportunity online sampling through social media, parenting and mental health advice websites, the call for participants advertising site (https://www.callforparticipants.com/), and via poster adverts displayed in non-healthcare/clinical settings; sent to providers via post, email or in person by the researcher. Recruitment will span from May 2019 to Feb 2020, with regular two weekly number progress checks. We aim to recruit a minimum of 167 mothers from a non-clinical sample. This sample size is based on achieving 90% power to detect a moderate effect (Cohen' f^2 = 0.02) with five predictors (perfectionism, colic and the interactions of the two domains of perfectionism) of PND (G*Power; Faul, Erdfelder, Lang, & Buchner, 2007). No participants will be under the responsibility of others. All participants will be adults, over the age of 18 years.

3.3 Describe the relationship between researcher and sample. Describe any relationship e.g., teacher, friend, boss, clinician, etc.
There will be no relationship between researcher and sample.

3.4 How will you obtain the consent of participants? (*please upload a copy of the consent form if obtaining written consent***) NB. Consent form is not needed for studies collecting data online.**
All participants will receive; an information sheet with generic information about study aims (enclosed within this application). We will collect data online, so participants (and partners providing informant data) will complete a check box version of a consent form (without a signature requirement) and will receive a debrief form at the end of study to explain the rationale for the study.

3.5 Is there any reason to believe participants may not be able to give full informed consent? If yes, what steps do you propose to take to safeguard their interests?
There is no reason why participants will not be able to give full informed consent. There may be questions around capacity of those experiencing puerperal psychosis having capacity to consent, however we are excluding those suffering from this condition from our study.

4. Research procedures, interventions and measurements

4.1 Give a brief account of the procedure as experienced by the participant. Make it clear who does what, how many times and in what order. Make clear the role of all assistants and collaborators. Make clear the total demands made on participants, including time and travel. *Upload copies of questionnaires and interview schedules to ERGO.*
Adverts to participate in the research will be posted online on various social media and support sites. Participants can then click a link to take part. Participants will be presented with an information sheet, detailing that the study aims both to understand whether a relationship between infantile colic and PND exists, as well as seeing if other factors may influence the associations. The information will not specify that we are looking at perfectionism in particular. Participants will then be asked to carry out a check box consent form. Following this they will be required to complete part 1: an initial colic (Wessel et al., 1954) and demographic screener; checking they meet further inclusion and exclusion criteria. This will take a maximum of five minutes (see attached questionnaires). Demographic data will include; age (mother and infant), ethnicity, education level, marital status and information on delivery and infant gender. Initial questions regarding infantile colic will be completed. These will be as follows: 1) how many hours does your infant cry per day? 0-10 scale & 10+ and 2) how many days per week do they cry that may hours? 0-7 days 3) For how many weeks has this been the situation? 0-7 and 7+, 4) what portion of the time would you class your infant's crying as inconsolable in a day? None, less than 30 mins, from 30 mins to 1 hour, from 1-2 hours, 2+ hours. Mothers of infants that do not meet all the infantile colic inclusion criteria; crying lasting ≥ three hours per day, on ≥ three days per week, over ≥ three weeks (Wessel et al., 1954) will be screened out of the study at this stage. Those eligible based on the initial infantile colic criteria, will be categorised for our analysis (based on their responses) as being in the moderate, moderate-severe or severe infantile colic group. They will also be screened out if they do not meet other inclusion criteria. At this initial stage screening stage, all participants will then have the option to provide an email address to be automatically entered into the initial prize draws (two £20 amazon vouchers).

Based on screener outcome, participants eligible for part 2 will be invited to answer additional questionnaires (taking a maximum of 45 minutes) and will be entered into ten further prize draws (£25 each of amazon vouchers).

The remaining questionnaires will include the following (in this order):

- Infant Behavior Questionnaire–Revised Very Short Form (IBQ-R) (Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014). The IBQ-R includes 37 items assessing infant temperament on a 7-point Likert type scale (1= Never, 7= always), based on experiences in the last week.
- A modified version of Hewitt et al's (1991) Multidimensional Perfectionism Scale will be used to measure general perfectionism (Maia et al., 2012). This version includes just two (self-oriented and socially-prescribed) of the original three dimensions. The questionnaire measures the extent to which participants agree with items relating to personal characteristics. Questions are rated on a 7-point Likert-type scale (1=Disagree, 7=Agree but with some items reversed).
- Parenting perfectionism will also be measured using a shortened 12-item version of the Multidimensional Parenting Perfectionism Questionnaire (MPPQ; by Snell, Overbey & Brewer, 2005). 12 items draw on the societal-oriented/ socially-prescribed and self-oriented parenting perfectionism. Items are measured on a 5-point Likert-type scale indicating how characteristic a statement is (1=Not characteristic of me, 5= very characteristic of me).
- 10-item Edinburgh Postnatal Depression Scale (EPDS); a self-report screening tool. Items on the EPDS relate to experiences in the last week, which are then scored on a 4-point Likert-type scale. A total score (range 0–30) will be calculated.
- Penn State Worry Questionnaire for anxiety (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ consists of sixteen items about "how typical" experiences are to the individual. Responses are rated on a 5-point Likert type scale; producing an overall score, ranging from 16-80.
- Warwick-Edinburgh Mental Well-being Scale (WEMWBS) for well-being (Tennant, Hiller, Fishwick, Platt, Joseph et al., 2007). The WEMWBS consists of fourteen items rated on a 5-point Likert-type scale including questions about; positive affect, positive interpersonal relationships and functioning. Questions relate to experiences in the past two weeks. A total score of between 14 to 70 is generated.

Partners or significant others will also be asked to complete an extra questionnaire (done independently of mothers but linking to their participant number); this will take a total of 10 minutes:

- Infant Behavior Questionnaire–Revised Very Short Form (IBQ-R) - providing an informant assessment to minimise possible bias.

All mothers in part 2 will have the option of participating without partner data (although partner involvement is preferred). All screening and questionnaire self- report data will be completed by participants via Southampton University's isurvey system. After all data has been submitted a debrief form will be provided to participants, clarifying that the study is specifically looking at whether perfectionism moderates any relationship that may exist

between infantile colic and PND.

Following completion of all data collection, prize draws will be distributed. Data will be cleaned and analysed using multiple regression models using the R software environment. A voluntary research assistant may help complete this process. Following analyses, the thesis will then be written up for submission to a peer reviewed journal and for examination towards my DClinPsych.

4.2 Will the procedure involve deception of any sort? If yes, what is your justification?

The information sheet will not include the exact study title and will not detail that we are specifically looking at the possible moderating role of perfectionism in associations between infantile colic and PND. The rationale for withholding this information is to prevent participants' responses being influenced by an awareness of what we are looking for. Participants will, however, be given a clear description of the study's aims in the debrief form (enclosed within this application). We do not anticipate that withholding this information will cause participants any additional harm.

4.3. Detail any possible (psychological or physical) discomfort, inconvenience, or distress that participants may experience, including after the study, and what precautions will be taken to minimise these risks.

As an observational cross-sectional design study, we do not anticipate that the participation will cause any added discomfort or distress, additional to what individuals may or may not already be experiencing. It is acknowledged however that by answering such questions, participants may become aware of challenges of parenting a baby with colic.

With this in mind, in order to minimise risk of distress and that any concerning mental health issues are picked up, participants will all be signposted to generic support services upon completion of questionnaires. Those who endorse the suicidal ideation item of the EPDS will be directed to a separate page and notified that their answers strongly suggest they should seek support (with guidance of how to seek professional help from their GP, Health Visitor or, in an emergency, their local Accident & Emergency department). We will also provide contacts of voluntary support agencies, including the Samaritans.

We anticipate that completion of the questionnaires will take up to a maximum of 45 minutes for participants and then 10 minutes for the significant other (likely to be partner).

Brief Patient and Public Involvement/PPI (with mothers of young infants) were carried

out. This involved asking opinions on the design, the questionnaires chosen and the expected time to complete the study. Feedback indicated that while time available for completion of a survey may be limited as a new mother, it would be possible when baby was napping or in the evenings (when others were around to support with child care). The PPI also indicated that they found the questionnaires appropriate; feedback was that while the measures were about sensitive mental health concerns, they did not feel that by answering such questions there would be any added distress induced. PPI indicated that it may not be possible for all participants to have a partner or significant other (who knew the baby well enough) to complete the informant data, it was clarified that data could be submitted without this. Overall feedback from PPI about the aims of the study was positive; with mothers indicating that gaining an understanding as to vulnerabilities for postnatal mental ill health, particularly in those with infants with colic, was important.

4.4 Detail any possible (psychological or physical) discomfort, inconvenience, or distress that YOU as a researcher may experience, including after the study, and what precautions will be taken to minimise these risks.

No particular discomfort or distress is anticipated to occur to myself as the researcher. I am however aware that as both a sensitive issue and a project requiring a lot of work, I will need to remain mindful and aware of any impact the thesis study is having. I will ensure that through regular meetings with my research supervisors and personal clinical doctorate tutor, I will have space to discuss any impact that my thesis is having.

4.5 Explain how you will care for any participants in 'special groups' e.g., those in a dependent relationship, are vulnerable or are lacking mental capacity), if applicable:

As detailed above, if any participants endorse the suicidal ideation item of the EPDS in our study, they will be taken to a separate page and notified that their answers strongly suggest they should seek support; with guidance to seek professional help from their GP, Health Visitor or, in an emergency, their local Accident & Emergency department. We will also provide guidance of how to contact voluntary support agencies, including the Samaritans.

4.6 Please give details of any payments or incentives being used to recruit participants, if applicable:

Participants completing part 1 - the initial screener, will be entered into two prize draws (two prize draws of £20 worth of Amazon vouchers). Those completing part 2 - the main set of questionnaires, will then be entered in to ten further prize draws (each for £25 worth of amazon vouchers).

5. Access and storage of data

5.1 How will participant confidentiality be maintained? Confidentiality is defined as non-disclosure of research information except to another authorised person. Confidential information can be shared with those already party to it and may also be disclosed where the person providing the information provides explicit consent. Consider whether it is truly possible to maintain a participant's involvement in the study confidential, e.g. can people observe the participant taking part in the study?
All participants will be allocated a participant number to maintain anonymity. Data will be collected online therefore there will be no copies of consent forms with identifiable information requiring storage. Email addresses provided for prize draws will be stored in a data base (and will not require a name to be given), with participant numbers removed, to ensure that data cannot be linked to identifiable information.

5.2 How will personal data and study results be stored securely during and after the study? Who will have access to these data?
Email addresses provided for prize draws will be stored in a data base that will be password protected and only accessible to the lead researcher. The project database will be password protected and accessible only to those working on the research. Data will only be kept for 10 years in accordance with University data retention regulations.

5.3 How will it be made clear to participants that they may withdraw consent to participate? Please note that anonymous data (e.g. anonymous questionnaires) cannot be withdrawn after they have been submitted. If there is a point up to which data can be withdrawn/destroyed e.g., up to interview data being transcribed please state this here.
In the information sheet it will detail that should participants decide halfway through that they no longer wish to complete the anonymous questionnaire, they can stop and navigate away from the page. Only data submitted in full will be made available to the research team. All participants will also be given the option as to whether they enter the prize draws or not and will be made aware that this will require giving an email address. Questionnaires will be anonymous and, as such, once submitted they cannot be withdrawn. Participants will be informed that should they want to withdraw their email address and no longer be placed in prize draws, they will be told that this will be possible (requests can be made by emailing the lead researcher).

6. Additional Ethical considerations

6.1. Are there any additional ethical considerations or other information you feel may be relevant to this study?
No

UNIVERSITY OF Southampton

ERGO II – Ethics and Research Governance Online https://www.ergo2.soton.ac.uk

Submission ID: 47281
Submission Title: Mental Health Outcomes in Mothers of Colicky Babies. An Investigation of Possible Moderators
Submitter Name: Clare Evans

Your submission has now been approved by the Faculty Ethics Committee. You can begin your research unless you are still awaiting any other reviews or conditions of your approval.

Comments:

-
-

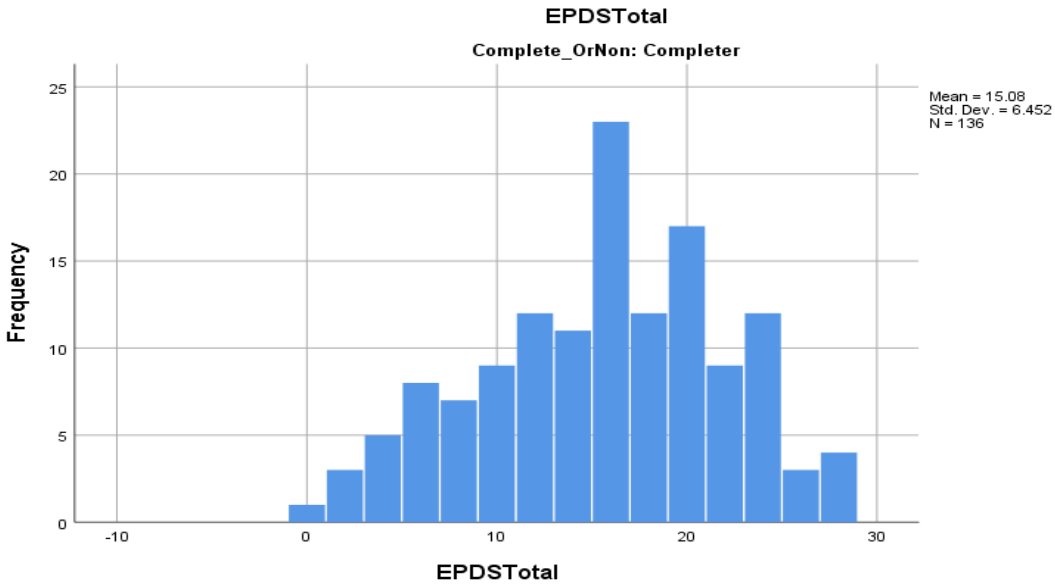
Click here to view the submission

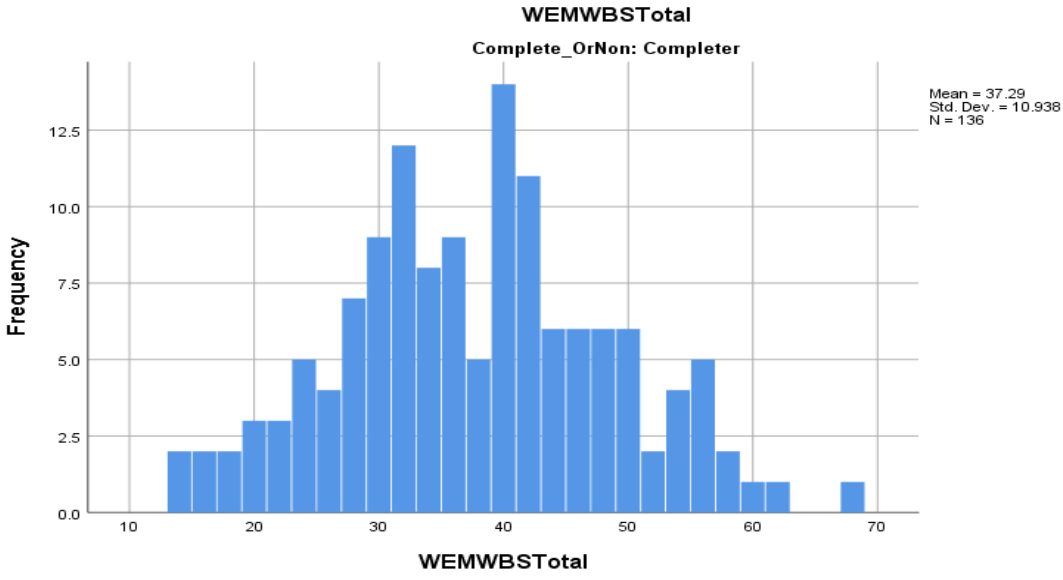
Tid: 23011_Email_to_submitter___Approval_from_Faculty_Ethics_committee__cat_B___C_ Id: 130393

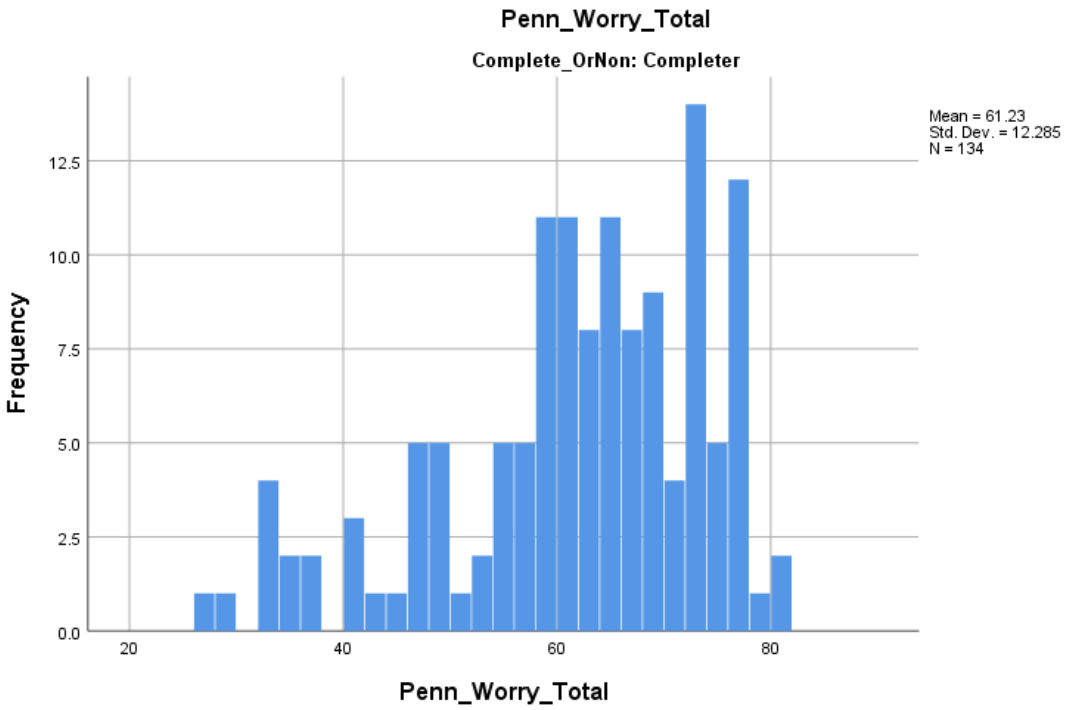
C.R.Evans@soton.ac.uk coordinator

Appendix I Histograms showing normality pre transformation of outcome variables

Link to all data: https://doi.org/10.5258/SOTON/D1537



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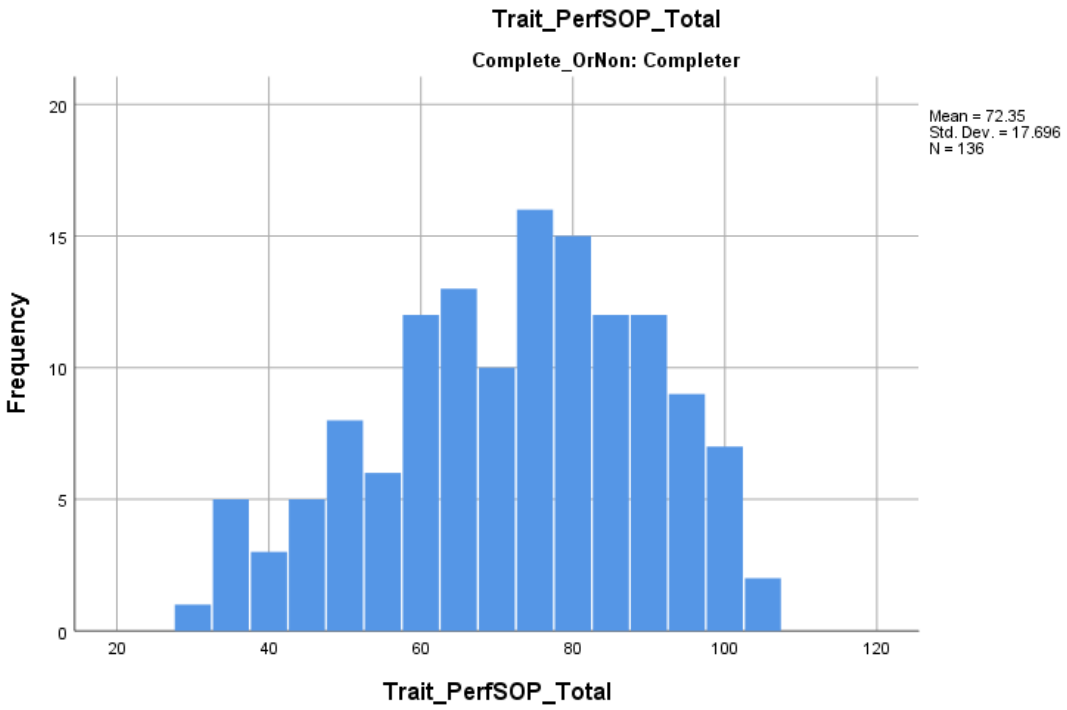
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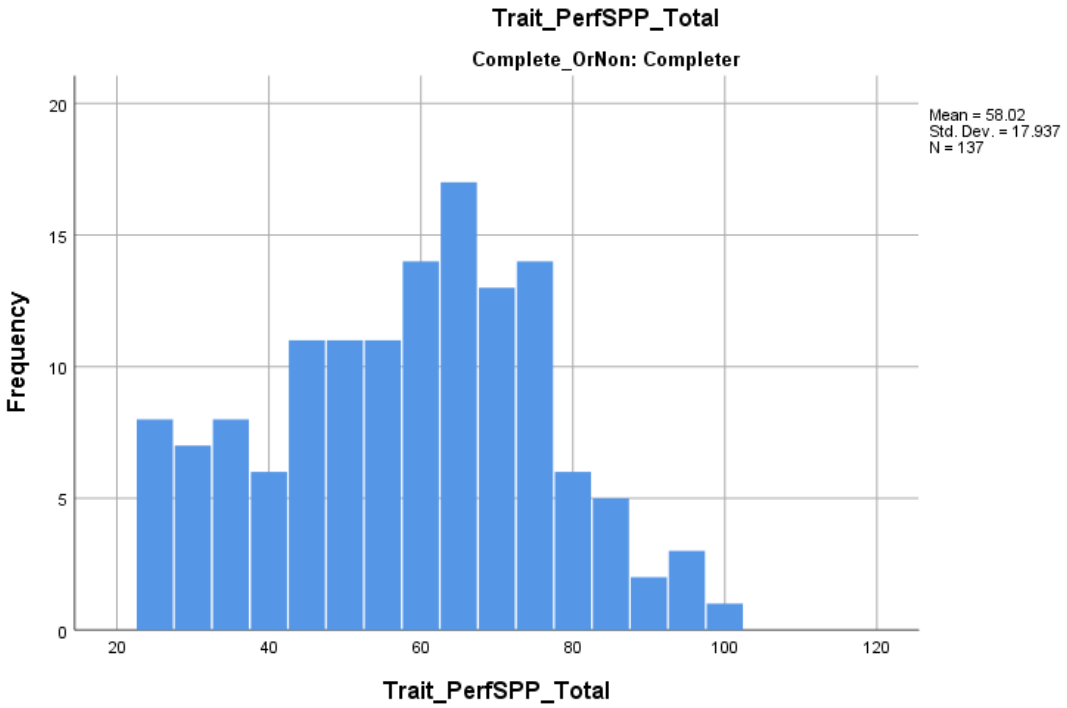
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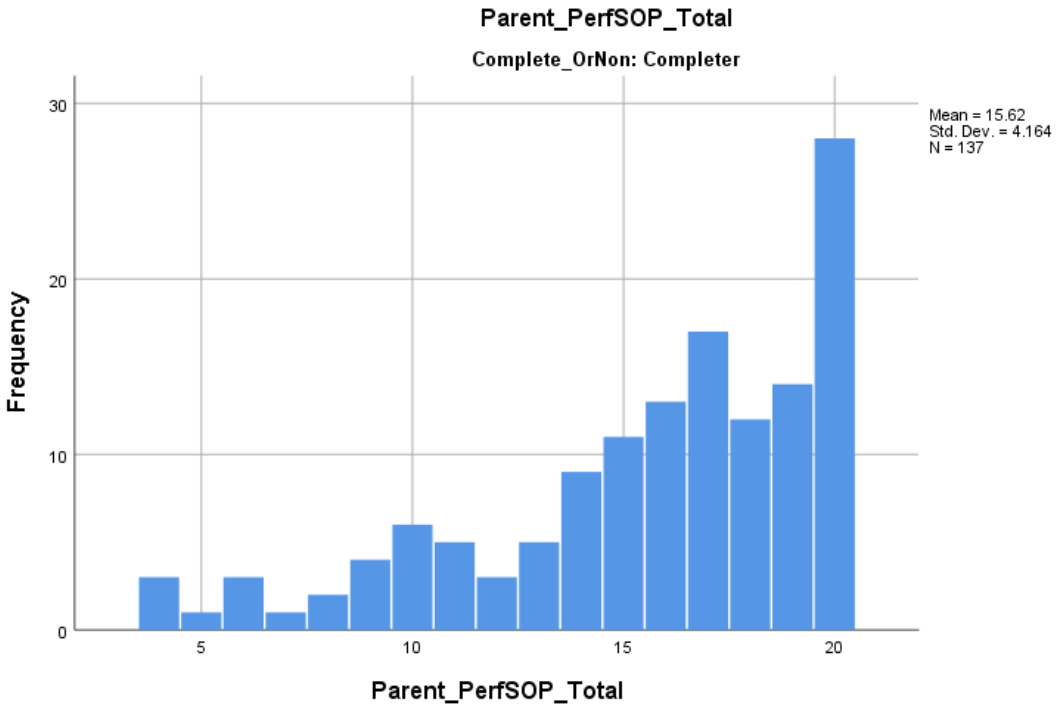
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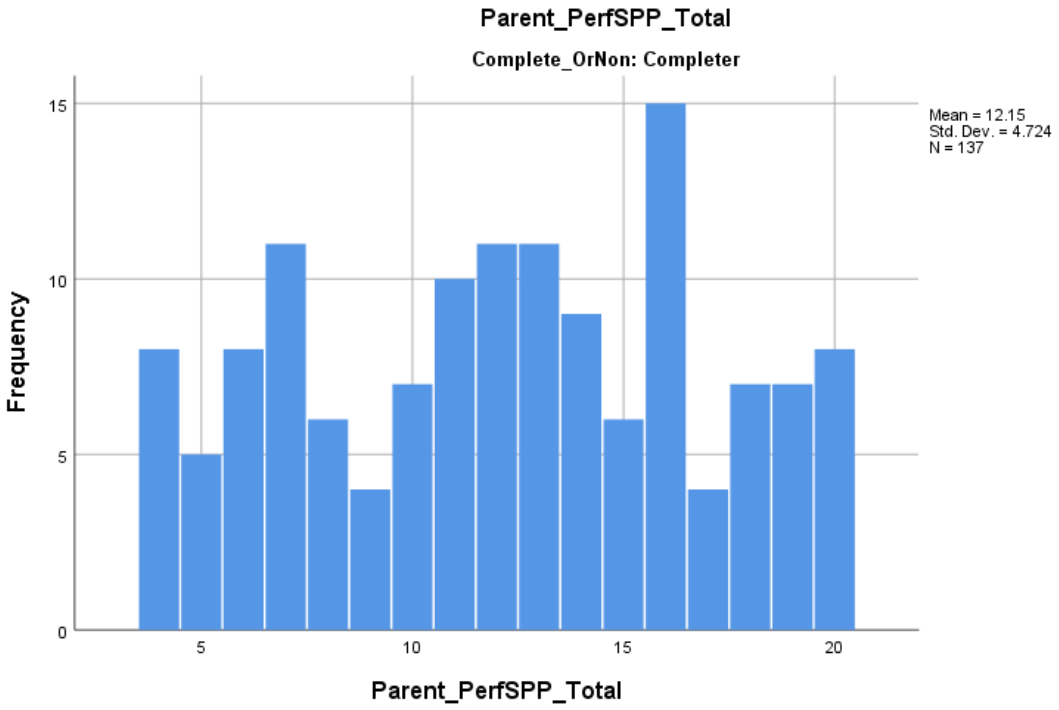
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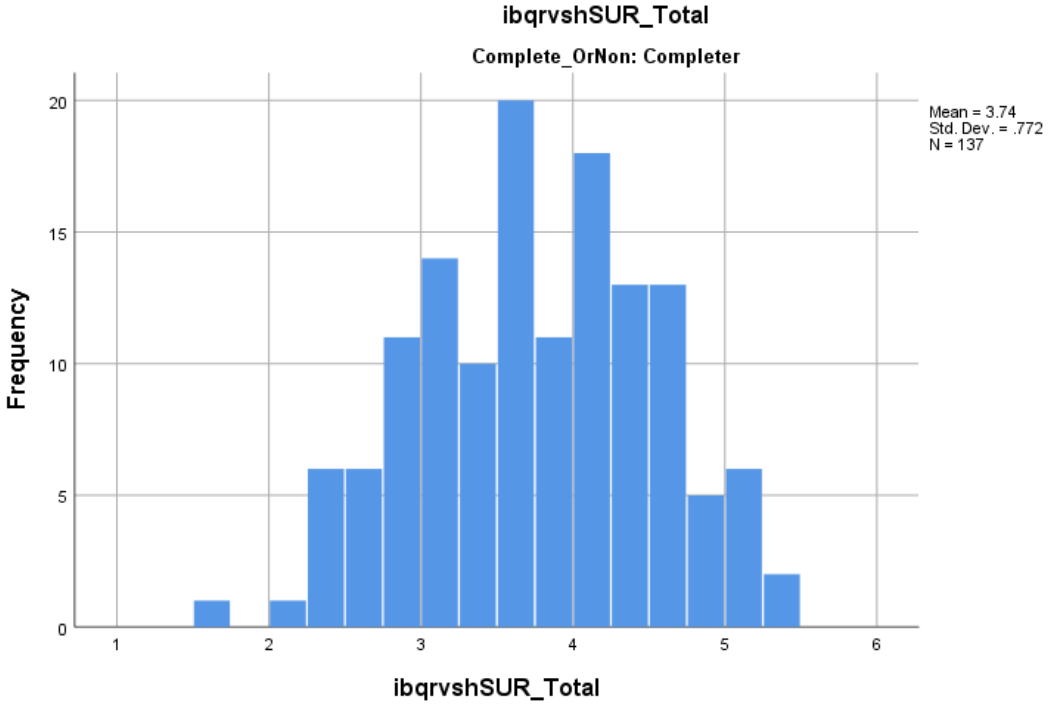
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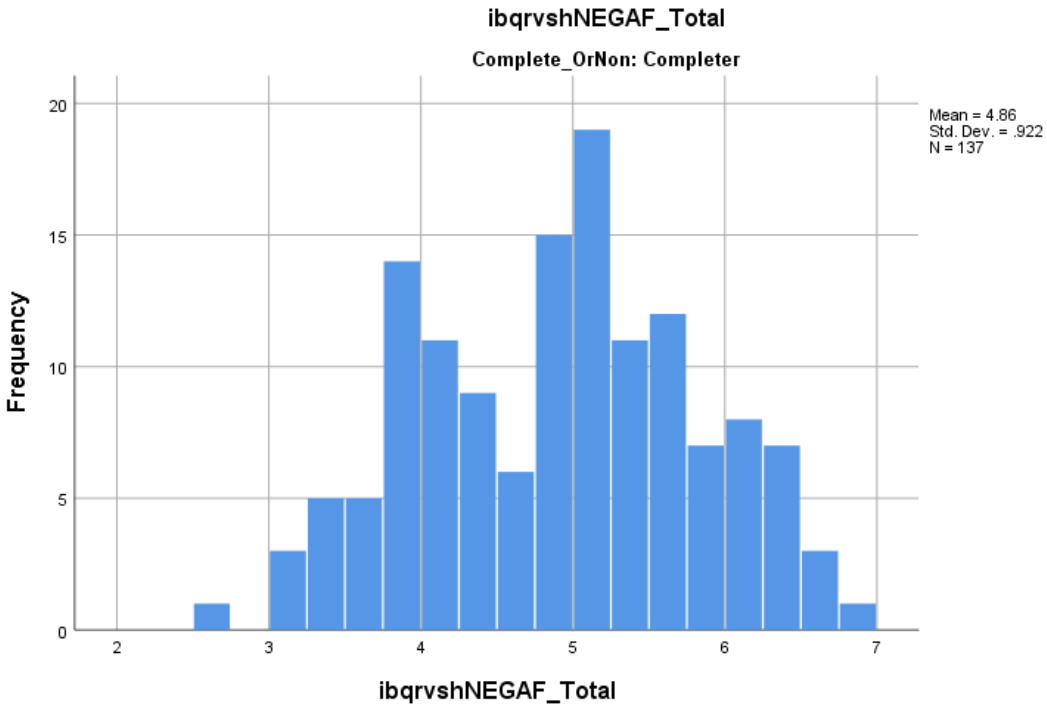
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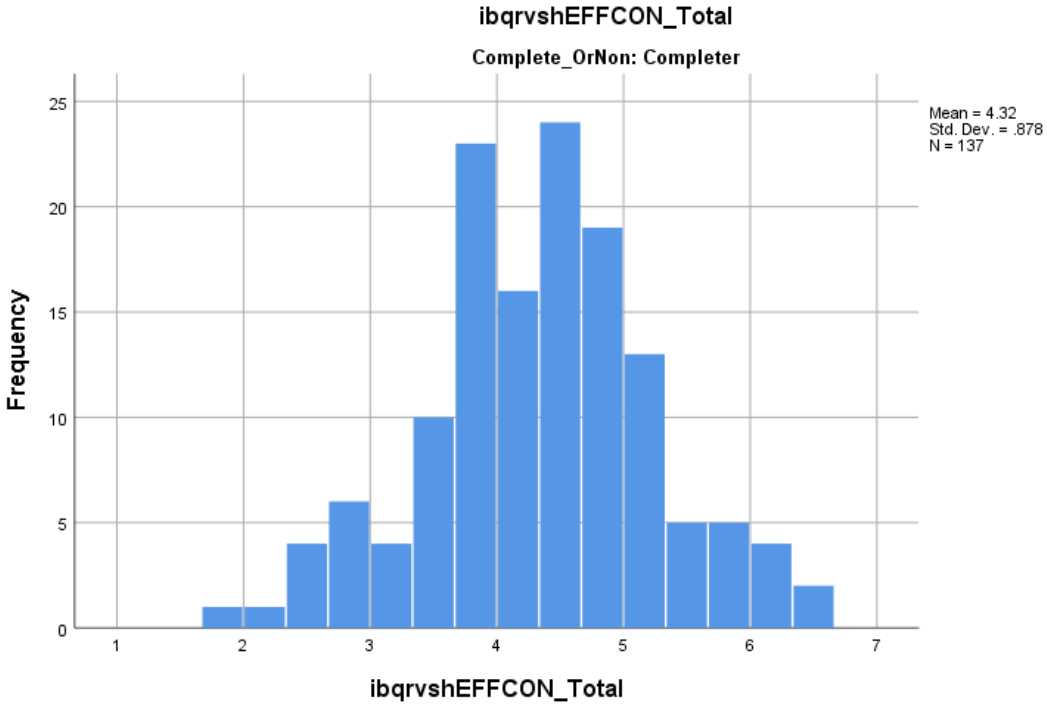
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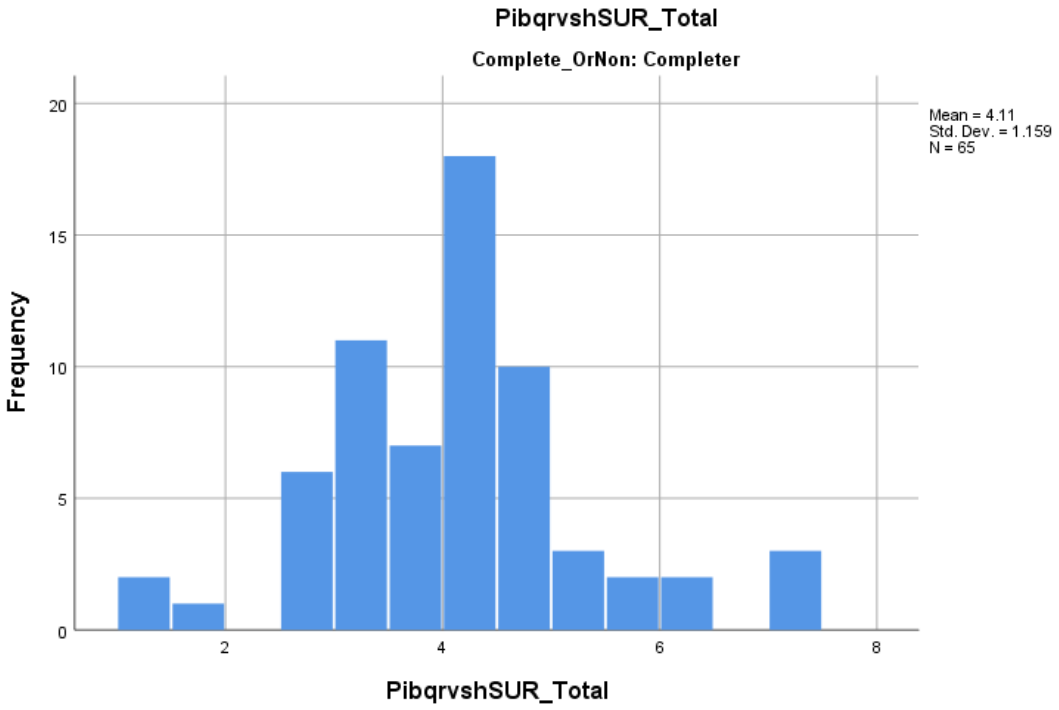
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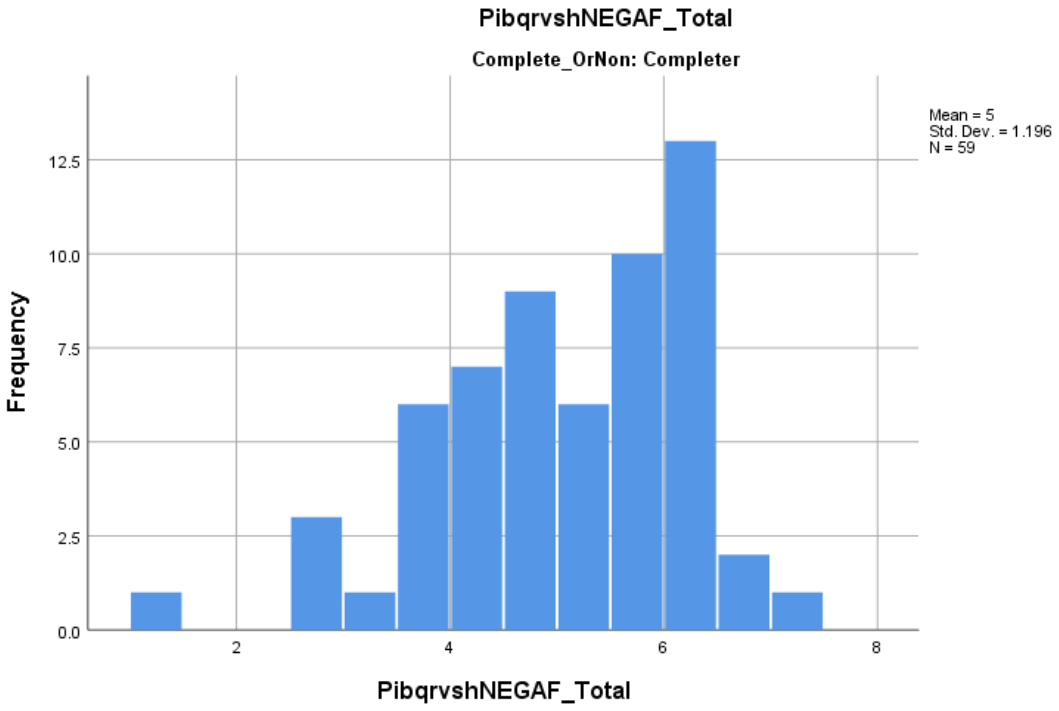
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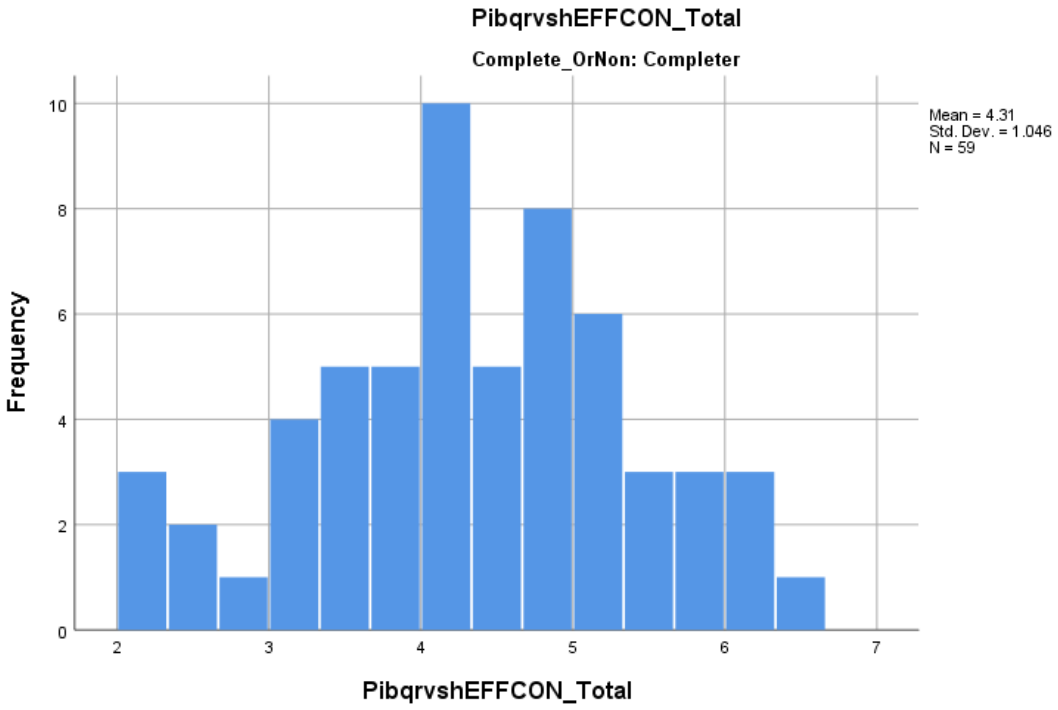
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Frequency
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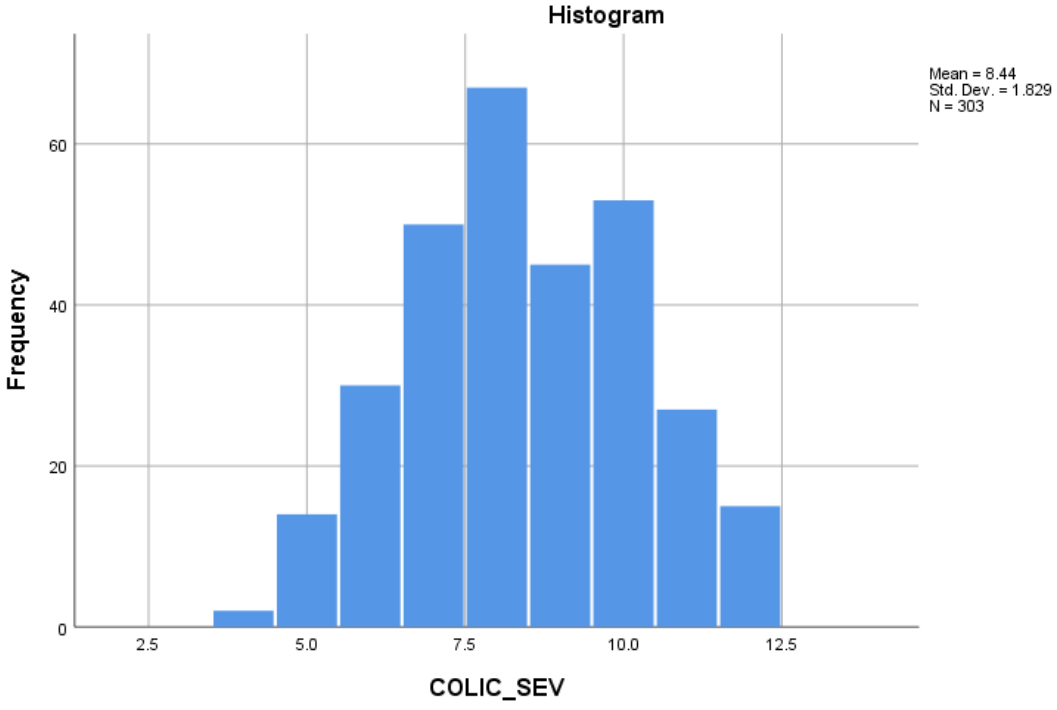
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Frequency
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Appendix J In depth details of Group Completer versus Non Completer & Completer Comparisons

Collapsed variables

Six variables were subsequently collapsed into more meaningful variables for analysis. Marital Status was collapsed into single/separated/divorced, living with partner, or married. Age was collapsed into 18-25 years, 26-30 years, 31-35 years and 36-50+ years. Ethnicity was collapsed into White/White British and Black Asian and minority ethnic groups (BAME). Employment status was collapsed into unemployed/student/student on maternity leave, full time/full time on maternity leave and part time/part time on maternity leave. Qualification level was collapsed into no formal, GSCES/O-levels, AS and A levels, Bachelor's Degree, Postgraduate studies and Doctorate/PhD. Country of completion was relabelled as continent of completion with categories collapsed into UK/Ireland/Europe, North America and Oceania (grouping the seven countries; UK, Ireland, Germany, France, Australia, New Zealand and Canada but excluding India and Malaysia where only one participant from each took part).

Chi Squared analysis Completers versus Non Completers non-significant findings

Chi squared analysis showed that there was no statistically significant difference between completers and non-completers on age χ^2 (3) = 0.93, p = .82, Φ = .06, qualification χ^2 (5) = 5.18, p = .39, Φ = .14, continent of completion χ^2 (2) = 2.05, p = .36, Φ = .89, employment status χ^2 (2) = 0.64, p = .73, Φ = .05, ethnicity χ^2 (1) = .09, p = .76, Φ = .02 , marital status χ^2 (1) = 1.72, p = .42, Φ = .08 and gender of baby χ^2 (1) = 2.46, p = .12, Φ = .17 (independence tests for gender of baby should be interpreted with caution as based on small sample size).

There was a significant difference between age of baby in weeks χ^2 (2) = 9.3, p = .01, Φ = .19 and delivery mode χ^2 (3) = 8.79, p = .03, Φ = .18 between the two groups. There were significantly more babies aged 17-22 weeks and 23-26 weeks in the completer sample (suggesting that mothers and infants in the completer group were more likely to fall in a prolonged crying category). Completers were more likely to have an induced delivery compared to non-completers. Effect sizes for both infant age and delivery mode between the two groups were calculated to be small.

Non- significant t-tests for Completer versus Non Completers

There was no significant difference between groups on colic severity; *t* (292) = 4 .45, *p* = .14, CI -.33 to .52 and the surgency domain of temperament; *t* (227) = .14, *p* = .887, CI -.2 to .23.

Mann Whitney U tests for remaining variables (all non-significant)

No significant difference were found between completers and non-completers on measures of depression using the EPDS (*U* = 124, *p =.*83*),* WEMWBS wellbeing (*U* = 118.5, *p =.*76*)*, Penn State Worry (*U* = 107, *p =.*63), trait self-oriented perfectionism on the HMPS (*U* = 189.5, *p =.*83), trait socially prescribed perfectionism on the HMPS (*U* = 139, *p =.*34), parenting self-oriented perfectionism on the MPPQ (*U* = 124.5, *p =.*24), parenting socially prescribed perfectionism on the MPPQ (*U* = 81.5, *p =.*07), informant ratings of the surgency domain of temperament (*U* = 157, *p =.*07), informant ratings of the negative affect domain of temperament (*U* = 131.5, *p =.*69) and informant ratings of the effortful control domain of temperament (*U* = 134.5, *p =.*75).

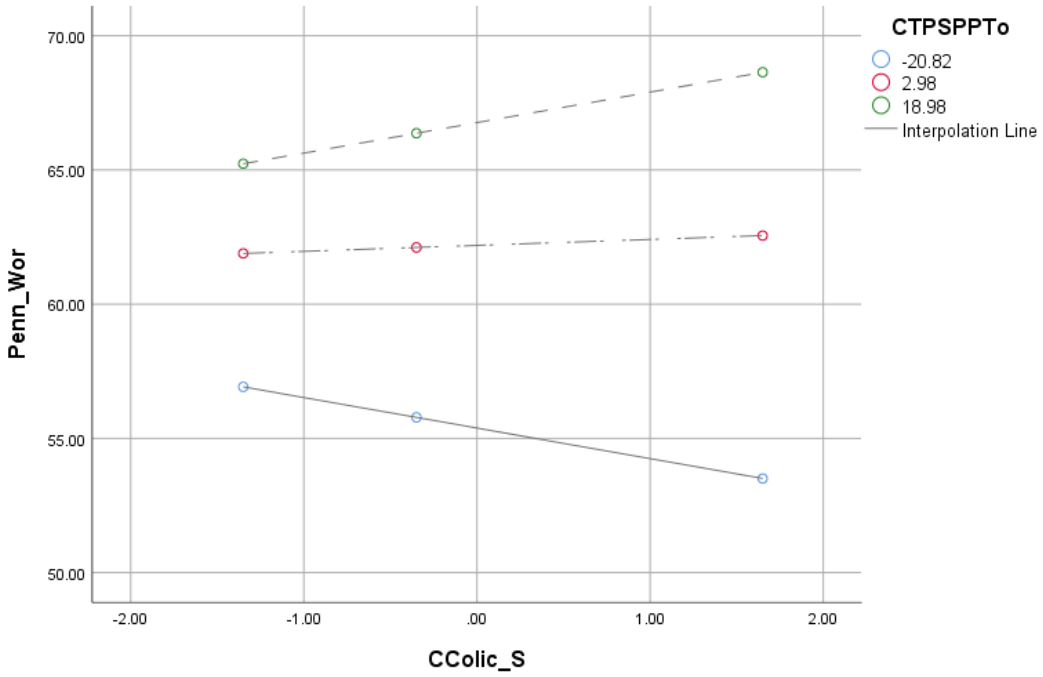
Exact tests exploring differences on demographic variables for completers versus almost completers

Exact two sided tests indicated no significant difference in groups on the age (*p* = .45), qualification level (*p* = .46), continent of completion (*p* = .41), employment status (*p* = .52), ethnicity grouped (*p* = .55), marital status (*p* = .57), gender of baby (*p* = .15), age of infant (*p* = .37) or delivery mode (*p* = .22).

Mann Whitney U non-significant tests between completers and almost completers

No significant difference was found between completers and almost completers on measures of depression using the EPDS (*U* = 108, *p =.*62*),* WEMWBS wellbeing (*U* = 402, *p =.*49*)*, Penn State Worry (*U* = 161, *p =.*17), trait self-oriented perfectionism on the HMPS (*U* = 463, *p =.*9), trait socially prescribed perfectionism on the HMPS (*U* = 467, *p =.*91), parenting self-oriented perfectionism on the MPPQ (*U* = 256.5, *p =.*12), parenting socially prescribed perfectionism on the MPPQ (*U* = 267, *p =.*15), maternal ratings of the surgency domain of temperament (*U* = 400.5, *p =.*08), and maternal ratings of the effortful control domain of temperament (*U* = 592, *p =.*84), informant ratings of the surgency domain of temperament (*U* = 51, *p =.*61), informant ratings of the negative affect domain of temperament (*U* = 17, *p =.*09) and informant ratings of the effortful control domain of temperament (*U* = 51.5, *p =.*76).

Appendix K Visual scatterplot of interaction effect (trait socially prescribed perfectionism x colic severity) approaching significance for anxiety outcome



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