Do personality traits predict the experience of childbirth and posttraumatic stress responses during the early postpartum period?

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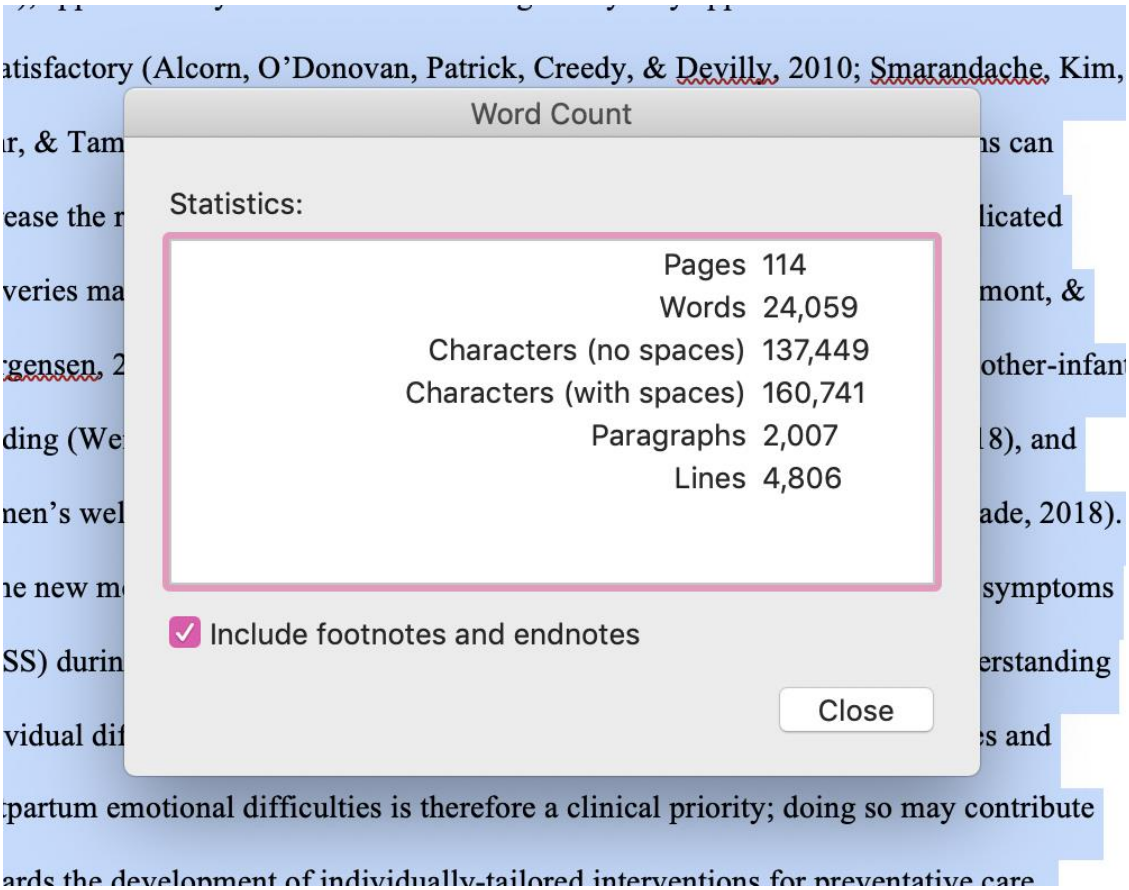
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Introductory Chapter: Thesis Overview

Childbirth is a complex and highly subjective life experience for women. Despite significant medical advances in the field of maternity care (Iravani, Janghorbani, Zarean, & Bahrami, 2015), approximately 10 to 45% of women globally may appraise childbirth as traumatic or unsatisfactory (Alcorn, O'Donovan, Patrick, Creedy, & Devilly, 2010; Smarandache, Kim, Bohr, & Tamim, 2016). Whilst medical interventions and obstetric complications can increase the risk of birth trauma, seemingly successful births involving uncomplicated deliveries may also be appraised as negative (Andersen, Melvaer, Videbech, Lamont, & Joergensen, 2012). A negative experience of birth can adversely impact upon mother-infant bonding (Weissman et al., 2010), marital satisfaction (Garthus-Niegel et al., 2018), and women's wellbeing postpartum (Bell & Andersson, 2016; Holt, Sellwood, & Slade, 2018). Some new mothers may even experience childbirth-related posttraumatic stress symptoms (PTSS) during the early postnatal period (Yildiz, Ayers, & Phillips, 2017). Understanding individual differences in risk and protective factors for difficult birth experiences and postpartum emotional difficulties is therefore a clinical priority; doing so may contribute towards the development of individually-tailored interventions for preventative care.

Numerous psychosocial, interpersonal and contextual factors have been shown to predict birth appraisal and the experience of postpartum PTSS (Henriksen, Grimsrud, Schei, & Lukasse, 2017). However, the role of personality-based risk and protective factors are less understood. This research dissertation aimed to address this gap in the literature. To meet this objective, chapter one is a systematic review of the research literature which aimed to understand the role of personality on the experience of birth events. Thirteen papers were located and accepted for inclusion within this review. Preliminary findings indicated that levels of specific personality traits may predispose appraisals of birth. However, the

relatively small number of empirical papers published to date, high heterogeneity in the personality traits and birth events examined, and the methodological limitations within the study designs, indicated the need for more robust longitudinal investigation.

Chapter two is an empirical study which examined whether levels of perfectionism, organisation and intolerance of uncertainty may predispose more negative experiences of birth and PTSS related to birth. Childbirth experience was also examined as a potential moderator of the relationship between personality and postpartum PTSS. The unique roles of perfectionism and intolerance of uncertainty on the appraisal of birth and postpartum emotional difficulties were highlighted. This has potential implications for the support provided to women by maternity care providers during antenatal birth planning.

The systematic review will be submitted to the *Health Psychology Review* for publication, whilst the empirical paper will be submitted to the *Archives of Women's Mental Health*. The author felt that the aims and findings of this dissertation were appropriate for the interests and objectives of each journal. The author will follow the reference style guidelines requested by each journal.

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Chapter One: Systematic Literature Review

Do personality traits affect how women experience childbirth: A systematic review

Prepared in accordance with guidelines for submission to Health Psychology Review (Appendix A).

Abstract

Understanding individual differences in risk factors for negative experiences of childbirth is important for tailoring preventative care. This systematic review aimed to synthesise quantitative literature that explored whether personality traits predispose the experience of birth. Five electronic databases (PsycINFO, CINAHL Plus, Scopus, Web of Science and PubMed) and bibliographic reference lists were searched for relevant literature published between 1997 and 2019. The eligibility criteria included primiparas or multiparas mothers of healthy infants, the assessment of at least one personality trait by validated questionnaire, the assessment of birth experience (overall experience or individual aspects of birth), and an analysis of the association between personality trait(s) and birth experience. Thirteen papers were included in the final synthesis. The methodological quality of papers was assessed using a tool adapted from the Agency for Healthcare Research and Quality. The association between personality and six aspects of the birth experience were examined. Preliminary findings suggested that levels of specific personality traits may predict appraisals of birth, and may predispose women to appraise birth differently. Maternity care providers should offer individually-tailored support and education during the antenatal period. Further longitudinal studies are needed which seek to address the methodological limitations of current research.

Keywords: Personality Traits, Childbirth Experience, Birth Appraisal, Systematic Review

Introduction

Perception of the birth experience is highly subjective (Bryanton, Gagnon, Johnston, & Hatem, 2008), with women's views regarding what constitutes a positive and satisfying birth varying significantly. A positive experience of birth has been related to feelings of empowerment, accomplishment and greater maternal self-confidence (Olza et al., 2018), whilst positively influencing mother-infant bonding (McGowan, 2014). Alternatively, a negative experience of birth can have a detrimental effect on maternal self-efficacy (Elmir, Schmied, Wilkes, & Jackson, 2010), may contribute towards the development of emotional difficulties during the postpartum period (Bell & Andersson, 2016; Garthus-Niegel, von Soest, Vollrath, & Eberhard-Gran, 2013), and may lead to delays in having subsequent children (Henriksen, Grimsrud, Schei, Lukasse, & Bidens Study Group, 2017). As approximately 10 to 45% of women globally may appraise childbirth as negative (Alcorn, O'Donovan, Patrick, Creedy, & Devilly, 2010; Smarandache, Kim, Bohr, & Tamim, 2016), understanding individual differences in risk and protective factors for negative birth experiences is imperative for tailoring preventative care.

A number of conceptual frameworks to explain heterogeneity in childbirth experience have been proposed. These include the Diathesis-Stress Model (Ayers, Bond, Bertullies, & Wijma, 2016; see Chapter Two of this report) and the Transactional Theory of Stress and Coping (TTSC; Lazarus & Folkman, 1984). The TTSC suggests that women use primary appraisal processes to evaluate the threat-severity of birth (i.e. the stressor), and secondary appraisal processes to assess their capacity to cope (Haagen, Moerbeek, Olde, van der Hart, & Kleber, 2015). Together, these cognitive processes produce positive or negative emotional responses that reciprocally influence the appraisal of birth (Honey, Morgan, & Bennett, 2003). Birth appraisal therefore is likely based upon idiosyncratic interpretations of labour

and birth events, rather than the actual experience of adverse events (Størksen, Garthus-Niegel, Vangen, & Eberhard-Gran, 2013).

Numerous studies utilising a variety of research methods (i.e. qualitative designs and randomised controlled trials) have investigated potential psychosocial and contextual factors that may contribute towards women's appraisals of childbirth (Bryanton et al., 2008; Henriksen et al., 2017; Smarandache et al., 2016). Lower maternal stress and anxiety (Waldenström, Hildingsson, & Ryding, 2006), increased maternal perceptions of control (Fair & Morrison, 2012) and participation in decision-making (Lally, Murtagh, Macphail, & Thomson, 2008) may prompt more positive appraisals of birth. Alternatively, proposed vulnerability factors for negative experiences of birth include assisted or operative deliveries following spontaneous labour (Blomquist, Quiroz, Macmillan, McCullough, & Handa, 2011), obstetric complications (Henriksen et al., 2017), and perceptions of poor interpersonal care (Aktaş & Aydin, 2018). Of concern, the effects of these variables are not consistently replicated across studies (Hodnett, 2002). This reduces our ability to predict the women that may appraise birth more negatively.

Systematic reviews to date have largely focused upon identifying environmental and interpersonal factors contributing towards higher quality maternity care (e.g. Shakibazadeh et al., 2018). Whilst important, the potential role of innate dispositional factors on the appraisal of birth remains uncertain. Research indicates that personality traits may predict levels of stress, perceptions of pain, and adaptive and maladaptive coping styles in response to other stressful life events (Afshar et al., 2015; Gustin, Burke, Peck, Murray, & Henderson, 2016). Personality traits are traditionally conceptualised as individual differences in patterns of thoughts, feelings and actions across contexts and developmental periods (McCrae & Costa, 2003). Whilst there remains no consensus about the basic dimensions of personality and their interrelationships (see McCrae, 2009), personality factors appear to have a physiological and

genetic basis, show substantial heritability, and long-term stability into adulthood (Mõttus, Kandler, Bleidorn, Riemann, & McCrae, 2017). Identifying a relationship between personality and the appraisal of birth would therefore enable maternity care providers to identify the women who are at a greater risk of negative birth experiences during the antenatal period. Understanding any potential role may also contribute towards the development of government health policies aimed at improving the quality of maternity care (see *Implementing Better Births;* NHS England, 2017).

This systematic review aimed to narratively synthesise and critique quantitative literature that explored whether personality traits affect the experience of birth events, and the direction of any associations identified.

Method

Pre-registration of review protocol

The review protocol was pre-registered with the International Prospective Register of Systematic Reviews (PROSPERO) with the registration number CRD42019123110.

Search strategy

Recommendations for the reform of maternity services were outlined in *Changing Childbirth* (Department of Health, 1993), with the purpose of ensuring greater choice, flexibility and continuity of care. Following the national implementation of these objectives, the Audit Commission (1997) concluded that 90% of women surveyed were satisfied with the care they had received. To control for the implementation of these changes, the search strategy of this review was limited from 1997 to January 2019. Following several scoping searches, five bibliographic databases (PsycINFO, CINAHL Plus, Scopus, Web of Science and PubMed) were searched for relevant published literature using a combination of controlled vocabulary

and keyword search terms, combined with Boolean operators, including: (personalit* OR temperament*) AND (childbirth* OR birth* OR parturition) AND (experienc* OR evaluat* OR satisf* OR pain* OR perception* OR trauma*). Appendix B outlines the search strategy used for each of the five databases.

Eligibility criteria

Eligible studies included: (1) primiparas or multiparas mothers of healthy infants, (2) a mean sample age of eighteen years or over, (3) singleton pregnancy, (4) 34-42 weeks' gestation at birth; studies involving late preterm births (34-37 weeks' gestation) were included where no complications during pregnancy and the delivery of a healthy infant were indicated, (5) full-text available in the English language, (6) the assessment(s) of personality trait(s) by validated questionnaire(s), (7) the assessment(s) of birth experience (overall experience or individual aspects of birth) ≤ 1 year postpartum, and (8) an analysis of the association between personality trait(s) and birth experience.

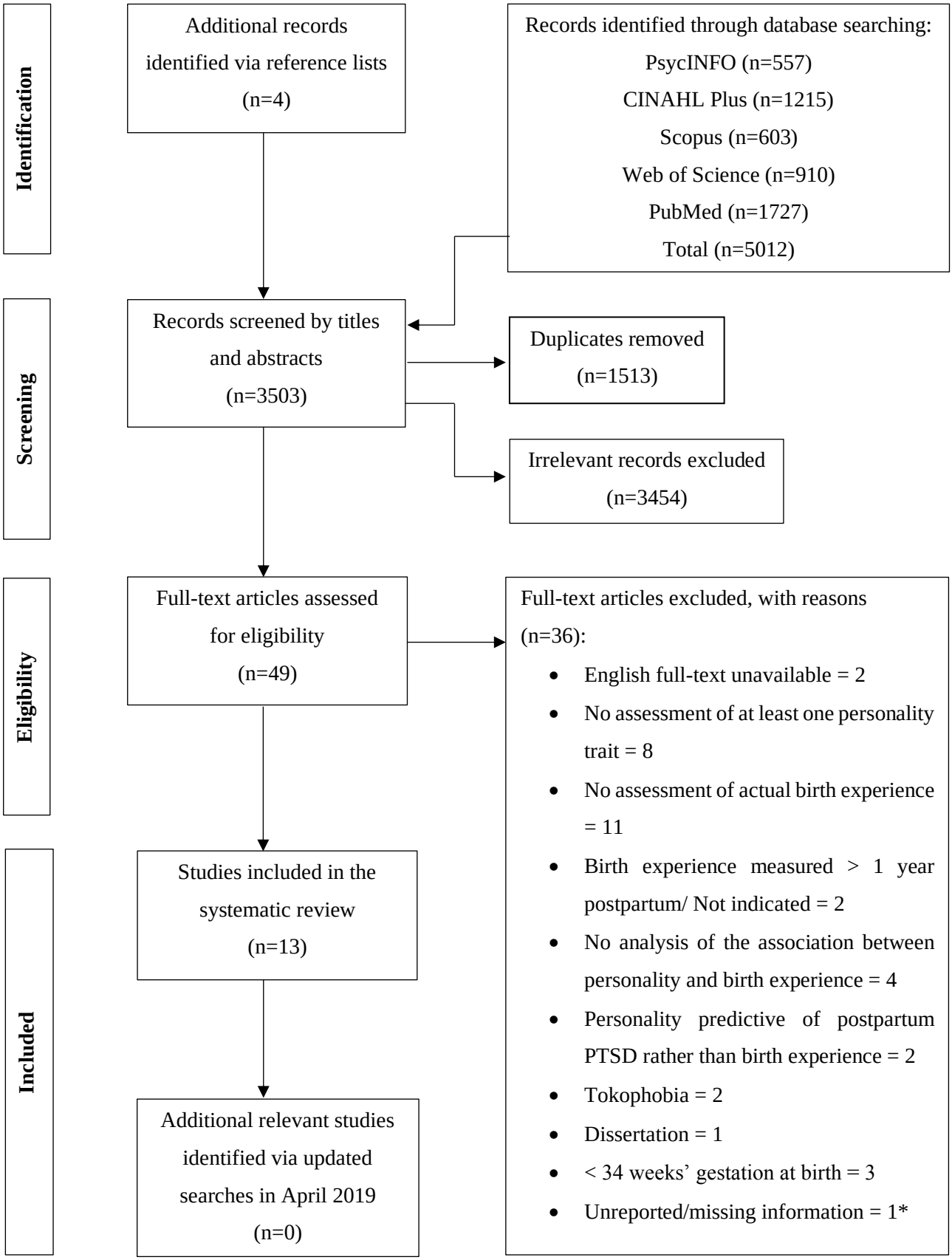
Childbirth via vaginal delivery involves three transitional stages: (1) early labour onset to full dilation of the cervix, (2) pushing in response to uterine contractions until the birth of the infant, and (3) the delivery of the placenta (National Institute for Health and Care Excellence, 2014). The recent NHS Maternity Statistics Report outlined the prevalence of delivery methods for women between 2017 to 2018 (NHS Digital, 2018). This indicated that approximately 58% of women experienced a spontaneous vaginal delivery, 12% required an instrumental delivery, and 28% underwent a caesarean section during this period. Subsequently, this review considered all modes of delivery, and encapsulated the period between the onset of labour as perceived by either the woman or healthcare professional, and the delivery of the placenta and immediate obstetric aftermath.

Excluded studies included: (1) Qualitative studies, reviews, case studies/case series and dissertations, (2) the assessment of expectations of birth rather than the actual experience of birth, (3) the assessment of tokophobia, and (4) where the relationship between personality and birth experience existed via mediator influence only.

Study selection

Abstracts and titles were screened for inclusion independently by the first author (LP) and a Trainee Clinical Psychologist. Full-text copies of potentially relevant studies were then examined. Disagreements and uncertainty was resolved through consensus with the second (LC) and third authors (PS). The reference lists and citing articles of all included studies were checked for further relevant publications. The authors of included studies were approached regarding any additional published papers that might fit the eligibility criteria (Appendix C). The search flow diagram is presented in Figure 1.

Fig. 1. Flowchart of included studies



*Information relating to four aspects of the eligibility criteria were not reported (i.e. the personality assessment used, the number of weeks' gestation at birth, whether it was a singleton pregnancy, and the mean age of included participants). No response received from the author when contacted via email.

Assessment of study quality

A risk of bias assessment was conducted to guide the interpretation of findings from included studies. The methodological quality of papers was assessed using a tool adapted for this review from the Agency for Healthcare Research and Quality (Williams, Plassman, Burke, Holsinger, & Benjamin, 2010; Appendix D). This tool facilitated the assessment of study quality across eight areas, and was selected due to the methodological diversity between the studies. This enabled all included studies to be assessed against the same criteria, which maximised the author's ability to synthesise and critique the quality of the available evidence, and also evaluate the individual strengths and weaknesses of each paper. Uncertainty was resolved through consensus with the second (LC) and third authors (PS).

Results

Study characteristics

A total of 5016 records were obtained from the electronic search, from which 13 publications were identified for inclusion (Figure 1). An overview of study characteristics and relevant extracted data from included studies is displayed in Table 1 and 3. Three studies adopted cross-sectional designs, with data collected between 0 to 6 months' postpartum. Ten studies used prospective cohort designs with outcomes examined at two (n=8), three (n=1) and four (n=1) time points. At least nine studies recruited via convenience sampling, with Larsson, Saltvedt, Edman, Wiklund and Andolf (2011) using stratified sampling. Sample sizes ranged from 35 to 1111 participants, with six publications recruiting less than 50 participants. The mean age of participants fell between 26 and 34 years (where this was reported). Ethnicity data was not reported in nine of the thirteen studies. At least four studies recruited only primiparas participants, whilst six combined data from primiparas and multiparas women. Studies were conducted in European (UK, Croatia, Poland, Sweden, Finland, the Netherlands) and Middle-Eastern (Iran) countries, with three taking place in the USA.

Table 1.

Main characteristics of included studies

Author, Year	Study Characteristics					Participant Characteristics		
	Country	**Design**	**Time of Assessment(s)**	**Sampling Method**	**Sample size (recruited) completed**	**Mean age (SD)**	**Ethnicity: n (%)**	**Parity: n (%)**
Beebe, Lee, Carrieri-Kohlman, & Humphreys (2007)	USA	Prospective Cohort	T1: Third trimester T2: 1≤22 days' postpartum	Convenience sampling	(40) 35	NS[a]	Asian: 2 (5.7), White: 31 (88.6), Hispanic: 2 (5.7)	Primiparas: 35 (100)
Carvalho, Zheng, & Aiono-Le Tagaloa (2014)	USA	Prospective Cohort	T1: On admission to delivery ward and prior to induction (37 ≤ 42 weeks' gestation) T2: labour onset to delivery	Convenience sampling	(50) 39	34 (5.0)	Caucasian: 24 (62), Asian: 8 (21), Hispanic: 3 (8), Other: 4 (9)	NC[b]
Curzik & Jokic-Begic (2011)	Croatia	Prospective Cohort	T1: 37 ≤ 40 weeks' gestation T2: Labour onset but before pushing T3: "Immediately" after birth T4: 1 month postpartum	Convenience sampling	(60) 46	26.18 (4.95)[c]	NS	Primiparas: 46 (100)
Johnston & Brown (2013)	UK	Cross-sectional	T1: 0 ≤ 6 months' postpartum	Convenience sampling	(NS) 755	29.53 (4.55)	NS	Primiparas: 502 (66.4), Multiparous: 253 (33.6)
Keogh, Ayers, & Francis (2002)	UK	Prospective Cohort	T1: 36 weeks' gestation T2: 2 weeks' postpartum	Convenience sampling	(42) 40	31.58 (5.19)	White European: 27 (67.5), Other: 13 (32.5)	Primiparas: 23 (57.5), Multiparous: 17 (42.5)
Kwissa-Gajewska & Dołęgowska (2017)	Poland	Prospective Cohort	T1: First stage of labour T2: 2 days' postpartum	NS	(NS) 45	28.31 (5.2)	NS	Primiparas: 23 (51.1), Multiparous: 22 (48.9)
Lang, Sorrell, Rodgers, & Lebeck (2006)	USA	Prospective Cohort	T1: 7 ≤ 32 weeks' gestation T2: Shortly after birth	Convenience sampling	(44) 35	29.0 (6.0)	African-American: 4 (11.4), Caucasian: 22 (62.9), Hispanic: 5 (14.3), Other/Unknown: 4 (11.5)	NS

Table 1. (*continued)*

Author, Year	Study Characteristics					Participant Characteristics		
	Country	**Design**	**Time of Assessment**	**Sampling Method**	**Sample size (recruited) completed**	**Mean age (SD)**	**Ethnicity: n (%)**	**Parity: n (%)**
Larsson et al. (2011)	Sweden	Prospective Cohort	T1: 37 ≤ 39 weeks' gestation T2: 9 months' postpartum	Stratified sampling	(541) 422 /423 and 355[d]	NS (NS)[e]	NS	Primiparas: 460 (100)
Saisto, Salmela-Aro, Nurmi, & Halmesmäki (2001)	Finland	Prospective Cohort	T1: 7 ≤ 30 weeks' gestation T2: 30 ≤ 40 weeks' gestation T3: 14 ≤ 200 days' postpartum	NS	(350) 211	29.4 (5.1)	NS	NS
Van de Pol et al. (2006)	Netherlands	Prospective Cohort	T1: 24 and 36 weeks' gestation T2: Immediately after birth	Convenience sampling	(672) 354	30.0 (3.6)	NS	Primiparas: 354 (100)
Waldenström (1999)	Sweden	Prospective Cohort	T1: Early pregnancy T2: 2 months' postpartum	NS	(1230) 1111[f]	Positive birth: 30.2 (4.4), Less positive birth: 30.5 (4.3)	NS	Positive birth: Primiparas: 372 (47.1), Multiparous: 418 (52.9) Less positive birth: Primiparas: 229 (71.3), Multiparous: 92 (28.7)
Wilde-Larsson, Sandin-Bojö, Starrin, & Larsson (2011)	Sweden	Cross-sectional	T1: 2 months' postpartum	Convenience sampling	(1173) 739	30.4 (4.7)	NS	Primiparas: 321 (43), Multiparous: 417 (56) Other (NS): 1 (1)
Yadollahi et al. (2013)	Iran	Cross-sectional	T1: Postpartum (After delivery but prior to discharge)	Convenience sampling	(NS) 220	NS (NS)[e]	NS	Primiparas: 92 (41.7), Multiparous: 128 (58.3)

Note. NS Not stated; NC Not clear; SD Standard deviation; T Time; UK United Kingdom; USA United States of America

[a] The age of participants ranged from 18 to 40 years

[b] The study reported two values: 100% of participants were primiparas (method) and 46% of participants were primiparas (results)

[c] Demographic data was based on the total number of participants recruited (n=60) and not those who completed (n=46)

[d] Kendall's rank order correlations were conducted using data from 460 participants, whilst the logistic regression analysis was performed using data from 355 participants

[e] The information reported did not indicate an adolescent sample. This study was therefore still included within this review

[f] 1148 women returned the follow-up questionnaires but data from 37 participants were removed due to not meeting the eligibility criteria

Quality assessment

The risk of bias assessment for each study is presented in Table 2. A minimum of three sources of bias were identified within each study design. All samples were self-selecting (where reported), with participants predominately recruited via convenience sampling from local hospitals, obstetric clinics and childbirth preparation classes. Three studies (Kwissa-Gajewska & Dołęgowska, 2017; Saisto et al., 2001; Waldenström, 1999) failed to provide any information about their recruitment strategy. This increased the possibility of cohort effects (i.e. marital status, socio-economic status, and ethnicity). A limited description of the samples was found across studies (n=11). Levels of education, socioeconomic status and ethnicity were rarely reported. These factors limited the author's ability to generalise the findings from the systematic review across populations and cultures (e.g. populations with no access to standardised maternity care).

All thirteen studies failed to validate their participant numbers using a power analysis and may have been underpowered. This raises the probability of type II error. Power is unlikely to have been a concern in studies involving larger samples (e.g. Wilde-Larsson et al., 2011) or those performing correlational analyses (e.g. Beebe et al., 2007) where assumptions underlying analyses have been met (Bonett & Wright, 2000). However, six studies included sample sizes below 50 participants. The attrition rate ranged from 22% to 47% in six studies. Of particular concern, two studies (Carvalho et al., 2014; Lang et al., 2006) failed to recruit a minimum of 10 participants per predictor variable as recommended for multivariate predictor models (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). In the absence of a power calculation, these results must be interpreted with caution.

All but two studies (Beebe et al., 2007; Van de Pol et al., 2006) used self-report methodology to assess birth experience. The majority of studies (n=9) used visual or verbal analogue scales (VAS) of varying lengths. Evidence of the psychometric properties of VAS

as a measure of pain and satisfaction in obstetric settings are sparse (Wei, Leng, & Lin, 2010). These scales, in addition to the obstetric questionnaires developed by the authors, were largely implemented without evaluation from independent experts in their fields, and with unknown psychometric data. Only three studies supplemented VASs with validated questionnaires. Two studies used The McGill Pain Questionnaire (MPQ; Melzack, 1975) and the MPQ – Short Form (MPQ-SF; Melzack & Katz, 2001) respectively to assess sensory (i.e. temporal, spatial, pressure and thermal) and affective (i.e. tension, fear and autonomic) aspects of pain. The reliability and validity of the MPQ and MPQ-SF are well-documented in both clinical and research settings (Lovejoy, Turk & Morasco, 2012). One further study used The Stress Appraisal Questionnaire (Włodarczyk & Wrześniewski, 2010) to assess cognitive appraisal of birth. This measure has demonstrated satisfactory internal reliability in other studies exploring the appraisal of challenging life events (Ogińska-Bulik & Kobylarczyk, 2016). Evidence of its validity within an obstetric setting remains unknown.

Seven studies provided inadequate information about their eligibility criteria. This made it difficult to establish whether the risk of potential confounds were minimised at the stage of recruitment. However, the majority of studies (n=9) controlled or partially controlled for potential covariates associated with birth appraisal in their analyses. Failure to exclude potential confounding variables may have led to biased estimates of the associations between personality and birth experience. However, high heterogeneity was observed in the timing of follow-up assessments across the postnatal period (after delivery to 9 months' postpartum). This has been highlighted as a notable limitation within research exploring birth experience (Bell & Andersson, 2016). In light of this, studies were not penalised on the basis of employing longer follow-up periods (providing they were implemented within 1 year postpartum). However, the findings from three studies (Johnston & Brown, 2013; Larsson et al., 2011; Saisto et al., 2001) were at a greater risk of memory bias.

There were some general concerns about the appropriateness of some of the statistical analyses conducted (n=7). These were failing to report whether assumptions for parametric testing had been met (Yadollahi et al., 2013), studies likely being underpowered for aspects of the analyses performed (Carvalho et al., 2014; Curzik & Jokic-Begic, 2011; Kwissa-Gajewska & Dołęgowska, 2017; Lang et al., 2006; Larsson et al., 2011), and conducting an analysis without addressing concerns regarding the psychometric properties of the chosen instruments (Keogh et al., 2002).

Table 2.

Quality Assessment

Author(s)	Unbiased selection of cohort	Sample size calculation/ justification	Adequate description of the cohort	Valid method to assess birth experience	Adequate follow-up[a]	Missing data minimal	Control of confounders	Analysis appropriate
Beebe et al. (2007)	No	No	Yes	Yes	Yes	Yes	Partial	Yes
Carvalho et al. (2014)	Partial	No	Partial	Partial	Yes	No	Partial	Partial
Curzik & Jokic-Begic (2011)	Partial	No	Partial[b]	Partial	Yes	No	No	Partial
Johnston & Brown (2013)	Yes	No	Partial	No	NA	Unclear	Yes	Yes
Keogh et al. (2002)	No	No	Partial	Yes	Yes	Yes	No	No
Kwissa-Gajewska & Dołęgowska (2017)	Unclear	No	Partial	Partial	Yes	Unclear	Unclear	Unclear
Lang et al. (2006)	Partial	No	Yes	Partial	Yes	Yes	Yes	No
Larsson et al. (2011)	Partial	No	No	Partial	Yes	No[c]	Yes	Partial
Saisto et al. (2001)	Unclear	No	No	No	Yes	No	Yes	Yes
Van de Pol et al. (2006)	Yes	No	Partial	Yes	Yes	No	Yes	Yes
Waldenström (1999)	Unclear	No	No	No	Yes	Yes	Yes	Yes
Wilde-Larsson et al. (2011)	Yes	No	Partial	No	NA	No	Yes	Yes
Yadollahi et al. (2013)	Partial	No	Partial	Partial	NA	Unclear	No	Unclear

Note. Three further domains sometimes included within this quality assessment were not used to evaluate the studies (i.e. selection minimises baseline differences, assessors blind to exposure, valid method to assess personality), as included studies adopted observation designs. In addition, utilising a valid instrument to assess personality formed part of the eligibility criteria for this review.

[a] No evidence to suggest an optimum follow-up period to evaluate birth experience; ≤ 1 year postpartum will be considered an adequate follow-up period within this review

[b] Description of the cohort is based on the total number of participants recruited (n=60) and not those who completed (n=46)

[c] Two different analyses performed - 22% attrition rate for Kendall's rank order correlations, and a 34.5% attrition rate for logistic regression analysis

Assessment of personality traits

Ten clusters of personality traits were evaluated across the thirteen studies. The most commonly studied constructs were anxiety (trait/ sensitivity/ somatic/ psychic; n=11), conformity or non-conformity (agreeableness/ lying/ social desirability/ suspicion/ detachment/ guilt; n=9), neuroticism (or inadequacy/ impulsive/ irritation) or emotional stability (n=9), extraversion (or socialisation/ egoism/ dominance) or introversion (or social inadequacy; n=9), and openness (or monotony avoidance) or rigidity (n=6). Aggression (psychoticism/ indirect aggression/ verbal aggression/ hostility/ inhibition of aggression; n=5), conscientiousness (n=4), somatic vulnerability (muscular tension/ psychasthenia or lack of energy; n=2), self-esteem (n=1) and locus of control (n=1) were also considered.

Personality traits were examined across eleven validated measures. Five rating instruments of varying length (5 to 60 items) were used to measure all or facets of the five-factor model of personality (i.e. neuroticism or emotional stability, extraversion, agreeableness, conscientiousness and openness) as described by Costa & McCrae (1992a), in five studies. The assessment of personality according to these five broad factors is highly prevalent within the wider literature (Jakšić, Brajković, Ivezić, Topić & Jakovljević, 2012). Three further rating scales assessed facets of these traits: The Eysenck Personality Questionnaire-Short Scale (EPQR-S; Eysenck & Eysenck, 1975, n=1), The Karolinska Scales of Personality (KSP; Schalling & Edman, 1987, n=2) and The Dutch Personality Questionnaire (DPQ; Luteijn, Starren, & Van Dijk, 2000, n=1). However, there are notable differences in the factor structure and theoretical models underlying these instruments. All three studies examining trait anxiety used The State-Trait Anxiety Inventory – Trait Anxiety (STAI-T; Spielberger, Gorsuch, & Lushene, 1970). Furthermore, the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986) was used in four studies. Of concern, internal reliability for the mental concerns subscale of the ASI in one study (Keogh et al.,

2002) was .16. A low value of alpha may reflect a small number of items, unsatisfactory inter-relatedness or heterogenous constructs (Tavakol & Dennick, 2011). Results from this study should be treated with caution. Finally, the Internal-External Locus of Control Scale (Rotter, 1966) was employed in one study. In summary, all of these instruments have shown robust psychometric properties within the wider literature, which confirms their validity and reliability as assessments of personality (Francis, Lewis, & Ziebertz, 2006; Gustavsson, Weinryb, Göransson, Pedersen, & Åsberg, 1997; Julian, 2011; Luteijn et al., 2000; Meades & Ayers, 2011; Wang & Lv, 2017; Woods & Hampson, 2005).

Assessment of birth experience

Six aspects of the birth experience were investigated across the thirteen studies reviewed. These six aspects were mode of birth (n=3), birth complications (n=1), characteristics of labour (n=1), labour pain (n=4), pain relief (n=2) and overall birth experience (n=5). The majority of studies (n=11) reported on one aspect of the birth experience.

Main findings

A summary of all relevant findings from included studies can be found in Table 3. Only key outcomes will be described. In total, twelve out of thirteen studies identified at least one personality trait that was associated with or predicted variance in the aspect of birth assessed.

Mode of birth

Three studies explored the role of different personality traits on mode of birth. Firstly, levels of anxiety sensitivity, characterised by the tendency to fear anxiety-related sensations (Reiss et al., 1986), were significantly higher in women undergoing an elective caesarean section compared to a vaginal delivery or emergency caesarean section (Keogh et al., 2002). Thus,

high anxiety sensitivity may affect prenatal decision-making about mode of birth. Concerns regarding the internal reliability of the ASI in this study have previously been highlighted.

Secondly, lower levels of emotional stability and extraversion were identified in women undergoing a caesarean section (elective or emergency) compared to a vaginal delivery (Johnston & Brown, 2013). Low emotional stability (or high neuroticism) refers to tendencies to be emotionally reactive and experience negative emotions more easily (Costa & McCrae, 1992a). In addition, low extraversion is characterised by tendencies to be quiet, reserved and less involved in social situations. These dispositions increased the likelihood of undergoing an emergency caesarean section relative to other forms of birth. Furthermore, low levels of these traits, alongside low openness to experience, were related to undergoing an assisted vaginal delivery over a vaginal delivery without medical intervention. Overall, lower emotional stability and extraversion may predispose undergoing any form of medical intervention at birth, whilst low openness to experience may be problematic for women undergoing a vaginal delivery.

Lastly, higher levels of self-esteem were found in women undergoing instrumentally-assisted vaginal births or emergency caesarean sections compared to unassisted vaginal deliveries (Van de Pol et al., 2006). Self-esteem refers to an individual's belief and confidence in their own ability (Mruk, 2006). However, levels of self-esteem did not predict assisted or operative deliveries following spontaneous labour. In summary, some personality traits may predict mode of delivery during the prenatal or intrapartum period.

Birth complications

One study (Johnston & Brown, 2013) investigated differences in levels of the five-factor model of personality and various birth complications. Women with lower levels of emotional stability and extraversion were significantly more likely to experience any form of birth

complication, and tearing and failure to progress specifically. Women reporting foetal distress had significantly lower levels of emotional stability, although no significant differences in any of the personality factors and the experience of postpartum haemorrhaging were identified. Overall, lower levels of emotional stability and extraversion may predispose the experience of a number of birth complications during delivery.

Characteristics of labour

One study (Beebe et al., 2007) examined the association between personality and cervical status on admission to hospital. Higher levels of trait anxiety, defined as a predisposition to experience anxiety (Spielberger et al., 1970), were moderately associated with increased cervical dilation and progression towards birth. Failing to control for any confounding factors (i.e. duration of early labour) impedes the robustness of this finding.

Labour pain

The association between personality traits and labour pain was explored in four studies. Levels of anxiety sensitivity and trait anxiety were examined in two studies (Curzik & Jokic-Begic, 2011; Lang et al., 2006). Collectively, no association between trait anxiety and experienced or recalled labour pain intensity were identified. Furthermore, trait anxiety did not predict labour pain (Lang et al., 2006). These findings highlight the limited utility of trait anxiety in predicting levels of labour pain.

Small to medium positive associations were identified between levels of anxiety sensitivity (as captured by the total score on the ASI, and the physical concerns domain specifically) and sensory labour pain (Lang et al., 2006; Curzik & Jokic-Begic, 2011). Where examined, high anxiety sensitivity was weakly related to affective labour pain, but only predicted greater sensory pain (Lang et al., 2006). The findings regarding the role of anxiety

sensitivity on maximum pain levels were inconsistent across the two studies, although only a small negative correlation was identified where a relationship was shown (Curzik & Jokic-Begic, 2011). Furthermore, no differences in experienced and recalled labour pain were identified in women grouped according to high and low levels of trait anxiety and anxiety sensitivity (Curzik & Jokic-Begic, 2011). Overall, high anxiety sensitivity may predispose aspects of the labour pain experience, with the strongest evidence supporting a preliminary role in increasing sensory pain. Whilst the small sample sizes were a concern, the replication of these results across different populations strengthens the reliability of these findings.

Two studies assessed the association between the five-factor model of personality and labour pain. Elevated neuroticism was weakly associated with higher self-reported pain on admission to hospital and two days postpartum (Kwissa-Gajewska & Dołęgowska, 2017). In contrast, high conscientiousness was weakly related to lower recalled labour pain intensity. Conscientiousness refers to the tendency to be orderly, self-disciplined and achievement-focused (Costa & McCrae, 1992a). These findings were not replicated by Yadollahi et al. (2013). Instead, a weak positive correlation between agreeableness and openness to experience was shown with labour pain, but only higher agreeableness predicted greater pain intensity. Agreeableness describes the predisposition to be compliant with others' needs rather than asserting one's own opinions (Costa & McCrae, 1992a). Together, the role of specific personality traits on labour pain are inconsistent, despite similarities in the outcome measures adopted and the timing of postpartum data collection. However, the study by Kwissa-Gajewska and Dołęgowska (2017) may have been underpowered. The different findings may also reflect potential differences in the characteristics of included participants.

Pain relief

Personality and pain relief during labour in women undergoing a vaginal delivery were explored in two studies. Whilst women who received an epidural or pethidine/meptid had

lower emotional stability (Johnston & Brown, 2013), Carvalho et al. (2014) found no relation between neuroticism and local anaesthesia consumption, nor between personality and other aspects of the pain relief experience. Together, this provides mixed support for the role of neuroticism in pain relief. However, participants in the study by Carvalho et al. (2014) had pre-requested pain relief to manage labour pain within antenatal birth plans. This may have reduced tendencies to experience and therefore express emotional distress during labour.

In further analyses, lying positively predicted a greater duration of time between the onset of labour to epidural analgesia request (Carvalho et al., 2014). Thus, a tendency to conceal real needs may delay requests for pain relief. Higher levels of extraversion, psychoticism and anxiety sensitivity predicted greater labour pain experienced within a given time frame. High extraversion refers to tendencies to seek social simulation and opportunities to engage with others (Costa & McCrae, 1992a), whilst psychoticism is characterised by aggressiveness and interpersonal hostility (Eysenck & Eysenck, 1975). Additionally, higher levels of anxiety sensitivity predicted lower epidural local anaesthetic consumption, indicating that greater tendencies to fear anxiety-related sensations reduced the amount of pain relief consumed. Together, higher levels of specific personality traits, and anxiety sensitivity in particular, may differentially predispose the experience of pain relief.

Overall experience of birth

The role of personality traits on overall birth experience was the most studied aspect of childbirth in the literature (n=5). Two studies utilised the KSP to assess personality. Exploring traits underlying anxiety proneness, and a measure of locus of control, women with higher somatic anxiety appraised birth more negatively (Waldenström, 1999). However, a predisposition to experience the physical symptoms of anxiety did not predict birth appraisal. The former finding was not replicated by Larsson et al. (2011). Instead, small negative

correlations between indirect aggression, verbal aggression, irritation and guilt, and appraisals of birth were noted, but only irritation negatively predicted birth experience (Larsson et al., 2011). Overall, a tendency to be more easily annoyed and less patient (Schalling & Edman, 1987) may predispose more negative experiences of birth.

Three studies investigated differences in levels of the five-factor model of personality and overall birth experience. Using a single item to assess birth satisfaction, Saisto et al. (2001) suggested that levels of neuroticism and individual facets of neuroticism did not predict disappointment with delivery (overall and below 10th percentile). Similarly, Wilde-Larsson et al. (2011) found no association between personality and emotions to describe birth. However, a personality pattern of lower emotional stability, lower conscientiousness, and higher extraversion contributed to the odds of reporting more negative feelings. Women in the lowest 10th percentile for positive feelings and the highest 90th percentile for negative feelings also showed significantly lower levels of emotional stability. The potential role of neuroticism on birth experience was also supported by Kwissa-Gajewska and Dołęgowska (2017). Higher tendencies to experience emotional distress were associated with increased threat/loss appraisal of birth (negative appraisal), and a decrease in challenge appraisal (positive appraisal). The opposite pattern was found for conscientiousness. In summary, lower levels of emotional stability or higher neuroticism may predispose more negative feelings and appraisals of birth, but not levels of satisfaction. Conscientiousness may be problematic at low levels, although may predispose more positive appraisals of birth at higher levels. The robustness of these findings are strengthened by the replication of results across two studies adopting different measures of personality.

Table 3.

The association between personality traits and childbirth experience

Author, Year	Personality Trait(s)	Measure of Personality	Outcome variable(s)	Measure of Outcome Variables	Analyses	Key Outcomes
Beebe et al. (2007)	Trait Anxiety	STAI-T	Cervical status at admission	Medical records	1) Pearson's correlation	1) Moderate (+) correlation between trait anxiety and cervical dilation at admission to hospital*
Carvalho et al. (2014)	Anxiety Sensitivity[a] Neuroticism Extraversion Psychoticism Lying	ASI EPQR-S	Pain relief (Time from onset of labour to EA request; Pain at EA request; Area under the pain x time curve during labour; Epidural local anaesthesia consumption; Satisfaction with labour analgesia)	VAS (0= no pain, 10= worst pain imaginable; 0=totally unsatisfied, 100=totally satisfied); Obstetric questionnaire	1) Spearman's correlation (adjusted for multiple testing) 2) Multivariate linear regression[b]	1) No association between any of the personality traits and pain relief (all outcome variables). 2) Lying (+) predicted time from labour onset to EA request**. State anxiety and analgesia expectations also significant predictors. Adjusted R_2=.23 Anxiety sensitivity, extraversion and psychoticism (+) predicted labour pain x time area under curve***. State anxiety and confidence also significant predictors. Adjusted R_2=.41 Anxiety sensitivity (-) predicted epidural local anaesthesia consumption***. Anxiety, confidence and pain catastrophising also significant predictors. Adjusted R_2=.40
Curzik & Jokic-Begic (2011)	Anxiety Sensitivity Trait Anxiety	ASI STAI-T	Experienced labour pain (maximum, average, maximum sensory) Recalled labour pain (maximum and average)	MPQ-SF VAS (1-10, scale labels NS)	1) Pearson's correlation 2) Median split method; ANOVA	1) No association between trait anxiety and experienced and recalled labour pain (all outcome variables) Weak (-) correlation between anxiety sensitivity (social concerns domain) and experienced maximum labour pain* Weak (+) correlation between anxiety sensitivity (physical concerns domain) and MPQ-SF (experienced sensory labour pain)* 2) Women were divided into 4 groups based on high/low levels of trait anxiety and anxiety sensitivity. No significant differences between all 4 groups and experienced and recalled labour pain (all outcome variables).
Johnston & Brown (2013)	Emotional Stability Extraversion Agreeableness Conscientiousness Openness	TIPI	Mode of birth (VD, VA, CS (PCS and ECS); Pain relief; Birth complications (tearing, postpartum haemorrhage, foetal distress, failure to progress)	Yes/no/ I don't know response to questions developed by researchers	1)Multivariate ANCOVA	1) Maternal age, education and parity were controlled for throughout analyses. *Mode of birth* Emotional Stability*** and extraversion lower* in ECS/PCS than VD[c] Emotional stability and extraversion lower in ECS than VD and PCS***[c] Extraversion***, emotional stability** and openness*** lower in VA No differences in personality traits between VD and PCS[c] *Pain relief* Of those who had a VD, emotional stability*** lower with epidural and pethidine/meptid use *Birth complications* Emotional stability*** and extraversion** lower with any birth complication Emotional stability ** and extraversion* lower with failure to progress[d] Extraversion* and emotional stability*** lower with tearing and episiotomy[e] Emotional stability*** lower with foetal distress No significant differences between personality traits and postpartum haemorrhage

Table 3. *(Continued)*

Author, Year	Personality Trait(s)	Measure of Personality	Outcome variable(s)	Measure of Outcome Variables	Analyses	Key Outcomes
Keogh et al. (2002)	Anxiety Sensitivity	ASI	Mode of delivery (PCS vs. VD vs. ECS)	Obstetric questionnaire	1) ANOVA	1) Anxiety sensitivity higher in PCS than VD or ECS, $F(2,37)=6.15$*
Kwissa-Gajewska & Dołęgowska (2017)	Neuroticism Extraversion Agreeableness Conscientiousness Openness	NEO-FFI	Labour pain (actual and recalled); Cognitive appraisal of childbirth (threat loss; challenge)	VAS (0= no pain, 10= worst possible pain); Stress Appraisal Questionnaire	1) Spearman's correlation/ Pearson's correlation	1) Moderate (+) correlation between neuroticism and threat/loss appraisal** Weak (-) correlation between neuroticism and challenge appraisal* Weak (+) correlation between neuroticism and actual (T1) and recalled (T2) labour pain* Moderate (-) correlation between conscientiousness and threat/loss appraisal** Moderate (+) correlation between conscientiousness and challenge appraisal** Weak (-) correlation between conscientiousness and recalled (T2) labour pain**
Lang et al. (2006)[f]	Anxiety Sensitivity Trait Anxiety	ASI STAI-T	Labour pain (maximum pain, average pain, sensory pain, affective pain)	MPQ VAS (0=none, 5=excruciating)	1) Correlations (specific test not stated) 2) Multiple linear regression	1) Moderate (+) correlation between anxiety sensitivity and MPQ (sensory pain)** Weak (+) correlation between anxiety sensitivity and MPQ (affective pain)* No association between anxiety sensitivity and maximum pain or average pain. No association between trait anxiety and labour pain (all outcome variables). No association between labour pain variables and parity, use of analgesia, marital status, intentionality of conception and duration of labour. 2) Anxiety sensitivity (+) predicted MPQ (sensory pain) $\beta=.52$*. The use of analgesia, parity and trait anxiety were not significant predictors. $R^2=.26$ Trait anxiety did not predict labour pain.
Larsson et al. (2011)	Somatic Anxiety , Muscular Tension, Psychic Anxiety, Psychasthenia, Inhibition of Aggression, Impulsivity Monotony Avoidance, Detachment, Socialisation, Social Desirability, Indirect Aggression, Irritation, Verbal Aggression, Suspicion, Guilt	KSP	Overall experience of birth	VAS (1=most negative; 10=most positive)	1) Kendall's rank order correlation 2) Multivariate logistic regression	1) Weak (-) correlations between Indirect Aggression*, Verbal Aggression*, Irritation** and Guilt* and birth experience. No association between mode of birth and birth experience. 2) Trait irritation, higher pain levels at delivery, use of analgesia postpartum, longer admissions, prenatal worry were independent predictors of birth experience* R^2 not reported Irritation (-) predicted birth experience $b=-0.67$*
Saisto et al. (2001)	Neuroticism and facets of neuroticism: vulnerability and anxiety	NEO-PI	Satisfaction with childbirth	Six-item VAS (1= not at all, 5= a lot)	1) Hierarchical linear regression 2) Hierarchical logistic regression	1) Personality traits did not predict disappointment with delivery. Depression, dissatisfaction with partnership and physical complaints during pregnancy, pain during delivery, and delivery via ECS (+) predicted dissatisfaction with birth* $R^2=.48$ 2) Level of neuroticism did not predict those who were most disappointed with delivery (below 10_{th} percentile). Prenatal mood and obstetric experience predicted highest levels of disappointment with birth. R^2 not reported.

Table 3. *(Continued)*

Author, Year	Personality Trait(s)	Measure of Personality	Outcome variable(s)	Measure of Outcome Variables	Analyses	Key Outcomes
Van de Pol et al. (2006)	Inadequacy (or neuroticism) Social Inadequacy Rigidity Hostility Egoism Dominance Self-Esteem	DPQ	Mode of birth (VN versus. VA or ECS)	Medical records; Healthcare professionals	1) Non-parametric tests (specific tests not stated) 2) Multivariate logistic regression	1)VA or ECS associated with higher self-esteem than VN* 2)Personality traits did not predict mode of delivery. Foetal distress, non-occiput anterior vertex presentation, birth weight, and the quality of women's emotional relationship with their partner (+) predicted VA or ECS*. R_2=0.27
Waldenström (1999)	Anxiety Proneness (Somatic Anxiety and Psychic Anxiety) Locus of Control	KSP Internal-External Locus of Control Scale	Overall birth experience	VAS (1=very negative, 7=very positive) dichotomised into negative (scores 1-5) and positive (scores 6-7)	1) Student t-test[g] 2) Logistic regression[g]	1) High somatic anxiety identified in more negative birth experience only** 2) Somatic Anxiety did not predict birth experience. Involvement in the birth process***, anxiety***, pain***, parity*** and midwife support*** predicted birth experience. R_2=0.43
Wilde-Larsson et al. (2011)	Emotional Stability Extraversion Agreeableness Conscientiousness Openness	SIMP	Positive feelings (sense of control, feeling secure, feeling pride, having a sense of receiving positive attention) Negative feelings (feeling a failure, feeling ignored)	Six-item VAS (1= not at all, 6= to a very high extent);	1) Spearman's correlation[g] 2) Generalised linear mixed effects model	1) No correlation between personality traits and positive/negative feelings (after a Bonferroni correction). 2) Higher extraversion, lower emotional stability and lower conscientiousness contributed to the odds of reporting stronger negative feelings, controlling for within-maternity unit variation* Personality traits did not predict stronger positive feelings. Women in the lowest 10th percentile for positive feelings and highest 90$_{th}$ percentile for negative feelings had a lower degree of Emotional Stability**
Yadollahi et al. (2013)	Neuroticism Extraversion Agreeableness Conscientiousness Openness	FFI (Persian)	Labour pain	VAS (0=lack of pain, 10=the most intense pain)	1) Pearson's correlation 2) Multiple linear regression	1) Weak (+) correlation between agreeableness and openness with labour pain* Weak (+) correlation between parity and labour pain. 2) Agreeableness (+) predicted labour pain β=.27**. R_2=0.7

Note. VAS Visual/verbal analogue scales; STAI State-Trait Anxiety Inventory (Spielberger et al., 1970); ASI Anxiety Sensitivity Index (Reiss et al., 1986); DPQ Dutch Personality Questionnaire (Luteijn et al., 2000); KSP Karolinska Scales of Personality (Schalling & Edman, 1987); Internal-External Locus of Control Scale (Rotter, 1966); EPQR-S Eysenck Personality Questionnaire Short Scale (Eysenck & Eysenck, 1975); NEO-FFI Neuroticism, Extraversion, Openness Five Factor Inventory (Costa & McCrae, 1992a); NEO-PI Neuroticism, Extraversion, Openness Personality Inventory (Costa & McCrae, 1992b); TIPI Ten Item Personality Inventory (Gosling, Rentfrow, & Swann Jr, 2003); SIMP Single Item Measures of Personality (Woods & Hampson, 2005); FFI Five Factor Inventory (Goldberg, 1990); Stress Appraisal Questionnaire (Włodarczyk & Wrześniewski, 2010); MPQ McGill Pain Questionnaire (Melzack, 1975); MPQ-SF McGill Pain Questionnaire short form (Melzack & Katz, 2001); VD Vaginal delivery, with and without instrumental assistance; VA Vaginal delivery, instrumentally assisted; VN Vaginal delivery, unassisted; ECS Emergency caesarean section; PCS Planned/Elective caesarean section; EA Epidural Analgesia

[a] ASI used as a measure of anxiety in this study. For consistency, the findings were described in relation to anxiety sensitivity rather than anxiety in this review as this was the intended purpose of the instrument

[b] Statistical significance defined as $p < 0.01$

[c] Independent of the experience of complications during labour

[d] Independent of whether they progressed to a ECS

[e] Independent of VA

[f] Only findings $p < .05$ will be considered significant and reported within this review

[g] Statistical significance is defined as $p<0.001$

r= correlational coefficient; b=unstandardized beta; β= standardised coefficient in linear regression analyses; R_2= coefficient of determination; F=variance of the group means/mean squared error
Strength of correlation coefficient 0.1-0.39=weak, 0.4-0.69=moderate, > 0.7=strong (as used by Carvalho et al. (2014))
*p<.05 **p<.01 ***p<.001

Discussion

This review contributes to the growing body of evidence seeking to identify predisposing factors that may directly influence the experience of childbirth. The relatively small number of empirical studies published within the literature, together with high heterogeneity in the personality traits and birth events examined, revealed an abundance of data difficult to synthesise. Whilst the majority of studies included in this review identified significant associations between personality and aspects of birth, the magnitude of effects were often weak to moderate, and seldom replicated between studies. There was also high variability in the design and quality of the studies. Together, these factors prevent reliable conclusions from being drawn regarding the effect of personality upon individual birth events.

When examining the direction of associations between personality and birth events, some tentative themes emerged. Four out of eight studies demonstrated a small to moderate negative effect of high irritation or neuroticism (or low emotional stability) on the appraisal of different birth events. Whilst potential sources of bias were identified in all studies (see Table 2), the methodological quality of two studies involving larger samples were relatively high (Johnson & Brown, 2013; Wilde-Larsson et al., 2011). This strengthens the reliability of this finding. In addition, three further studies suggested that higher levels of anxiety sensitivity may have an adverse effect on specific aspects of the labour pain experience. However, the small sample sizes reduce the clinical utility of this finding at present; replication is thus imperative. Together, the preliminary maladaptive roles of neuroticism and anxiety sensitivity upon birth events are unsurprising. Previous research has suggested that higher levels of these traits may predict patterns of disengagement rather than active coping in response to other stressful life events (Vollrath & Torgersen, 2000), and may predispose higher levels of distress even following minor stressors (Bolger & Schilling, 1991).

A possible adaptive role of conscientiousness upon the perception of birth was preliminarily highlighted in two studies. However, caution is warranted in light of possible selection bias (i.e. Kwissa-Gajewska & Dołęgowska, 2017), and using an assessment of birth with unknown psychometric properties (i.e. Wilde-Larsson et al., 2011). In line with the TTSC (Lazarus & Folkman, 1984), the findings from this review suggest that higher levels of conscientiousness may predispose women to estimate the threat-severity of birth to be lower (i.e. Kwissa-Gajewska & Dołęgowska, 2017) or their capacity to cope with birth to be higher. Perceptions of coping may be associated with increased tendencies to research aspects of birth prior to delivery (Conrad & Stricker, 2018). Engaging in problem-focused coping may enable women to focus their efforts on eliminating potential stressors during birth or to work towards their goals without allowing stressors to interfere (Lee-Baggley, Preece, & DeLongis, 2005). Lower tendencies to respond in this way may contribute towards more negative feelings about childbirth (i.e. Wilde-Larsson et al., 2011), and predispose more unsatisfactory birth experiences. Further exploration of the specific coping patterns utilised by women with higher levels of conscientiousness within a birth context may assist the development of preventative care for women who may not instinctively respond in this way.

Three studies identified a significant association between levels of extraversion and birth appraisal, although the direction of effects were not consistent. The findings from this review indicated that extraversion may be problematic at low and high levels, or it may influence birth events differently. Research indicates that women who are less outgoing may be more reluctant to adopt new approaches if problems arise (Lawrence, Lewis, Hofmeyr, & Styles, 2009). This may partially explain higher rates of caesarean sections and birth complications during delivery (Johnson & Brown, 2013). Nonetheless, individuals with high extraversion typically show reduced sensitivity to negative stimuli including physical pain, and events that may induce low mood (Park, Lee, Sohn, Eom & Sohn, 2014). This was not

consistent with the findings from this review (Carvalho et al., 2014, Wilde-Larsson et al., 2011). In line with the findings from Johnson and Brown (2013), it may be that a personality profile characterised by clusters of specific traits at different levels may simultaneously determine personality-based risk or resources. This warrants further investigation to further understand the role of extraversion on birth experience.

Six studies assessed several predictors simultaneously to determine the relative importance of personality over other vulnerability factors for negative birth appraisals (see Table 3). These included both vulnerability factors in pregnancy and risk factors during birth. With the exception of Lang et al. (2006), five of these studies indicated that prenatal mood states and/or obstetric characteristics were important predictors of birth experience. Three studies showed that personality traits, anxiety sensitivity and irritation specifically, may account for some of the explained variance in birth appraisal. Future research should seek to analyse personality data using multivariate modelling that controls for known predictors of birth experience. This may facilitate our understanding of the unique role of personality within a multidimensional context that is influenced by many factors.

Strengths and limitations

This systematic review has a number of strengths. A comprehensive search strategy was employed (see Appendix B), maximising the identification of all relevant publications within the area. In addition, the process of conducting this review was thorough and objective when accepting studies for inclusion and undertaking the quality assessment. Only published studies were included in this review to minimise potential bias that may be present within studies that haven't undergone peer review (Lowe, 2017). Finally, the review only included studies utilising a standardised assessment of personality, increasing the validity and reliability of the findings.

A number of limitations of the review also exist. Firstly, high heterogeneity in the instruments used to measure both personality and birth experience precluded a holistic assessment of reliability and validity, and contributed to the lack of clear consensus in the findings. Thus, greater consistency between research studies would be invaluable when selecting assessment measures. Secondly, recruiting participants via convenience sampling (n=9) impeded the authors ability to generalise the findings from this review across socioeconomic groups. Recruiting representative samples of pregnant women may reduce possible selection bias. Finally, the association between parity and birth appraisal remains uncertain within the literature (Lundgren, 2005). The present eligibility criteria did not control for parity in order to provide an accurate summation of the studies conducted to date. In doing so, this review is unable to determine whether the relationship between personality and childbirth appraisal in some instances may be confounded by prior experiences of birth. In particular, higher levels of anxiety sensitivity have previously been related to prior negative birth experience (Gardner, 2003). Given that parity was unclear in all but one study examining anxiety sensitivity, it is impossible to omit this as a source of bias.

Clinical relevance

The preliminary identification of personality-based risk and protective factors may increase the awareness and understanding of maternity care providers regarding heterogeneity in birth appraisal. This may contribute to the development of new strategies for preventing and reducing the risks associated with negative or unsatisfactory births. Specifically, expectant women may benefit from antenatal discussion with their midwives around previous patterns of coping with stressful life events. Where more maladaptive coping responses are highlighted, individually-tailored information and care should be provided that becomes embedded within birth planning. However, it is imperative that maternity care providers continue to monitor for other contextual, obstetric or interpersonal factors influencing

childbirth, which may presently show stronger and more consistent associations with negative and unsatisfactory appraisals of birth (Howarth, Swain, & Treharne, 2010; Henriksen et al., 2017; Smarandache et al., 2016).

Further research

Evidence of a relationship between personality and birth experience is presently limited by the lack of a gold standard assessment of the birth experience. Examining a narrow spectrum of feelings or types of appraisal about birth means that other important themes supported by the literature (e.g. participation in birth; Dencker, Taft, Bergqvist, Lilja, & Berg, 2010) are unlikely to have been adequately captured. Summated rating scales may also have less utility when the objective is to improve maternity care and inform healthcare policy (Bell & Andersson, 2016). Integrating qualitative interviews with more robust assessments of birth experience, including the Childbirth Experience Questionnaire (Dencker et al. 2010), may further enrich our understanding of the link between personality and appraisals of birth.

Conclusion

This is the first review of the literature to explore the relationship between personality traits and childbirth experience. It provides preliminary evidence that levels of specific personality traits may predict appraisals of labour and childbirth. A significant association between personality and birth events were identified in twelve out of thirteen studies. Some key themes emerged: (1) higher levels of neuroticism and anxiety sensitivity may predispose more physically and psychologically challenging experiences of birth, (2) elevated conscientiousness may offer a protective role against negative birth experiences, and (3) the role of extraversion remains unclear in light of the divergent results. However, the present findings are limited by the small number of data sources currently available, high

heterogeneity in the personality traits and birth events examined, and the variable quality of studies. Future research must address these limitations prior to firm conclusions being drawn regarding the clinical significance or utility of the research conducted to date.

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Chapter Two: Empirical Paper

Personality Factors and Vulnerability to Posttraumatic Stress Responses after Childbirth: An Investigation of the Roles of Perfectionism, Intolerance of Uncertainty and Organisation

Prepared in accordance with guidelines for submission to Archives of Women's Mental Health (Appendix E).

Abstract

This prospective study investigated whether levels of perfectionism, organisation and intolerance of uncertainty predispose more negative birth experiences and postpartum posttraumatic stress symptoms (PTSS). Birth experience was also examined as a potential moderator of the relationship between levels of the personality traits and postnatal PTSS. First-time expectant mothers (*N*=10,000) were contacted via *Emma's Diary* during the perinatal period. At 32 to 42 weeks' gestation, participants completed measures examining the three personality traits and prenatal mood. At 6 to 12 weeks' postpartum, instruments assessing childbirth experience, birth trauma, PTSS and postnatal mood were administered. Data from 418 women were analysed. Higher perfectionism and intolerance of uncertainty were associated with more negative birth appraisals and PTSS. Organisation was not related to birth experience or PTSS, and was not included in the regression analyses. Higher intolerance of uncertainty predicted more negative feelings about birth. Elevated perfectionism predicted more negative birth appraisals and PTSS. Birth experience did not moderate the relationship between perfectionism or intolerance of uncertainty and PTSS. Risk factors for negative birth experiences and postnatal PTSS are identifiable prenatally. Maternity care providers should educate women about the unique roles of high perfectionism and intolerance of uncertainty during antenatal birth planning.

Key Words: Perfectionism, Organisation, Intolerance of Uncertainty, Childbirth Experience, Posttraumatic Stress Symptoms

Introduction

Childbirth is often considered to be a positive life experience for new mothers (Lyerly 2012). However, up to 45% of women may appraise childbirth as traumatic (Alcorn et al. 2010), with an estimated 3.1% of women meeting the criteria for posttraumatic stress disorder at 12 weeks' postpartum (Grekin and O'Hara 2014). Adverse outcomes associated with postnatal posttraumatic stress symptoms (PTSS) include maternal distress and depression (Shahar et al. 2015), sexual and marital difficulties (Ayers et al. 2006), and problems with mother-infant attachment (Dekel et al. 2019). Identifying factors that may predict emotional difficulties following childbirth is therefore imperative; doing so may enable us to tailor preventative care.

Conceptual frameworks distinguish between vulnerability factors in pregnancy, risk factors during birth, and maintaining factors after birth in the onset and maintenance of PTSS (Ayers 2004; Slade 2006). Specifically, the Diathesis-Stress model explains postpartum health outcomes as an interplay between pre-trauma vulnerability factors and birth events (Ayers et al. 2016). Perinatal risk factors associated with postnatal PTSS include pre-existing maternal psychological difficulties (Czarnocka and Slade 2000), prior trauma (Ayers et al. 2016), and a severe fear of childbirth (Söderquist et al. 2009). Additional psychosocial factors including age, parity, unplanned pregnancy and socioeconomic status have shown small and inconsistent associations with PTSS (Andersen et al. 2012). To date, these vulnerability factors have largely been assessed retrospectively when self-reports of predisposing variables may be influenced by postnatal psychological states (McNally 2003).

Reviews of PTSS in other populations (i.e. mental health advocates) have indicated that personality traits may underlie vulnerability or resilience to PTSS following trauma exposure (DiGangi et al. 2013; Jakšić et al. 2012). Personality traits are defined as enduring and stable patterns of thoughts, feelings and actions across contexts and developmental

periods (McCrae and Costa 2003). The findings from a recent systematic review indicated that higher levels of neuroticism, trait hostility/anger and trait anxiety may predispose higher levels of PTSS in non-childbearing samples, whilst higher levels of extraversion, conscientiousness, hardiness and optimism may be protective against PTSS (Jakšić et al. 2012). Factors influencing PTSS following birth may differ from other potentially traumatic events as the event is expected, occurs within the context of formal care, and is anticipated to have a positive outcome (McKenzie-McHarg et al. 2015). This may limit the generalisability of these findings to female only samples within the context of traumatic birth.

There is a scarcity of research examining the role of personality-based risk factors for PTSS related to birth. The present study seeks to address this gap in the literature. Antecedent traits thus far related to postpartum PTSS have included high trait anxiety (Czarnocka and Slade 2000; Haagen et al. 2015), high anxiety sensitivity (Keogh et al. 2002; O'Donovan et al. 2014), low internal locus of control (Soet et al. 2003) and high neuroticism (Lyons 1998; Garthus-Niegel et al. 2014). However, these relationships have not been consistently replicated (Creedy et al. 2000; Maggioni et al. 2006).

One personality characteristic that may influence birth appraisal and the development of postpartum PTSS is perfectionism. Women's transition into motherhood may be influenced by sociocultural expectations of the 'perfect' pregnancy and birth, in addition to the pressures women put on themselves (Henderson et al. 2016). The setting of markedly high performance standards and high levels of self-scrutiny (Frost et al. 1990) may be problematic in an environment where multiple factors determine the process of birth. However, the effect of perfectionism on birth appraisal and postnatal PTSS are yet to be explored. Perfectionism in pregnancy thus far has only been studied in relation to postnatal depression, anxiety and maternal bonding (Egan et al. 2017; Oddo-Sommerfeld et al. 2016). As higher perfectionism has been associated with greater PTSS following other stressful

events in community samples (Egan et al. 2014), elevated perfectionism may also negatively impact upon women's psychological wellbeing after birth.

Organisation is another personality trait that may affect the appraisal of birth and postpartum PTSS. Trait organisation is the tendency to be overly orderly, organised and tidy (Antony et al. 1998), and is distinct from perfectionism (Frost et al. 1990). The findings from qualitative reviews demonstrate that a large proportion of expectant mothers attend all prenatal midwifery appointments, read educational resources and develop birth plans in preparation for childbirth (Divall et al. 2017). Whilst organisation has not been associated with postnatal depression (Gelabert et al. 2012), difficulties in implementing birth plans have been related to more negative appraisals of birth (Cook and Loomis 2012). Given that unsatisfactory experiences of birth pose a key vulnerability factor for postpartum PTSS (Dekel et al. 2017), expectant mothers who are more organised may be more vulnerable to psychological distress during the postpartum period.

Despite careful planning, the unpredictable nature of labour and birth means that women inevitably experience a lot of uncertainty when they give birth for the first time. Individuals with higher levels of intolerance of uncertainty are more likely to interpret and respond to ambiguous events as threatening (Dugas et al. 2004), experience higher levels of distress in uncertain situations (Bottesi et al. 2019), and may endorse more negative beliefs about their ability to cope (Doruk et al. 2015). This may have a detrimental impact on women's experience of birth, although this is yet to be investigated. More recently, higher intolerance of uncertainty has been associated with PTSS of avoidance, numbing and hyperarousal (Fetzner et al. 2013), and increased PTSS in women following exposure to unpredictable or traumatic events (Oglesby et al. 2016). Therefore, it is possible that higher intolerance of uncertainty may also play a role in the development and severity of childbirth-related PTSS.

Aims and Hypotheses

The identification of personality-based vulnerability factors for negative birth experiences and PTSS could contribute towards the development of health policies aimed at improving the awareness, knowledge and understanding of women's mental health during the perinatal period. This study aimed to determine whether predisposing personality traits in pregnant women affect the experience of birth, and women's wellbeing during the early postnatal period. Specifically, we aimed to test three hypotheses. Firstly, we hypothesised that women with higher levels of perfectionism, organisation or intolerance of uncertainty would be more likely to appraise their childbirth as more negative, and experience higher levels of PTSS relating to childbirth. Secondly, we hypothesised that these relationships would continue to be evident when prenatal mood was controlled. Finally, we hypothesised that the relationships between levels of perfectionism, organisation or intolerance of uncertainty, and postpartum PTSS would be moderated by the appraisal of birth.

Materials and Method

Study Design

A prospective survey design was adopted, with participants assessed at two time points: between 32 to 42 weeks' gestation (time 1), and approximately 6 to 12 weeks after childbirth (time 2). Data were collected between September 2018 to February 2019.

Participants

At time 1, women aged 18 to 50 who were at least 32 weeks pregnant with their first child, were included. Participants who disclosed a history of mental health difficulties, or those receiving input from the perinatal mental health team, were excluded. Participants were also exempt if they were expecting two or more infants, their pregnancy was considered high risk

(i.e. under consultant-led care), or plans were in place to give birth by elective caesarean section. At time 2, women who gave birth at or after 37 weeks of pregnancy were included. Women who experienced a pregnancy loss or stillbirth, were receiving input from the perinatal mental health team, or whose infant required neonatal care for more than 48 hours, were excluded. This criteria reduced the number of potential confounds on the mechanisms underlying birth experience and postpartum wellbeing.

Procedure

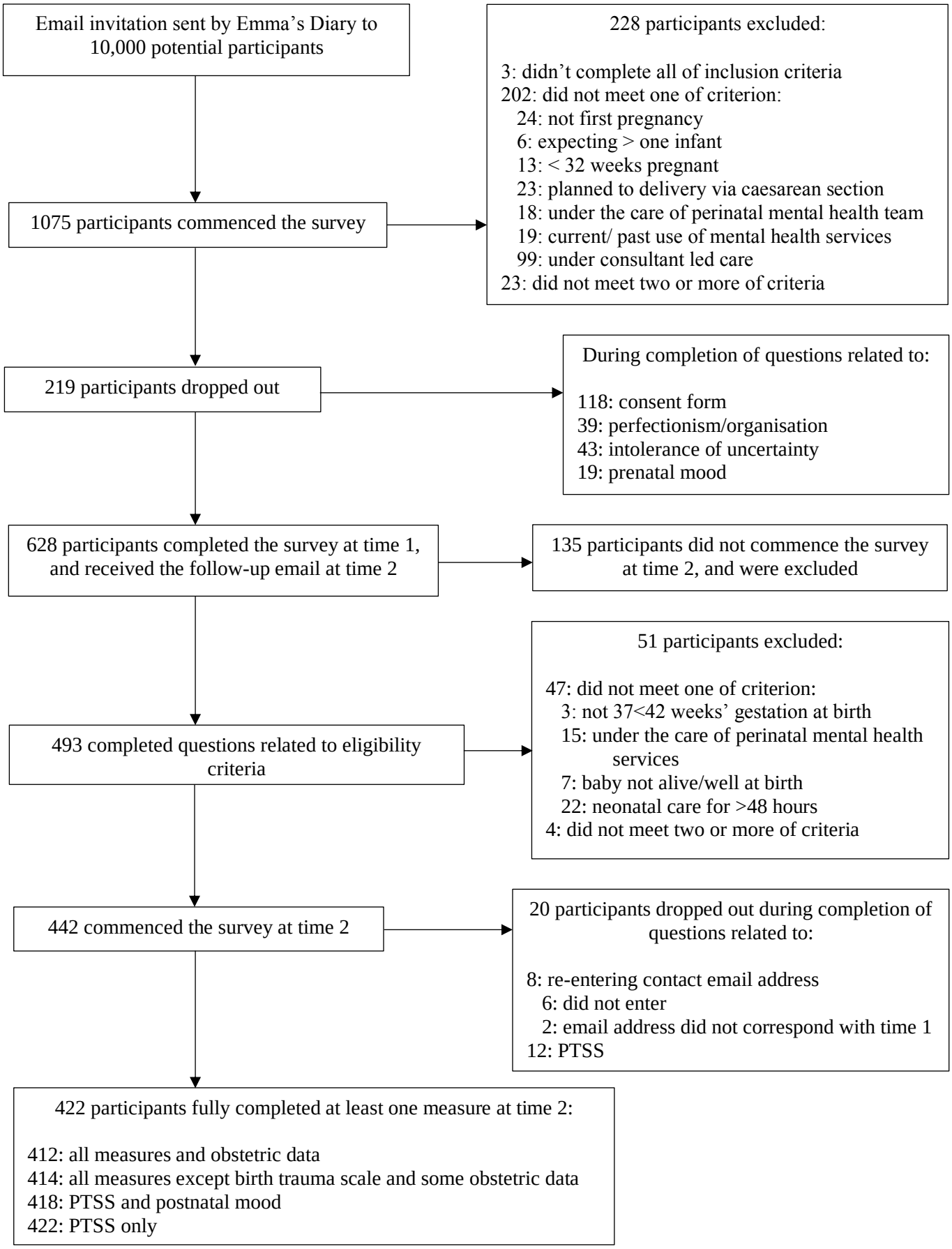
Ethical approval was obtained from The University of Liverpool Ethics Committee prior to data collection (Appendix F). Participants were recruited via *Emma's Diary* (www.emmasdiary.co.uk). This is an online resource which offers information to women about pregnancy, childbirth and motherhood. Information about *Emma's Diary* is routinely supplied to women during pregnancy by their NHS general practitioner. Women who register are asked to provide personal demographic information and their expected date of delivery. They then have the option to participate in relevant research studies.

Measures were administered via Qualtrics (www.qualtrics.com). At time 1, an email invitation was sent to 10,000 website registrants who met the inclusion criterion as determined by the information supplied to *Emma's Diary*. Participants read an information sheet outlining the study aims and procedures, and provided their informed consent. Eligibility to participate was then assessed. Participants who met the inclusion criteria then provided demographic information and completed three measures assessing personality traits and mood. At time 2, participants received a follow-up email from the researchers. Eligibility to participate was then assessed, prior to participants completing five measures assessing PTSS, childbirth experience, birth trauma and mood, and answering questions about their

obstetric experience. Participants who completed all measures had the opportunity to enter into a prize draw for their time (see Appendix G to K for copies of all study documentation).

The participant recruitment flowchart is outlined in Figure 1. Altogether, 1075 participants commenced the survey, 228 participants were excluded and 219 did not complete the data set. 628 participants completed the survey, and were eligible to receive the follow-up email (6.3% response rate). At time 2,493 participants attempted to complete the eligibility criteria. Following this, 51 participants were excluded and 20 did not complete one full measure. In total, 422 participants completed at least one full measure (67.2% completion rate), with this data reviewed for potential analysis.

Figure 1. Participant recruitment flowchart



Measures

At time 1, demographic information was collected concerning age, marital status, educational attainment and employment status. Participants also indicated their current gestational age. In addition, participants were administered three questionnaires (see Appendix K for copies of all outcome measures):

Personality traits

Perfectionism and organisation: The Frost Multidimensional Perfectionism Scale (FMPS; Frost et al. 1990) is a 29-item measure of perfectionism consisting of five subscales: *concern over mistakes*, *personal standards*, *parental expectations*, *parental criticism* and *doubt about actions.* A sixth subscale, organisation, is not routinely included in the total perfectionism score, but was included as a 6-item measure of organisation. This measure has been validated on women during pregnancy (Oddo-Sommerfeld et al. 2016) and had good to excellent internal consistency for perfectionism (α =.92) and organisation (α =.83) in the present sample.

Intolerance of Uncertainty: The Intolerance of Uncertainty Scale, Short Form (Carleton et al. 2007) is a 12-item measure that assesses responses to uncertainty, ambiguous situations and the future on a 5-point Likert Scale (1 = *not at all characteristic of me*, 5 = *entirely characteristic of me*). This measure has been validated on clinical samples (Laposa et al. 2015), significantly correlates with the full 27-item version (r =.96; McEvoy and Mahoney 2011), and had excellent internal consistency (α =.90) in the present sample.

Emotional functioning

The Center for Epidemiological Studies-Depression Scale (CES-D; Radloff 1977) is a 20-item self-report questionnaire used to screen for the presence and frequency (0 = *rarely or*

none of the time, to 3 = *most or all of the time*) of affect, social and/or behavioural symptoms associated with depression. This measure has been validated for use with women during the perinatal period (Onoye et al. 2013). The scale showed good internal consistency, α =.89, in the present sample.

At time 2, obstetric information including mode of birth and duration of labour were collected. In addition to the CES-D, participants completed four measures:

Appraisals of childbirth

The Childbirth Experience Questionnaire (CEQ; Dencker et al. 2010) is a 22-item measure assessing the experience of childbirth across four domains: *own capacity, professional support, perceived safety and participation*. A 4-point Likert scale is used for 19 of the items (4 = *totally agree*, 1 = *totally disagree*), and a visual analogue scale is used for the final 3 items. Higher scores indicated better childbirth experience. Question 9 was removed at the request of *Emma's Diary*. The CEQ demonstrates a strong correlation (r =.73) with the 'gold standard' interview assessment tool (the Maternity Survey). Cronbach's alpha for the *participation* subscale was .43 in the present sample. However, internal consistency for the remaining scales and total CEQ was good (α ranged between .79 and .90).

The Experience of Birth Scale (EBS; Slade et al. 1993) is a 10-item measure consisting of independent positive and negative subscales of adjectives to describe birth. Positive adjectives included "exciting" and "exhilarating," whereas negative adjectives included "frightening" and "difficult." Participants were asked to rate the extent to which they experienced each emotion on a 0 to 10 visual analogue scale. The measure has good content

validity as it was developed with women postnatally (Slade et al. 1993). Cronbach's alpha was .88 for positive feelings and .70 for negative feelings in the present sample.

Women's appraisal of birth was also measured through an assessment of birth trauma developed by Slade et al. (2014), based upon *The Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev; American Psychiatric Association 2000). Participants were asked if at any time during childbirth or after birth whilst in hospital they (a) experienced horror or helplessness about what was happening, (b) felt really frightened about their own or their baby's wellbeing. Responses were scored on a binary scale (0 = *no*, 1 = *yes*). Cronbach's alpha was .60 in the present sample.

PTSS

PTSS were assessed using The Impact of Events Scale-Revised (IES-R; Weiss 2007). Participants rated their responses to 22 items on a 5-point Likert Scale (0 = *not at all*, 4 = *extremely*). Three subscales investigated three symptom clusters of PTSS: *intrusive thoughts*, *avoidance behaviours* and *hyperarousal*, with higher scores indicative of more symptoms. Participants were asked to answer all questions in relation to their experiences of childbirth. The IES-R has good reliability in perinatal samples (Gökçe İsbir et al. 2016), and showed excellent internal consistency (α =.93) in the present sample.

Power calculation

The power analysis was based on the least powerful test (i.e. moderation analysis) to ensure adequate power for all analyses. A priori power calculation using G*Power 3 software (Faul et al. 2007) indicated a required sample size of 403 participants at time 2, in order to obtain a small effect of 0.3, an alpha error probability of .05 and power of .80 (Appendix M). A conservative estimate was used due to being unclear about which personality factors would be included within the final regression model prior to data analysis.

Statistical analysis

The data was analysed using the Statistical Package for Social Science version 25 (IBM Corp 2017). The key study variables were examined to confirm they met the assumptions for parametric data analysis. Normality checks were conducted for each measure using the Kolmogorov-Smirnov normality statistic (Smirnov 1948), and examining the distribution of histograms and skewness and kurtosis statistics. PTSS were non-normally distributed, with skewness of 1.94 (*SE*=.12) and kurtosis of 4.36 (*SE*=.24). In addition, prenatal and postnatal mood violated the assumption of normality, with skewness of 1.12 and 1.17 (*SE*=.12) and kurtosis of 1.58 and 1.08 (*SE*=.24) respectively. Log transformations were performed for these variables only, to achieve normality. No significant differences were found in the results of the statistical tests performed for transformed and non-transformed data. Therefore, the analyses presented used non-transformed data.

Parametric tests are robust to violations of normality when the sample size is large (Field 2013). These tests were used to identify (a) differences between participants who completed measures at both time points versus participants who discontinued after time 1, (b) to assess the relationships between all independent and dependent variables, and (c) to examine the effect of the demographic and obstetric variables on the independent and dependent variables. Inferential statistics were evaluated at the .05 significance level. Effect sizes indicated the magnitude of observed differences (e.g. 0.2=small, 0.5= moderate, 0.8=large; Cohen 1988), since the sample was large and even small effects would be significant. Hierarchical regressions were conducted to determine whether levels of the personality traits predicted birth experience (CEQ and EBS) and PTSS. Finally, a moderation analysis was conducted to examine whether the relationships between levels of the personality traits and PTSS were moderated by the appraisal of birth (CEQ).

Results

Missing data

Of the 422 participants who completed at least one full measure at time 2, data from 4 participants were excluded prior to any analysis due to concerns regarding response bias (n=418). The total number of participants included in each section of the analysis will be indicated.

Participants

Demographic and obstetric data are displayed in Table 1 and 2. The majority of participants were below 30 years old (56%), were either married (58.1%) or cohabiting (32.8%), had obtained higher educational qualifications (67.7%) and were employed during pregnancy (90.2%).

Table 1.
Demographic data of the study population

	Total n	**%**
Age (years)		
18 ≤ 30	234	56.0
31 < 50	184	44.0
Marital Status		
Married	243	58.1
Cohabiting	137	32.8
Not married	175	9.1
Educational Attainment		
No qualifications/GCSE's	50	12
A levels/vocational qualifications	85	20.3
Graduate/post graduate	283	67.7
Pre-pregnancy employment		
Employed (full time/part time/self-employed)	377	90.2
Unemployed (out of work/voluntary work/student)	41	9.8

Note. n=418

Over two-thirds of participants estimated that they were in labour for less than 24 hours, with half of participants undergoing an unassisted vaginal delivery. The majority of participants used pain relief (81.6%), with gas and air the most prevalent method. Approximately 75% of participants reported experiencing some form of maternal complication during or immediately after birth, with 27.2% of women experiencing maternal complications during the postpartum period.

Table 2.
Obstetric data of the study population

	Total n	**%**
Number of weeks' gestation at birth		
37 ≤ 38 weeks	45	10.9
38 ≤ 39 weeks	45	10.9
39 ≤ 40 weeks	91	21.1
40 ≤ 41 weeks	123	29.9
41 ≤ 42 weeks	108	26.2
Induction provided		
Yes	164	39.8
No	248	60.2
Self-reported length of labour		
0 ≤ 24 hours	278	67.5
24 ≤ 48 hours	98	23.8
48 ≤ 72 hours	22	5.3
> 72 hours	14	3.4
Pain relief used		
Yes	336	81.6
No	76	18.4
Method of pain relief (if used, n=336)		
Gas and air	165	49.1
Epidural	144	42.9
General anaesthetic	7	2.1
Other	20	5.9

Table 2. *(Continued)*

	Total n	**%**
Mode of birth		
Normal vaginal delivery	206	50.0
Assisted vaginal delivery	112	27.2
Emergency caesarean section	93	22.6
Missing data	1	0.2
Others present at birth (excluding health professionals)		
Yes	408	99.1
No	3	0.7
Missing data	1	0.2
Foetal distress		
Yes	177	43.0
No	234	56.8
Missing data	1	0.2
Infant required neonatal care		
Yes	31	7.5
No	380	92.3
Missing data	1	0.2
Length of neonatal care (if required, n=31)		
0 ≤ 24 hours	21	67.7
24 ≤ 48 hours	10	32.3
Maternal complications during/immediately after birth		
Vaginal tear requiring stitching	156	37.9
Episiotomy	93	22.5
Heavy blood loss requiring a transfusion	23	5.6
Other	36	8.7
None	102	24.8
Missing	2	0.5
Maternal complications since birth		
Vaginal infection	33	8.0
Caesarean wound infection	22	5.4
Major bleeding (haemorrhage)	7	1.7
Other	50	12.1
None	298	72.3
Missing data	2	0.5

Note. n=412

Comparisons between participants who completed measures at both time points (n=418) versus participants who discontinued after time 1 (n=206)

Independent samples t-tests indicated that participants who were retained at time 2 (*M*=22.81, *SD*=5.18) scored higher on the personal standards domain of perfectionism compared to participants who were lost to the study through non-participation (*M*=21.87, *SD*=5.52), *t*(622)=-2.07, *p*=.039, *d*=-.176. The magnitude of effect was small. There were no other significant differences.

Pearson's Chi-squared tests were conducted to examine for differences in demographic characteristics between the two groups. Marital status, educational attainment and pregnancy employment status were significant. Participants who fully completed at least one measure at time 2 were more likely to be married, X_2 (2)= 6.27, *p*=.043, have higher educational qualifications, X_2 (2) = 24.80, *p*<.001, and be in paid employment during pregnancy, X_2 (1) = 5.09, *p*=.024.

Prevalence of PTSS and trauma appraisals of birth

Table 3 displays the descriptive statistics for all predictor and outcome measures. In accordance with IES-R classification guidelines (Weiss 2007), the level of PTSS experienced by three hundred and sixty four participants (87.1%) did not reach the sub-diagnostic threshold for posttraumatic stress disorder (score < 24). Of the remaining fifty four participants, twenty eight participants (6.7%) experienced symptoms commensurate with partial PTSS (score 24 ≤ 32), and five participants (1.2%) experienced symptoms that would indicate a probable diagnosis (score 33 ≤ 36). A further twenty-one participants (5%) scored above the clinical-cut off for a diagnosis of posttraumatic stress disorder (score > 37).

Table 3.

Descriptive statistics (n=418)

Variable	Mean (SD)	Range of scores	Possible range of scores
Prenatal period (32 ≤ 42 weeks' gestation)			
Perfectionism	74.29 (17.88)	33-129	29-145
Concern over mistakes	20.81 (7.24)	9-41	9-45
Personal standards	22.81 (5.18)	8-35	7-35
Parental expectations	12.87 (4.11)	5-25	5-25
Parental criticism	7.68 (3.45)	4-18	4-20
Doubts about actions	10.12 (3.35)	4-19	4-20
Organisation	24.78 (3.49)	14-30	6-30
Intolerance of uncertainty	28.83 (8.86)	13-54	12-60
Prospective Anxiety	18.73 (5.51)	7-34	7-35
Inhibitory Anxiety	10.09 (4.05)	5-21	5-25
Prenatal mood	12.91 (8.80)	0-50	0-60
Postnatal period (6 ≤ 12 weeks)			
PTSS	10.85 (12.04)	0-69	0-88
Intrusion	4.99 (5.33)	0-28	0-32
Avoidance	3.58 (4.72)	0-24	0-32
Arousal	2.28 (3.31)	0-20	0-24
Postnatal mood[a]	12.92 (10.47)	0-56	0-60
Childbirth experience[b]			
Participation	2.89 (0.75)	1-4	1-4
Own capacity	2.45 (0.61)	1-4	1-4
Professional support	3.49 (0.64)	1.6-4	1-4
Perceived safety	2.95 (0.69)	1-4	1-4
Total childbirth experience	2.95 (0.52)	1.4-4	1-4
Positive feelings	23.47 (12.03)	0-50	0-50
Negative feelings	29.18 (8.99)	7-50	0-50
	Total n	**%**	
Birth trauma[c]			
Horror or helplessness experienced	172	42.0	
Frightened about own or infant's wellbeing	136	33.2	
Met both criteria	97	23.7	

Note. [a] n=415, [b] n=412, [c] n=410

An assessment of birth trauma developed by Slade et al. (2014) indicated that 42% of the present sample experienced horror or helplessness about what was happening during birth, and 33.2% felt really frightened about their own or their baby's wellbeing. Just under a quarter of the sample (23.7%) experienced both aspects of birth trauma. In the subsequent analyses, birth trauma responses were coded to represent increasing levels of negative birth experience (0 = *no to both statements*, 1 = *yes to one statement*, 2 = *yes to both statements*).

Do higher levels of perfectionism, intolerance of uncertainty or organisation increase the likelihood of appraising childbirth as more negative?

The zero-order correlation coefficients for all study variables are shown in Table 4. Higher levels of perfectionism were negatively related to all CEQ subscales (*r*s ranged from -.10 to -.23, *p* values ranged from .034 to <.001) and total CEQ (*r*=-.21, *p*<.001). Higher levels of perfectionism were related to more negative feelings and less positive feelings about birth experience (EBS), *r*=.25, *p*<.001 and *r*=-.16, *p*<.010, respectively. Significant positive correlations were also found for levels of perfectionism and the appraisal of birth as traumatic (Slade et al. 2014), *r*=.18, *p*<.001. Higher levels of intolerance of uncertainty were negatively but weakly related to *own capacity*, *perceived safety* and total CEQ (*rs*=-.15, *p*<.003), in addition to negative feelings about the birth experience (EBS), *r*=.28, *p*<.001. Significant positive correlations were also found for levels of intolerance of uncertainty and the experience of birth trauma (Slade et al. 2014), *r*=.18, *p*<.001. Organisation was not related to any measure of birth experience (*p* values ranged from .962 to .221). Overall, only higher levels of perfectionism and intolerance of uncertainty were related to a more negative experience of birth, but the magnitude of effects for all findings were small, given the longitudinal nature of the study. This provided partial support for the hypothesis that women with higher levels of specific personality traits may appraise birth as more negative.

Table 4.

Intercorrelations of study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Perfectionism	—													
2. Organisation	0.220 ***	—												
3. Intolerance of uncertainty	0.568 ***	0.204 ***	—											
4. Prenatal mood	0.375 ***	-0.003	0.435 ***	—										
5. PTSS	0.278 ***	0.077	0.210 ***	0.239 ***	—									
6. Postnatal mood	0.315 ***	0.024	0.293 ***	0.466 ***	0.603 ***	—								
7. Own capacity	-0.202 ***	-0.006	-0.153 **	-0.206 ***	-0.310 ***	-0.214 ***	—							
8. Professional support	-0.123 *	0.023	-0.065	-0.179 ***	-0.220 ***	-0.200 ***	0.321 ***	—						
9. Perceived safety	-0.234 ***	-0.023	-0.146 **	-0.206 ***	-0.425 ***	-0.291 ***	0.764 ***	0.493 ***	—					
10. Participation	-0.104 *	-0.002	-0.088	-0.150 **	-0.167 ***	-0.145 **	0.399 ***	0.380 ***	0.398 ***	—				
11. CEQ (Total)	-0.213 ***	-0.003	-0.146 **	-0.239 ***	-0.361 ***	-0.274 ***	0.793 ***	0.703 ***	0.854 ***	0.731 ***	—			
12. Negative feelings (EBS)	0.250 ***	0.059	0.284 ***	0.317 ***	0.378 ***	0.364 ***	-0.574 ***	-0.193 ***	-0.580 ***	-0.170 ***	-0.483 ***	—		
13. Positive feelings (EBS)	-0.159 **	-0.011	-0.092	-0.133 **	-0.186 ***	-0.205 ***	0.649 ***	0.292 ***	0.594 ***	0.304 ***	0.590 ***	-0.337 ***	—	
14. Birth trauma	0.182 ***	0.061	0.183 ***	0.195 ***	0.392 ***	0.278 ***	-0.504 ***	-0.284 ***	-0.562 ***	-0.314 ***	-0.547 ***	0.395 ***	-0.312 ***	—

Note. All correlations represent Pearson's r coefficients, with the exception of birth trauma (Slade et al. 2014) where Spearman's Rank-Order Correlations were used. Strength of correlation coefficient 0.1-0.39=weak, 0.4-0.69=moderate, > 0.7=strong

CEQ = Childbirth Experience Questionnaire; EBS = Experience of Birth Scale; PTSS = Posttraumatic Stress Symptoms

* p < .05, ** p < .01, *** p < .001

Do higher levels of perfectionism, intolerance of uncertainty or organisation increase the likelihood of experiencing higher levels of PTSS relating to childbirth?

Higher levels of perfectionism and intolerance of uncertainty (*r*s ranging from .21 to .28, $p<.001$) were related to higher levels of PTSS after childbirth. Levels of organisation were not related to levels of PTSS ($p=.114$). Overall, only higher levels of perfectionism and intolerance of uncertainty increase the risk of experiencing more PTSS after birth, but the magnitude of effects were small. This provided partial support for the hypothesis that women with higher levels of specific personality traits may experience higher levels of PTSS related to birth. Together, bivariate correlations showed no relationship between organisation and the dependent variables; organisation was therefore not included in further analyses.

Demographic background and obstetric experience

A series of one-way ANOVAs and independent samples t-tests were conducted to compare the effect of demographic and obstetric variables on levels of the two personality traits, CEQ (birth experience), EBS (positive and negative feelings) and PTSS. These tests were conducted to identify additional variables to be controlled within the regression models.

Firstly, an independent-samples t-test showed a significant difference between women aged 18 ≤ 30 years and 31 ≤ 50 years on levels of intolerance of uncertainty, $t(416)=2.56$, $p=.011$, $d=.25$. Levels of intolerance of uncertainty were significantly higher for women between 18 ≤ 30 years (M=29.80, SD=9.34) than women who were aged between 31 ≤ 50 years ($M=27.58$, $SD=8.06$). As the size of the effect was small, age was not controlled for throughout the regression analyses. There were no other significant differences between age, marital status, education level and employment, and the independent and dependent variables (*p* values ranged from .087 to .958). Thus, demographic background was not controlled for throughout the regression analyses.

Secondly, an independent-samples t-test showed a significant difference between experiences of foetal distress during birth on levels of perfectionism, $t(409)=-2.75$, $p=.006$. Women who reported foetal distress had higher levels of perfectionism ($M=77.05$, $SD=18.83$), than those who did not report this ($M=72.19$, $SD=16.89$). The magnitude of the effect was small ($d=-.274$). As the presence of foetal distress was derived from self-report data rather than an objective source (i.e. health records), significant associations between perfectionism and foetal distress could represent a perceptual confound. Foetal distress was therefore not controlled for in the regression analyses.

Thirdly, a series of one-way ANOVAs showed a significant effect of mode of birth on the CEQ, $F(2,408) = 17.62$, $p<.001$, $\eta^2=.080$, negative feelings, $F(2,408) = 7.11$, $p<.001$, $\eta^2=.034$, positive feelings, $F(2,408) = 4.21$, $p=.015$, $\eta^2=.020$, and PTSS, $F(2,408) = 4.762$, $p=.009$, $\eta^2=.023$. Hochberg's GT2 post hoc test indicated that women who underwent an assisted vaginal delivery ($M=2.84$, $SD=.43$) or a caesarean section ($M=2.76$, $SD=.53$) appraised their birth experience as more negative (CEQ) than women undergoing an unassisted vaginal delivery ($M=3.09$, $SD=.51$). Additionally, women who underwent an assisted vaginal delivery ($M=31.13$, $SD=7.75$) or a caesarean section ($M=30.43$, $SD=9.03$) scored significantly higher on negative feelings about birth than women undergoing an unassisted vaginal delivery ($M=27.55$, $SD=9.35$). Additionally, women who underwent an assisted vaginal delivery ($M=21.52$, $SD=11.78$) scored significantly lower on positive feelings about birth than women undergoing an unassisted vaginal delivery ($M=25.18$, $SD=.11.82$). Finally, women who underwent an assisted vaginal delivery $M=13.19$, $SD=12.38$) experienced significantly higher PTSS than women undergoing an unassisted vaginal delivery ($M=9.13$, $SD=.11.27$). Together, these results indicated that women undergoing a medical intervention during delivery appraised their childbirth more negatively, experienced more negative feelings and PTSS, and less positive feelings about birth. Given

the small to moderate effects indicated, mode of delivery was controlled for in the regression models. The data for mode of birth was simplified and recoded (0 = *unassisted vaginal delivery*, 1 = *delivery requiring medical intervention*) prior to being entered into the regression analyses to reflect the pattern of significant differences found.

Finally, an independent samples t-test showed a significant difference between the experience of complications since birth on PTSS, $t(408)=-4.614$, $p<.001$. Women who experienced complications ($M=15.27$, $SD=9.23$) reported significantly more PTSS than those who did not experience any complications ($M=9.23$, $SD=10.77$) since birth. The magnitude of the effect was moderate ($d=-.511$). Complications since birth (coded as 0 = *no complications*; 1 = *complications experienced*) was therefore controlled for in the regression analyses where PTSS represented the dependent variable.

Do the relationships between perfectionism or intolerance of uncertainty continue to be evident on birth experience when prenatal mood and mode of birth are controlled?

To test this hypothesis, three hierarchical multiple regressions using the enter method were performed to predict birth experience (CEQ and EBS) from perfectionism and intolerance of uncertainty, whilst controlling for prenatal mood and mode of birth. Assumptions for regression analyses were first assessed. A small degree of multi-collinearity was observed. The variance inflation factor (VIF) ranged from 1.13 to 1.62. VIFs below 10 are widely considered as acceptable (O'Brien 2007). This suggested a limited effect of collinearity on the prediction models, with no further action warranted. Table 5 reports the individual beta coefficients and standard errors for each of the predictors.

Table 5.

Hierarchical regressions of childbirth experience regressed onto prenatal mood, mode of birth, perfectionism and intolerance of uncertainty

	CEQ			Negative feelings (EBS)			Positive feelings (EBS)		
	b	**SE**	**Std. β**	***b***	**SE**	**Std. β**	***b***	**SE**	**Std. β**
Step 1									
Prenatal mood	-.015	.003	-.260***	.340	.047	.331***	-.196	.067	-.143**
Mode of birth	-.305	.047	-.296***	3.69	.826	.205***	-3.64	1.17	-.151**
Step 2									
Perfectionism	-.004	.002	-.142*	.039	.028	.078	-.090	.040	-.134
Intolerance of uncertainty	.002	.003	.026	.140	.058	.137*	.037	.083	.027

Note. CEQ = The Childbirth Experience Questionnaire; EBS = The Experience of Birth Scale
* p < .05, ** p < .01, *** p < .001
CEQ model: R^2 =.144, F (2, 408)=34.32, p<.001; Step 2: Δ R^2 =.015, F (2, 406)=3.59, p=.029.
Negative feelings model: R^2 =.142, F (2, 408)=33.83, p<.001; Step 2: Δ R^2 =.029, F (2, 406)=7.11, p<.001.
Positive feelings model: R^2 =.040, F (2, 408)=8.54, p<.001; Step 2: Δ R^2 =.013, F (2, 406)=2.77, p=.064.

Relationship between personality and the appraisal of birth (CEQ)

Prenatal mood and mode of birth were entered in step 1, and together explained 14.4% of the variance of CEQ. Prenatal mood and mode of birth were predictive of CEQ, β=-.260, p<.001 and β=-.296, p<.001, respectively. With the addition of perfectionism and intolerance of uncertainty at step 2, the standardised betas for prenatal mood (β=-.217, p<.001) and mode of birth (β=-.290, p<.001) reduced, but remained significant. Adding in perfectionism and intolerance of uncertainty led to an increase in 1.5% of the variance of CEQ, p=.029. Only perfectionism was significant, β=-.142, p<.012. Thus, women with higher levels of perfectionism reported more negative experiences of birth, even if they experienced lower mood during the pregnancy and regardless of delivery.

Relationship between personality and negative feelings about birth (EBS)

Prenatal mood and mode of birth were entered in step 1, and together explained 14.2% of the variance of negative feelings about birth. Prenatal mood and mode of birth were predictive of negative feelings about birth, β=.331, $p<.001$ and β=.205, $p<.001$, respectively. With the addition of perfectionism and intolerance of uncertainty at step 2, the standardised betas for prenatal mood (β=.242, $p<.001$) and mode of birth (β=.198, $p<.001$) reduced, but remained significant. The step including perfectionism and intolerance of uncertainty led to an increase in 2.9% of the variance of negative feelings, $p<.001$. Only intolerance of uncertainty was significant, β=.137, $p=.017$. Thus, women with higher levels of intolerance of uncertainty reported more negative feelings about birth, regardless of emotional difficulties during pregnancy and mode of delivery.

Relationship between personality and positive feelings about birth (EBS)

Prenatal mood and mode of birth were entered in step 1, and together explained 4% of the variance of positive feelings about birth. Prenatal mood and mode of birth were predictive of positive feelings about birth, β=-.143, $p=.004$ and β=-.151, $p=.002$, respectively. No significant change in R_2 was observed when adding in perfectionism and intolerance of uncertainty at the second step, $p=.064$. Overall, levels of perfectionism and intolerance of uncertainty did not predict levels of positive feelings about birth.

Do the relationships between perfectionism or intolerance of uncertainty continue to be evident on PTSS when prenatal mood, mode of birth and maternal complications since birth are controlled?

To test this hypothesis, a hierarchical multiple regression using the enter method was performed to predict levels of PTSS from perfectionism and intolerance of uncertainty, whilst

controlling for prenatal mood, mode of birth and maternal complications since birth. Table 6 reports the individual beta coefficients and standard errors for each of the predictors.

Table 6.

Hierarchical regression of PTSS regressed onto prenatal mood, mode of birth, maternal complications since birth, perfectionism and intolerance of uncertainty

	b	**SE**	**Std. β**
Step 1			
Prenatal mood	.310	.065	.225***
Mode of birth	2.93	1.18	.121*
Maternal complications since birth	4.47	1.33	.165***
Step 2			
Perfectionism	.116	.039	.172**
Intolerance of uncertainty	.072	.080	.053

Note. * p < .05, ** p < .01, *** p < .001
PTSS model: R^2 =.108, F (3, 406)=16.32, p<.001; Step 2: Δ R^2 =.035, F (2, 404)=8.17, p<.001.

Prenatal mood, mode of birth and maternal complications since birth were entered in step 1, and together explained 10.8% of the variance of PTSS. Prenatal mood (β=.225, p<.001), mode of birth (β=.121, p<.013) and maternal complications since birth (β=.165, p<.001) were predictive of PTSS. With the addition of perfectionism and intolerance of uncertainty at step 2, the standardised betas for prenatal mood (β=.139, p=.008), mode of birth (β=.117, p=.015), and maternal complications since birth (β=.146, p=.003) all reduced, but remained significant. Adding in perfectionism and intolerance of uncertainty led to an increase in 3.5% of the variance of PTSS, p<.001. Only perfectionism was significant, β=.172, p<.003. Thus, higher levels of perfectionism predicted more postpartum PTSS, regardless of lower prenatal mood during pregnancy, mode of delivery and the experience of maternal complications after birth.

Are the relationships between perfectionism or intolerance of uncertainty and PTSS moderated by the appraisal of birth (CEQ)?

To test this hypothesis, a moderation analyses were conducted using the Hayes Process tool plug-in to SPSS (Hayes 2012). Birth experience (CEQ) was examined as a moderator of the relationship between levels of perfectionism or intolerance of uncertainty and PTSS. Prenatal mood, maternal complications since birth, mode of birth, perfectionism, intolerance of uncertainty and CEQ were entered in step 1, and together explained 19.9% of the variance of PTSS, F (6, 403)=16.69, p<.001. Only perfectionism, β=.141, p=.012, CEQ, β=-.262, p<.001, and maternal complications since birth, β=.110, p=.020, significantly accounted for this variance. No significant change in R^2 was observed when adding in the interaction term in the second step, ΔR^2 =.011, F (2, 401)=2.74, p=.066. Thus, the analysis did not produce a significant interaction effect, indicating that levels of perfectionism and intolerance of uncertainty do not interact with appraisals of birth to determine levels of postpartum PTSS.

Discussion

This is the first known study to explore the roles of perfectionism, organisation and intolerance of uncertainty on the appraisal of birth and postpartum PTSS in a large sample of first-time mothers. There was a relatively high prevalence of birth trauma (Slade et al. 2014) within the sample (23.7%), which is in line with previous estimates reported for childbearing women (Alcorn et al. 2010; Smarandache et al. 2016). This finding suggests that negative appraisals of birth are relatively common. The 5% prevalence rate of PTSS (according to the IES-R, Weiss 2007) in the present sample at 6 to 12 weeks' postpartum was slightly higher than that reported in other studies involving primiparas women (Khoramroudi 2018), but much lower than that reported for high-risk groups (Grekin & O'Hara 2014). In context, up to 700,000 women in the United Kingdom give birth per annum (Yildiz et al. 2017). The

present results indicate that approximately 165,900 women may experience negative and/or traumatic births, whilst 35,000 women may experience postpartum PTSS. This shows the importance of the present research in guiding the development of preventative care.

Turning first to the experience of birth, higher levels of perfectionism and intolerance of uncertainty were associated with more negative appraisals of birth as measured by the CEQ, EBS and an assessment of birth trauma (Slade et al. 2014), even if effect sizes were small. The results also revealed differential effects of the two personality traits on birth experience. Higher levels of intolerance of uncertainty were found to predict more negative feelings about birth at 6 to 12 weeks' postpartum, accounting for just under 3% of the variance. Elevated intolerance of uncertainty has previously been identified as a predictor of fear of childbirth (FOC; Rondung et al. 2019), whilst FOC is a recognised predictor of negative and/or trauma appraisals of birth (Henriksen et al. 2017). As reduced perceptions of control may contribute to more negative appraisals of birth (Goodman et al. 2004), it is unsurprising that higher tendencies to interpret and respond to uncertain events as threatening were related to more negative feelings about birth given the unpredictability inherent in childbirth. In addition, elevated perfectionism predicted more negative appraisals of birth according to the CEQ. In an environment where it may be difficult to maintain predisposed high performance standards as multiple factors may determine the process of birth, women who are more prone to critical self-scrutiny may evaluate their birth experiences and the support from maternity providers as more negative.

The role of personality-based risk factors on women's postnatal mental health was partially confirmed. Higher levels of perfectionism were associated with and predicted higher levels of PTSS related to birth at 6 to 12 weeks' postpartum, accounting for 3.5% of the variance in PTSS. Our results extend the findings from previous research exploring the association between perfectionism and PTSS in non-childbearing samples (Egan et al. 2014),

and studies also indicating the negative effect of high perfectionism on other areas of women's wellbeing postpartum (e.g. postnatal anxiety, Oddo-Sommerfeld et al. 2016).

Contrary to our hypotheses, the tendency to be highly organised was not related to the appraisal of birth nor PTSS. These results are consistent with previous research using the FMPS to examine postnatal depression (Gelabert et al. 2012), but also suggest that trait organisation is not a risk or protective factor for negative or traumatic birth experiences or PTSS. The present study used subscales from the FMPS to individually examine perfectionism and organisation as recommended by Frost et al. (1990). More recently, studies have categorised the FMPS subscales into functional (*personal standards* and *organisation*) and dysfunctional (*concern over mistakes, doubts about actions, parental expectations and parental criticism*) perfectionism (e.g. Gelabert et al. 2012; Mazzeo et al. 2006). The present findings suggest that perfectionism and organisation represent distinct constructs in the context of birth and postpartum PTSS. Therefore, future studies should be cautious of combining and implementing the subscales in this way.

The present findings also indicated that neither perfectionism or intolerance of uncertainty predicted positive feelings about birth. Thus, the mechanisms underlying positive and negative appraisals of birth appear to be different. Identification of personality entities that may be protective of birth trauma and PTSS requires further investigation.

We also examined whether birth experience moderated the effect of levels of personality traits on PTSS. This is the first known study to examine this interaction. Our results suggested that levels of perfectionism and intolerance of uncertainty do not interact with birth experience to determine levels of PTSS following birth. Given that levels of perfectionism were shown to predict postpartum PTSS, high perfectionistic tendencies may therefore pose a risk for women's postpartum wellbeing, irrespective of whether women go on to have positive or negative birth experiences.

Outside the main hypotheses, there were some interesting additional findings. Higher levels of depressive symptomology during pregnancy and deliveries requiring medical intervention accounted for a high degree of the variance in birth appraisal (CEQ and EBS), much greater than that predicted by personality. These predictor variables, alongside the experience of maternal complications since birth, also explained 10.8% of the variance in one of the regression models examining PTSS. These findings are consistent with previous prospective and cross-sectional research (Modarres et al. 2012; Waldenström et al. 2004), which demonstrate the detrimental effect of prenatal mood states and obstetric risk factors on the appraisal of birth and the onset and/or maintenance of PTSS. In addition, the moderate relationship between higher levels of PTSS and low postnatal mood contributes to research seeking to understand the effect of PTSS on women's overall wellbeing (Söderquist et al. 2009). Current public health interventions addressing women's postnatal wellbeing are largely designed to reduce the stigma attached to postpartum depression. Whilst important, the present results suggest that health visitors also need to assess for PTSS, which women may be more hesitant to disclose (Campbell and Renshaw 2013).

Strengths and limitations

Women who participated in the present study were visitors of a website related to pregnancy, birth and motherhood. Whilst this self-selection process meant that sufficient numbers were recruited to ensure adequate power, this may have resulted in a non-representative sample and response bias. We identified differences in the demographic characteristics, and levels of perfectionism (personal standards domain) between participants who completed the survey and those that provided responses at time 1 only. Typically, online samples commonly attract young, educated, middle-class and technologically-proficient individuals (Hewson 2015), which is captured within the demographic characteristics of the present sample. Despite this,

the distribution of age ranges for first-time mothers was comparable to normative data (Office for National Statistics 2017). Future studies may want to explore whether the present results hold true for different ethnic groups and geographic areas with differing levels of social deprivation. Recruitment via paper sources or a breadth of maternity units would facilitate the generalisability of the results.

This study relied on summated self-report instruments to collect data. The complexity of measuring the multidimensional nature of birth in particular remains debated (Larkin 2009). The CEQ, alongside the EBS, were implemented as they collaboratively captured important components of the birth experience, some of which have been correlated with birth trauma (Bryanton et al. 2008). Both instruments have robust psychometric properties as reported in other publications (e.g. King et al. 2017). However, the internal-reliability of the *participation* subscale of the CEQ was inadequate in the present study. Whilst the total CEQ score was used throughout the analyses, readers are encouraged to be cautious about the extent to which the results reflect appraisals of *participation* during birth.

The prospective cohort design enabled data to be collected at two time points. This enabled the author to understand whether risk factors for negative births and PTSS are identifiable during the antenatal period. Despite the breadth of data collected, there may be other predictors that were important to examine. For example, research indicates that women who have experienced prior trauma are at a higher risk of developing PTSS postpartum (Leeners et al. 2006). In addition, it is possible that a proportion of women with postnatal PTSS were experiencing either ongoing PTSS (which were transferred or exacerbated from a previous traumatic event) or recurrent PTSS (where childbirth reactivated previously latent symptoms; Ayers 2004), as evidenced by research exploring the prevalence of PTSS in pregnancy (Muzik et al. 2016). Subsequently, it may have been helpful to control for past experiences of trauma and PTSS within the regression models.

Implications

The findings indicate that risk factors for negative birth experiences and PTSS may be identifiable during the antenatal period. Within a clinical context, the small degree of variance explained by perfectionism and intolerance of uncertainty does not warrant the use of standardised antenatal screening instruments as part of a preventative intervention. Given that women report heterogeneity in the amount and quality of information afforded by their midwives (Divall et al. 2017), these results should instead be disseminated to maternity care providers to increase their awareness and knowledge about dispositional and obstetric risk factors for negative births and PTSS. Where previous patterns of high perfectionism or intolerance of uncertainty are highlighted by women during antenatal planning meetings, individually-tailored discussion and education should be provided in line with the recommendations outlined in *Implementing Better Births (*NHS England 2017).

Whilst the National Institute for Health and Care Excellence (NICE) guidelines on antenatal and postnatal mental health do not recommend formal debriefing for women who have experienced a traumatic birth (NICE 2006), postpartum debriefing sessions are routinely offered by maternity care providers as a preventative intervention for psychological trauma following childbirth (Baxter et al. 2014). Evidence of efficacy for postnatal debriefing is presently impeded by the absence of evaluation of benefit at local level, high heterogeneity in treatment content across maternity services, and the limited information available on the experience and training needs of midwives in terms of addressing maternal psychological wellbeing (Bastos et al. 2015; Rowan et al. 2007). In light of this, the recent expansion in the provision of specialist perinatal mental health services and midwifery training is well-timed (see *The Perinatal Mental Health Care Pathways*, National Collaborating Centre for Mental Health 2018). This may facilitate the identification of new mothers who may benefit from further support, and ensure that they have greater and more timely access to evidence-based

assessment and treatment for negative experiences of birth and postpartum emotional difficulties.

The findings also emphasise the importance of flexibility in birth planning. Birth plans constitute a key element of antenatal and intrapartum care provision in England (NICE 2014). Birth plans that are overly prescriptive may promote the idea that maintaining high personal standards and obtaining certainty is possible during an event that is unpredictable and highly changeable. Whilst reframing birth plans as 'birth preferences' may facilitate psychological adjustment (Welsh and Symon 2014), future research should explore the relationship between higher levels of perfectionism and intolerance of uncertainty in the context of birth planning.

Future research

Longitudinal studies, beginning antenatally, may be most helpful in identifying additional and more instrumental risk factors for negative birth experiences and PTSS, in light of the small degree of variance explained by personality. Nonetheless, investigating how high and low levels of perfectionism and intolerance of uncertainty are differentially externalised and expressed within the delivery room may facilitate the identification of protective factors that may moderate the relationship between higher levels of perfectionism or intolerance of uncertainty and birth experience.

The present findings indicate that PTSS and postnatal depression may share the same underlying vulnerability factors (Egan et al. 2017; Oddo-Sommerfeld et al. 2016). It would be interesting to explore the role of levels of perfectionism on PTSS maintenance, given that high perfectionism may be a risk and maintaining factor for postnatal depression (Egan et al. 2017). As approximately 2.4% of women who experience PTSS in the initial weeks post birth will continue to fulfil diagnostic criteria at six months (Ayers 2004), future studies could also

examine the efficacy of treatments for perfectionism at problematic levels, as an enhancement of established cognitive behavioural interventions for PTSS.

Conclusion

Minimising the risk of new mothers experiencing childbirth as a negative or traumatic event and PTSS should be a priority for maternity care providers due to the long-term negative implications for women and their families (Simpson and Catling 2016). Building on a small but growing body of work, the present findings highlight the unique and maladaptive roles of higher levels of perfectionism and intolerance of uncertainty on the appraisal of birth, and higher levels of perfectionism on PTSS at 6 to 12 weeks' postpartum. Integrating these findings into antenatal discussion around birth planning would increase women's awareness of predisposing and obstetric risk factors that partially explain experiences of unsatisfactory births and postpartum PTSS. Future longitudinal research should explore factors that may moderate the relationship between high perfectionism or intolerance of uncertainty and birth appraisal, and the role of perfectionism on the maintenance of PTSS.

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Appendices

Appendix A: Author guidelines for Health Psychology Review

Essential information is provided here. Please see author guidelines for full details.
Available at
https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=rhpr20

General Guidelines

Manuscripts must be written in English. American or British spelling and punctuation are acceptable, provided authors apply the style consistently throughout the manuscript.

Manuscript Length

There are no length restrictions on submitted articles.

Style Guidelines

Papers must be submitted in word. Authors should follow the style guidelines of the American Psychological Association Publication Manuel (6th Edition).

Systematic Reviews

To comply with international standards and for academic transparency, systematic reviews are required to include a statement in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (http://www.prisma-statement.org/) as a supplemental file for review.

Open Data

Authors of articles that make use of data (e.g. systematic reviews) are required to make all raw data files and code used in data analysis when submitting the manuscript.

Pre-Registration

From 1st January 2019 to 31st December 2019, all reviews with empirical content are strongly encouraged to be pre-registered on an appropriate independent, institutional registry such as Prospero (https://www.crd.york.ac.uk/prospero/) or the Open Science Framework (https://osf.io). Authors must report the web link to the timestamped pre-registration at the institutional registry or the pre-registration trial number (i.e. methods section) in the manuscript.

What to Include

Abstract

Should be a single paragraph that summarizes the main findings in no more than 200 words.

Keywords

No more than six words.

Figures

All figures must be numbered in the order in which they appear in the manuscript (e.g. Figure 1, Figure 2).

Tables

Should be numbered consecutively with Arabic numbers in the order of appearance in the text. Type each table double-spaced on a separate page, with a short descriptive title typed above and the essential footnotes below.

Authors' contributions

All authors are expected to have made substantive intellectual contributions to, and to have been involved in drafting or revising the manuscript. With the submission of a manuscript, it is assumed that all authors have read and approved the final manuscript.

Acknowledgements

All contributors who do not meet the above criteria for authorship, should be listed in an acknowledgements section in accordance with the APA guidelines.

Appendix B: Search strategy used for each electronic database

Search No.	Search permutation	Limiters	Results
	CINAHL Plus (Search conducted on 25th January 2019)		
#1	(TI personalit* OR AB personalit*) OR (TI temperament* OR AB temperament*) OR (MH "Personality+")		180,741
#2	(TI birth* OR AB birth*) OR (TI childbirth* OR AB childbirth*) OR (TI parturition OR AB parturition) OR (MH "Childbirth+") OR (MM "Delivery, Obstetric") OR (MM "Labor") (MH "Childbirth+" includes childbirth premature, term birth, vaginal birth)		100,238
#3	(TI experienc* OR AB experience*) OR (TI evaluat* OR AB evaluat*) OR (TI satisf* OR AB satisf*) OR (TI perception* OR AB perception*) OR (TI pain* OR AB pain*) OR (TI trauma* OR AB trauma*) OR (MM "Maternal Attitudes")		1,169,055
#4	#1 AND #2 AND #3	Filters: Publication date from 1997/01/01 to 2019/01/31	1215

Search No.	Search permutation	Limiters	Results
	PubMed (Search conducted on 25th January 2019)		
#1	((((personalit*[Title/Abstract]) OR temperament*[Title/Abstract]) OR "Personality"[Mesh])		372,847
#2	(((((((birth*[Title/Abstract]) OR childbirth*[Title/Abstract]) OR parturition[Title/Abstract]) OR "Parturition"[Mesh]) OR "Delivery, Obstetric"[Mesh]) OR "Labor, Obstetric"[Mesh] "Parturition"[Mesh]) includes: term birth, natural childbirth, birth setting, home childbirth Delivery, Obstetric (Mesh) includes: caesarean section, episiotomy, extraction, obstetrical, vacuum extraction obstetrical, labor induced, vaginal birth after caesarean		416,230
#3	(((((((experienc*[Title/Abstract]) OR evaluat*[Title/Abstract]) OR satisf*[Title/Abstract]) OR perception*[Title/Abstract]) OR pain*[Title/Abstract]) OR trauma*[Title/Abstract])		4,928,868
#4	#1 AND #2 AND #3	Filters: Publication date from 1997/01/01 to 2019/01/31	1727

Search No.	Search permutation	Limiters	Results
	Psychinfo (Search conducted on 25th January 2019)		
#1	(personalit* TI OR AB) OR (temperament* TI OR AB) OR "Personality Traits"[Mesh])		200,741
#2	(TI birth* OR AB birth*) OR (TI childbirth* OR AB childbirth*) OR (TI parturition OR AB parturition) OR (DE "Birth" OR DE "Caesarean Birth" OR DE "Natural Childbirth" OR DE "Premature Birth") or MM "Labor (Childbirth)"		64,730
#3	(TI experienc* OR AB experience*) OR (TI evaluat* OR AB evaluat*) OR (TI satisf* OR AB satisf*) OR (TI perception* OR AB perception*) OR (TI pain* OR AB pain*) OR (TI trauma* OR AB trauma*)		1,411,009
#4	#1 AND #2 AND #3	Filters: Publication date from 1997/01/01 to 2018/12/31	557

Search No.	Search permutation	Limiters	Results
	Scopus (Search conducted on 25th January 2019)		
#1	((TITLE (personalit*) OR ABS (personalit*))) OR ((TITLE (temperament*) OR ABS (temperament*)))		166,043
#2	((TITLE (birth*) OR ABS (birth*))) OR (TITLE (childbirth*) OR ABS (childbirth*))) OR (TITLE (parturition) OR ABS (parturition))) OR ((TITLE (labo*r) AND TITLE (birth*))) OR ((ABS (labo*r) AND ABS (birth*))) OR ((TITLE (labo*r) AND TITLE (childbirth*))) OR ((ABS (labo*r) AND ABS (childbirth*))) OR (TITLE (labo*r) AND TITLE (parturition))) OR ((ABS (labo*r) AND ABS (parturition)))		456,764
#3	((TITLE (experienc*) OR ABS (experienc*))) OR (TITLE (evaluat*) OR ABS (evaluat*))) OR (TITLE (satisfy*) OR ABS (satisfy*))) OR ((TITLE (perception*) OR ABS (perception*))) OR (TITLE (trauma*) OR ABS (trauma*))) OR (TITLE (pain*) OR ABS (pain*)))		10,567,115
#4	#1 AND #2 AND #3	Filters: Publication date from 1997/01/01 to 2019/01/31	603

Search No.	Search permutation	Limiters	Results
	Web of Science (Search conducted on 25th January 2019)		
#1	TS=(personalit* OR temperament*)		177,644
#2	TS=(birth* OR childbirth* OR paturition* OR (labo*r AND birth*) OR (labo*r AND childbirth*) OR (labo*r AND parturition)		391,352
#3	TS=(experienc* OR evaluat* OR satisf* OR trauma* OR perception* OR pain*)		7,897,854
#4	#1 AND #2 AND #3	Filters: Publication date from 1997/01/01 to 2019/01/31	910

Appendix C: Email sent to included authors seeking further publications to consider for inclusion

Dear (author's name),

I am currently undertaking a systematic review of the research literature exploring whether personality traits influence how women experience childbirth.

During the literature search, I identified your paper entitled "(name of paper)" which is relevant to the review.

I am emailing to check if you have undertaken any further research, which meets the following criteria:

- Primiparas or multiparas (adult) women who have given birth to a single infant between 34 and 42 weeks' gestation
- Assessment of at least one personality trait by validated questionnaire
- Assessment of childbirth experience– overall experience or specific aspects (e.g. labour pain)
- An analysis of the association between at least one personality trait and childbirth experience

If so, I was wondering whether you could send me any articles relating to this work to consider for inclusion in this review.

Thank you for your time.
Kind Regards,
Lisa Price

Trainee Clinical Psychologist
Under the supervision of Prof. Pauline Slade and Dr Luna Centifanti

Doctorate in Clinical Psychology Programme, Diversion of Clinical Psychology, The University of Liverpool, Whelan Building, Brownlow Hill, Liverpool, L69 3GB.

Appendix D: Quality assessment tool

General instructions: Grade each criterion as "Yes," "No," "Partial," or "Unclear."
Factors to consider when making an assessment are listed under each criterion.

1. **Unbiased selection of the cohort?**

- Factors that help reduce selection bias
- Inclusion/exclusion criteria (clearly described)
- Recruitment strategy (clearly described)
- Sample is representative of the population of interest
- Consider potential for self-selection bias in recruitment method (e.g. use of adverts)

2. **Sample size calculated**

Factors to consider:

- Did the authors report conducting a power analysis or describe some other basis for determining the adequacy of study group sizes for the primary outcome(s) of interest?
- Did the eventual sample size deviate by ≤ 20% of the sample size suggested by the power calculation?

3. **Adequate description of the cohort?**

Consider whether the cohort is well-characterized in terms of baseline demographics:

- Consider key demographic information such as age, gender and ethnicity
- Information regarding education or socio-economic characteristics is also important

4. **Validated method for assessing birth experience (aspects or overall)**

Factors to consider:

- Were primary outcomes assessed using valid and reliable measures? Note that measures that consist of single items of scales taken from larger measures are likely to lack content validity and reliability.
- Were these measures implemented consistently across all study participants?

5. **Adequate follow-up period (longitudinal studies only)**

Factors to consider:

- A justification of the follow-up period length is preferable.
- A follow-up period of at least 6 months is preferable for assessing labour pain (xxx)
- Follow-up period should be the same for all groups

6. **Missing data**

Factors to consider:

- Did missing data from any group exceed 20%?
- In longitudinal studies consider attrition over time as a form of missing data. Note that the criteria of < 20% missing data may be unrealistic over longer follow-up periods
- If missing data is present and substantial, were steps taken to minimize bias (e.g., sensitivity analysis or imputation)

7. **Analysis controls for confounding?**

Factors to consider:

- Does the study identify and control for important confounding variables and effect modifiers? Confounding variables are risk factors that are correlated with personality traits or childbirth experience and may therefore bias the estimation of the effect of personality traits on childbirth experience if unmeasured. These may include demographic and clinical variables (e.g., co-morbidity and hospital settings)

8. **Analytic methods appropriate?**

Factors to consider:

- Was the kind of analysis done appropriate for the kind of outcome data (categorical, continuous, etc.)?
- Was the number of variables used in the analysis appropriate for the sample size? (The statistical techniques used must be appropriate to the data and take into account issues such as controlling for small sample size, clustering, rare outcomes, multiple comparison, and number of covariates for a given sample size).

Appendix E: Author guidelines for Archives of Women's Mental Health

Essential information is provided here. Please see author guidelines for full details. Available at https://www.springer.com/medicine/psychiatry/journal/737

Types of papers
Original Contributions / Research Articles should be arranged under the following headings:

Abstract
Should not exceed 150-200 words.

Keywords
Not more than five.

Introduction
To include a brief outline of the background literature and the objective(s) of the study.

Materials and Methods
Describe the basic study design. State the setting (e.g., primary care, referral center). Explain selection of study subjects and state the system of diagnostic criteria used. Describe any interventions and include their duration and method of administration. Indicate the main outcome measure(s). Specify the dates in which data were collected (month/year to month/year).

Results
Include the key findings. Give specific data and their statistical significance, if possible (include p value if findings were significance). Subset Ns should accompany percentages if the total N is <100.

Discussion and Conclusion
Discuss your findings critically in comparison to existing literature and considering your methodological and other limitations. Conclusions should highlight the potential meaning to the field given the limitations.

Text formatting

- Use a normal, plain font for text.
- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Use the table function, not spreadsheets, to make tables.

Abbreviations:
Abbreviations should be defined at first mention and used consistently thereafter.

Footnotes:
Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols. Always use footnotes instead of endnotes.

References

Cite references in the text by name and year in parentheses. Some examples:

- Negotiation research spans many disciplines (Thompson 1990).
- This result was later contradicted by Becker and Seligman (1996).
- This effect has been widely studied (Abbott 1991; Barakat et al. 1995a, b; Kelso and Smith 1998; Medvec et al. 1999, 2000).

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list.

Reference list entries should be alphabetized by the last names of the first author of each work. Order multi-author publications of the same first author alphabetically with respect to second, third, etc. author. Publications of exactly the same author(s) must be ordered chronologically.

Journal article:
Gamelin FX, Baquet G, Berthoin S, Thevenet D, Nourry C, Nottin S, Bosquet L (2009) Effect of high intensity intermittent training on heart rate variability in prepubescent children. Eur J Appl Physiol 105:731-738. https://doi.org/10.1007/s00421-008-0955-8

Ideally, the names of all authors should be provided, but the usage of "et al" in long author lists will also be accepted: Smith J, Jones M Jr, Houghton L et al (1999) Future of health insurance. N Engl J Med 965:325–329

Article by DOI: Slifka MK, Whitton JL (2000) Clinical implications of dysregulated cytokine production. J Mol Med. https://doi.org/10.1007/s001090000086

Book: South J, Blass B (2001) The future of modern genomics. Blackwell, London

Book chapter: Brown B, Aaron M (2001) The politics of nature. In: Smith J (ed) The rise of modern genomics, 3rd edn. Wiley, New York, pp 230-257

Online document: Cartwright J (2007) Big stars have weather too. IOP Publishing PhysicsWeb. http://physicsweb.org/articles/news/11/6/16/1. Accessed 26 June 2007

Appendix F: Ethical approval letter

Health and Life Sciences Research Ethics Committee (Psychology, Health and Society)

30 May 2018

Dear Prof Slade

I am pleased to inform you that your application for research ethics approval has been approved. Application details and conditions of approval can be found below. Appendix A contains a list of documents approved by the Committee.

Application Details

Reference:	2475
Project Title:	Do factors in pregnancy affect how women feel in childbirth and postnatally?
Principal Investigator/Supervisor:	Prof Pauline Slade
Co-Investigator(s):	Miss Lisa Moorhouse, Dr Luna Centifanti
Lead Student Investigator:	-
Department:	Psychological Sciences
Approval Date:	30/05/2018
Approval Expiry Date:	Five years from the approval date listed above

The application was APPROVED subject to the following conditions:

Conditions of approval

- All serious adverse events must be reported via the Research Integrity and Ethics Team (ethics@liverpool.ac.uk) within 24 hours of their occurrence.
- If you wish to extend the duration of the study beyond the research ethics approval expiry date listed above, a new application should be submitted.
- If you wish to make an amendment to the research, please create and submit an amendment form using the research ethics system.
- If the named Principal Investigator or Supervisor leaves the employment of the University during the course of this approval, the approval will lapse. Therefore it will be necessary to create and submit an amendment form using the research ethics system.
- It is the responsibility of the Principal Investigator/Supervisor to inform all the investigators of the terms of the approval.

Kind regards,

Health and Life Sciences Research Ethics Committee (Psychology, Health and Society)

iphsrec@liverpool.ac.uk

0151 795 5420

Appendix - Approved Documents

(Relevant only to amendments involving changes to the study documentation)

Appendix G: Eligibility criteria at time 1 and 2

Time 1

Before you begin, we just need to check your eligibility to take part in the survey. Please answer the questions below:

Is this your first pregnancy?	YES	NO
Are you expecting one baby?	YES	NO
Are you in the last part of pregnancy (i.e. 32 weeks pregnant and over)?	YES	NO
Are there specific plans in place for you to give birth by caesarean?	YES	NO
Are you under the care of the perinatal mental health team?	YES	NO
Are you currently under the care of a psychiatrist?	YES	NO
Have you been under the care of a psychiatrist in the past?	YES	NO
Are you currently under midwifery or consultant-led care?	Midwifery Care Consultant-led Care	

Time 2

Before you begin, we just need to recheck your eligibility to continue with the survey. Please answer the questions below:

Your health Did you give birth approximately 6 to 12 weeks ago?	YES	NO
Did you give birth at or after 37 weeks of pregnancy?	YES	NO
Are you under the care of the perinatal mental health team?	YES	NO
Your baby's health Was your baby alive and well at birth?	YES	NO
Did your baby require neonatal unit care for more than 48 hours?	YES	NO
Is your baby living at home with you now?	YES	NO

Appendix H: Email invitations sent to participants at time 1 and 2

emma's diary

WE'D LOVE TO HEAR YOUR THOUGHTS

Dear {|Subscriber.FirstName|},

We are looking for expectant first-time mums to take part in a research study.

WHAT WILL BIRTH AND THE POSTNATAL PERIOD BE LIKE FOR YOU?

New mums can have very different experiences of birth and the postnatal period. We want to understand some of the reasons why this may happen.

We would like to invite you to take part in our online survey if you are:

- At least 32 weeks pregnant with your first child
- Expecting one baby
- Are under midwifery care
- This is your first pregnancy
- You have no specific plans to give birth by caesarean
- You have not been/ are not currently under the care of mental health services.

Please **click the link below** for more information and to connect to the survey. The survey will take a maximum of 15 minutes to complete.

There will be a prize draw for all people who complete the study and you could be in with a chance to win either x1 £100 voucher or one x3 £50 Amazon vouchers.

TAKE THE SURVEY

This research is being undertaken at the University of Liverpool by Lisa Moorhouse, Trainee Clinical Psychologist. If you have any questions or want to discuss this study, then please do not hesitate to contact Lisa on: lisa.moorhouse@liverpool.ac.uk

UNIVERSITY OF LIVERPOOL

emma's diary

WE'D LOVE TO HEAR YOUR THOUGHTS

HELLO AGAIN...

Thank you for completing the first part of our online survey. Here is the final part.

HOW WAS BIRTH AND HOW IS THE POSTNATAL PERIOD FOR YOU?

Remember you are helping us to understand why new mums can have very different experiences of birth and the postnatal period.

Please continue our online survey if you:

- Gave birth approximately 6 to 12 weeks ago
- You did not give birth before 37 weeks
- Your baby did not need neonatal care for more than 48 hours and is currently living at home
- You are not under the care of mental health services

Please **click here** for more information and to connect to the survey. We will first recheck that you are eligible to take part. The survey will take a maximum of 15 minutes to complete.

There will be a prize draw for all people who complete the study and you could be in with a chance to win either x1 £100 voucher or one x3 £50 Amazon vouchers.

This research is being undertaken at the University of Liverpool by Lisa Moorhouse, Trainee Clinical Psychologist. If you have any questions or want to discuss this study, then please do not hesitate to contact Lisa on: lisa.moorhouse@liverpool.ac.uk

UNIVERSITY OF LIVERPOOL

Appendix I: Participant information sheet

Do factors in pregnancy affect how women feel in childbirth and postnatally?

Name of researcher: Lisa Moorhouse

INFORMATION FOR PARTICIPANTS

You are being invited to take part in a research study. Before you decide whether to take part, it is important to understand why the research is being done and what it will involve. Take your time reading the following information. Please contact us if you would like to ask any questions, or if there is anything that you do not understand. We would like to emphasise that you do not have to accept this invitation and you should only agree to take part if you want to.

What is the purpose of the study?

New mothers can have very different experiences of birth and the postnatal period. We want to understand some of the reasons why this may happen. This will provide important information about factors that may predict who is more likely to experience emotional difficulties during and following childbirth. This would mean that better support and advice could be put in place during pregnancy in order to improve how women feel.

Why have I been chosen to take part?

We are seeking first time mothers in the last part of pregnancy, who are not under the care of mental health services. We would like you to complete several questionnaires, which will ask you about your pregnancy and your personality traits. You will then complete another set of questionnaires after you have given birth, which will ask you to think about this time and how you have been feeling since. This will help us to understand whether there are patterns in pregnancy that help us to understand who may have more difficulties after birth.

Do I have to take part?

No. Participation in this study is entirely voluntary. It is up to you to decide whether you choose to take part or not. If you decide to take part and then change your mind, you can withdraw from the study up until we begin to analyse the results.

Who can take part?

We are inviting first time mothers in the last part of pregnancy (i.e. at least 32 weeks pregnant), who are expecting one baby, who are under midwifery care, with no specific plans to give birth by caesarean, and who have not been and are not currently under the care of a psychiatrist or the perinatal mental health team.

What will happen if I take part?

You will just be asked to provide some basic information and complete two sets of questionnaires about you as a person: the first set during the last part of your pregnancy, and the second set approximately six to twelve weeks after you have given birth. You will be asked to provide a contact email address at the start of both surveys. This will enable the researchers to email you a link to the final set of questionnaires after you have given birth, and link up your responses during pregnancy and after giving birth. Each set of questionnaires will take approximately 10 to 15 minutes to complete.

What are the benefits and risks of taking part in the study?

The researchers will gain valuable information about factors that may predict which mothers are more likely to experience emotional difficulties during and following childbirth. We hope that this information will lead to mothers being provided with more individually tailored support during pregnancy in order to improve how women feel during birth and postnatally.

Some of the questions may ask you about potentially sensitive experiences, which could temporarily highlight distress. We will email any participants reporting high levels of distress after giving birth at the point of data analyses to suggest that they consider discussing their birth experience with a health visitor or GP. The contact details for different support services will be provided.

Who will know I have taken part in the study?

Only the people you tell will know that you have taken part. Your answers to the questions will be kept completely confidential. They will only be seen by the researcher team (i.e. the researcher and their supervisors).

Who will have access to information collected about me during the study?

All of the information collected will be kept on a secure database only accessed by the researchers. Your email address will be kept separate from the rest of the information you provide. No individual results will be shared with Emma's Diary. The data from the study will be securely disposed of after five years.

What will happen to the results of the research?

After the study is completed, the results will then be analysed and written up for the researcher's doctoral thesis in clinical psychology. Individual responses will not be identifiable in the report. The findings will also be submitted for publication in a scientific journal. An anonymised summary of the research findings will be given to Emma's Diary.

If you wish to know the findings from the research, you will need to leave your email address at the end of the study. We will then email you a summary sheet on completion of the study.

What if I am unhappy about the study or there is a problem?

If you are unhappy, or want to discuss any aspect of the study, please contact Lisa Moorhouse on lisa.moorhouse@liverpool.ac.uk. You should then contact Pauline Slade on

ps1ps@liverpool.ac.uk if you would like to discuss anything further. If you remain unhappy or have a complaint which you feel you cannot talk to us about then you should contact the Research Governance Officer at ethics@liv.ac.uk. When contacting the Research Governance Officer, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.

Expenses and Payments

If you take part in the study and complete both sets of questionnaires, you can enter into a prize draw to win one £100 Amazon voucher, or one of three £50 Amazon vouchers. You will be asked to enter you email address so that we can contact you should you win the prize draw. Your email address will be assigned a number and kept separately from the rest of your answers. The numbers will be drawn at random and winners will be contacted once data collection is completed.

Who is organising the research?

The principal investigator of the study is Prof. Pauline Slade from The University of Liverpool. Dr Luna Centifanti from The University of Liverpool is the secondary investigator. Lisa Moorhouse (Trainee Clinical Psychologist) is the researcher conducting the study as part of the requirements of the Doctorate in Clinical Psychology at The University of Liverpool.

Who has reviewed the study?

The study has been reviewed by members of the University of Liverpool Research Ethics Committee. A Research Ethics Committee is a group of independent people who review research to protect the dignity, rights, safety and well-being of participants and researchers.

If you have any questions or want to discuss this study further, then please do not hesitate to contact me on:
Lisa Moorhouse
Trainee Clinical Psychologist
Doctorate of Clinical Psychology Programme
The University of Liverpool
Email: lisa.moorhouse@liverpool.ac.uk

Alternatively, you can contact my supervisor:
Prof. Pauline Slade
Doctorate of Clinical Psychology Programme
The University of Liverpool
Email: ps1ps@liverpool.ac.uk

Appendix J: Participant consent form

Title of Research Project: **Do factors in pregnancy affect how women feel in childbirth and postnatally?**

Researcher: **Lisa Moorhouse**

1. I confirm that I have read and have understood the information sheet for the above study, and I am aware of the researchers' contact details should I wish to ask any questions.

2. I understand that my participation is entirely voluntary, and that I can withdraw and request that my responses are withdrawn up until data analysis, without providing any reason.

3. I understand that I will be asked to provide an email address before completing the first set of questionnaires so that the researchers can send me the second set of questionnaires approximately 6 to 12 weeks following childbirth.

4. I understand that my responses will be kept strictly confidential, and my email address will be kept separate from my responses.

5. I understand that the information I provide will be written up as a report as part of the researcher's doctoral thesis in clinical psychology, and is intended to be submitted to a scientific journal for publication. An anonymised summary of the research study and the findings will also be provided to Emma's Diary following publication.

6. I understand that I may receive an email with signposting information from the researchers after all of the data is collected, if my responses indicate that I am experiencing high levels of distress after giving birth.

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

Yes ☐ No ☐

Student Researcher:

Lisa Moorhouse
Trainee Clinical Psychologist
Doctorate of Clinical Psychology Programme
The University of Liverpool
Email: lisa.moorhouse@liverpool.ac.uk

Principal Investigator:

Prof. Pauline Slade
Doctorate of Clinical Psychology Programme
The University of Liverpool
Email: ps1ps@liverpool.ac.uk

Appendix K: Outcome measures at time 1 and 2

Multidimensional Perfectionism Scale (including the *organisation* subscale*)

(Frost et al. 1990)

Instructions:
Please select the number that best corresponds to your agreement with each statement below.
Use this rating system:

Strongly disagree 1 2 3 4 5 Strongly agree

1. My parents set very high standards for me.
2. Organisation is very important to me.*
3. As a child, I was punished for doing things less than perfectly.
4. If I do not set the highest standards for myself, I am likely to end up a second rate person.
5. My parents never tried to understand my mistakes.
6. It is important to me that I be thoroughly competent in everything I do.
7. I am a neat person.*
8. I try to be an organized person.*
9. If I fail at work/school, I am a failure as a person.
10. I should be upset if I make a mistake.
11. My parents wanted me to be the best at everything.
12. I set higher goals for myself than most people.
13. If someone does a task at work/school better than me, then I feel like I failed the whole task.
14. If I fail partly, it is as bad as being a complete failure.
15. Only outstanding performance is good enough in my family.
16. I am very good at focusing my efforts on attaining a goal.
17. Even when I do something very carefully, I often feel that it is not quite done right.
18. I hate being less than the best at things.
19. I have extremely high goals.
20. My parents have expected excellence from me.
21. People will probably think less of me if I make a mistake.
22. I never felt like I could meet my parents' expectations.
23. If I do not do as well as other people, it means I am an inferior human being.
24. Other people seem to accept lower standards from themselves than I do.

25. If I do not do well all the time, people will not respect me.
26. My parents have always had higher expectations for my future than I have.
27. I try to be a neat person.*
28. I usually have doubts about the simple everyday things I do.
29. Neatness is very important to me.*
30. I expect higher performance in my daily tasks than most people.
31. I am an organized person.*
32. I tend to get behind in my work because I repeat things over and over.
33. It takes me a long time to do something "right".
34. The fewer mistakes I make, the more people will like me.
35. I never felt like I could meet my parents' standards

Personality trait	**Scoring and interpretation**
Perfectionism	Possible range of scores is 29 to 145, with higher scores indicating higher levels of perfectionism.
Organisation	Possible range of scores is 6 to 30, with higher scores indicating higher levels of organisation.

Intolerance of Uncertainty Scale – Short Form

(Carleton et al. 2007)

Instructions:

Please select the number that best corresponds to how much you agree with each item.

Not at all characteristic of me	A little characteristic of me	Somewhat characteristic of me	Very characteristic of me	Entirely characteristic of me
1	2	3	4	5

1. Unforeseen events upset me greatly
2. It frustrates me not having all the information I need
3. Uncertainty keeps me from living a full life
4. One should always look ahead so as to avoid surprises
5. A small unforeseen event can spoil everything, even with the best of planning
6. When it's time to act, uncertainty paralyses me
7. When I am uncertain I can't function very well
8. I always want to know what the future has in store for me
9. I can't stand being taken by surprise
10. The smallest doubt can stop me from acting
11. I should be able to organise everything in advance
12. I must get away from all uncertain situations

Scoring:

Possible range of scores is 12 to 60, with higher scores indicating higher levels of intolerance of uncertainty.

The Center for Epidemiologic Studies Depression Scale (CES-D)

(Radloff 1977)

Instructions:

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

During the past week:

Rarely or None of the Time (Less than 1 Day)	Some or a Little of the Time (1-2 Days)	Occasionally or a Moderate Amount of Time (3-4 Days)	Most or All of the Time (5-7 Days)
0	1	2	3

1. I was bothered by things that usually don't bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues (feeling low) even with help from my family or friends.
4. I felt I was just as good as other people.
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt that everything I did was an effort.
8. I felt hopeful about the future.
9. I thought my life had been a failure.
10. I felt fearful.
11. My sleep was restless.
12. I was happy.
13. I talked less than usual.
14. I felt lonely.
15. People were unfriendly.
16. I enjoyed life.
17. I had crying spells.
18. I felt sad.
19. I felt that people dislike me.
20. I could not get “going”.

Scoring:

Possible range of scores is 0 to 60, with higher scores indicating higher levels of depressive symptomology.

Impact of Events Scale-Revised (IES-R)

(Weiss 2007)

Instructions:

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to your experience of giving birth that occurred approximately 6 to 12 weeks ago.

How much have you been distressed or bothered by these difficulties?

Not at all	A little bit	Moderately	Quite a bit	Extremely
0	1	2	3	4

1. Any reminder brought back feelings about it
2. I had trouble staying asleep
3. Other things kept making me think about it
4. I felt irritable and angry
5. I avoided letting myself get upset when I thought about it or was reminded of it
6. I thought about it when I didn't mean to
7. I felt as if it hadn't happened or wasn't real
8. I stayed away from reminders of it
9. Pictures about it popped into my mind
10. I was jumpy and easily startled
11. I tried not to think about it
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them
13. My feelings about it were kind of numb
14. I found myself acting or feeling like I was back at that time
15. I had trouble falling asleep
16. I had waves of strong feelings about it
17. I tried to remove it from my memory
18. I had trouble concentrating

19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart
20. I had dreams about it
21. I felt watchful and on-guard
22. I tried not to talk about it

Score	**Interpretation**
24 or more	PTSS are a clinical concern. Those with scores this high will have partial posttraumatic stress disorder.
33 to 36	This represents the best cutoff for a probable diagnosis of posttraumatic stress disorder.
37 or more	This is high enough to suppress your immune system's functioning.

Childbirth Experience Questionnaire (CEQ)

(Dencker et al. 2010)

Instructions:

We are interested in your experience of giving birth. Please rate your experience by either ticking a box (questions 1-19) or marking a line (questions 20-22).

Totally agree	Mostly agree	Mostly disagree	Totally disagree
4	3	2	1

Scoring for negatively worded statements (items 3, 5, 8, 9, 20) are reversed (R)

1. Labour and birth went as I had expected.
2. I felt strong during labour and birth.
3. I felt scared during labour and birth (R)
4. I felt capable during labour and birth.
5. I was tired during labour and birth (R)
6. I felt happy during labour and birth.
7. I have many positive memories from childbirth.
8. I have many negative memories from childbirth (R)
9. *Question removed at the request of Emma's Diary* (R)
10. I felt I could have a say whether I could be up and about or lie down.
11. I felt I could have a say in deciding my birthing position.
12. I felt I could have a say in the choice of pain relief.
13. My midwife devoted enough time to me.
14. My midwife devoted enough time to my partner.
15. My midwife kept me informed about what was happening during labour and birth
16. My midwife understood my needs.
17. I felt very well cared for by my midwife.
18. My impression of the team's medical skills made me feel secure.
19. I felt that I handled the situation well.

Questions 20 to 22 are assessed with visual analogue scales (VAS). The VAS scales are transformed to categorical values as follows:

0-40	41-60	61-80	81-100
1	2	3	4

20. As a whole, how painful did you feel childbirth was? (R)

No pain — Worst imaginable pain

100 — 0

21. As a whole, how much control did you feel you had during childbirth?

No control — Complete control

0 — 100

22. As a whole, how secure did you feel during childbirth?

Not at all secure — Completely secure

0 — 100

The Experience of Birth Scale

(Slade et al. 1993)

Instructions:

Thinking about your experience of giving birth, please rate the extent to which you found labour to be:

1. Exciting
2. Anxiety provoking
3. Enjoyable
4. Frightening
5. Satisfying
6. Embarrassing
7. Pleasant
8. Exhausting
9. Exhilarating
10. Difficult

Scoring:

Possible range of scores is 0 to 50 for positive and negative adjectives respectively, with higher scores indicating higher levels of positive and negative feelings.

Assessment of Birth Trauma

(Slade et al. 2014)

Instructions:

Thinking about your childbirth (and any time in hospital after) was there any time during this when you felt:

a. horror or helplessness about what was happening

- Yes (coded as 1)
- No (coded as 0)

b. Really frightened about your own or your baby's wellbeing?

- Yes (coded as 1)
- No (coded as 0)

Demographic information (Time 1)

1. How old are you?
   - 18 to 25
   - 26 to 30
   - 31 to 35
   - 36 to 40
   - 41 to 50
   - 51 or over

2. How would you describe your marital status?
   - Single
   - Married
   - Separated
   - Divorced
   - Cohabiting
   - Widowed

3. What is your highest educational qualification?
   - No qualifications
   - GCSEs
   - A-Levels
   - Vocational Qualifications
   - Undergraduate degree
   - Post graduate degree

4. What is your current employment status?
   - Employed full time
   - Employed part time
   - Self employed
   - Unemployed - out of work
   - Unemployed - voluntary work
   - Student

5. How many weeks pregnant are you?
   - 32 to 33 weeks
   - 33 to 34 weeks
   - 34 to 35 weeks
   - 35 to 36 weeks
   - 36 to 37 weeks
   - 37 to 38 weeks
   - 38 to 39 weeks
   - 39 to 40 weeks
   - 40 to 41 weeks
   - 41 to 42 weeks

Information about the birth (Time 2)

1. How many weeks pregnant were you when you gave birth?
    - 37 to 38 weeks
    - 38 to 39 weeks
    - 39 to 40 weeks
    - 40 to 41 weeks
    - 41 to 42 weeks

2. Were you induced?
    - Yes
    - No

3. In your opinion, how long were you in labour for?
    - 0 to 12 hours
    - 12 to 24 hours
    - 24 to 36 hours
    - 36 to 48 hours
    - 48 to 60 hours
    - 60 to 72 hours
    - Over 72 hours

4. Did you use any pain relief?
    - Yes
    - No

5. If yes, did you use:
    - Gas and air
    - Epidural
    - General anaesthetic
    - Other

6. How did you give birth?
    - Unassisted vaginal delivery
    - Assisted vaginal delivery- forceps
    - Assisted vaginal delivery-vacuum
    - Emergency caesarean section
    - Water birth

7. Apart from any healthcare professionals, who was present with you at the birth?
    - Partner
    - Family member(s)
    - Friend(s)
    - No one else was with me

8. Was your infant considered to be in any distress at any stage during the labour?
    - Yes
    - No

9. After birth, did your infant require care from the neonatal care unit?
    - Yes
    - No

10. If yes, approximately how long did they receive this care?
    - 0 to 12 hours
    - 12 to 18 hours
    - 18 to 24 hours
    - 24 to 36 hours
    - 36 to 48 hours
    - 48 hours +

11. Did you experience any complications during and/or immediately following the birth?
    - Vaginal tear requiring stitching
    - Episiotomy
    - Heavy blood loss requiring a transfusion
    - Other

12. Have you experienced any complications since giving birth?
    - Vaginal infection
    - Caesarean wound infection
    - Major bleeding (haemorrhage)
    - Other

Appendix L: Information provided on completion of all measures at time 2

Thank you for completing the final part of the study. We really appreciate the time you have given to contribute to the study.

If you would like to be entered into the prize draw for the chance to win a £100 Amazon voucher, please enter your email address into the box below. If you do not want to be entered into the draw, please leave the box blank.

If you wish to receive a summary of our findings once the study is completed, please enter your email address into the box below. If you do not want to receive a copy, please leave the box blank.

This study has focused on how you felt during childbirth and the postnatal period. We are providing information to all women about the various avenues of support available if you are currently experiencing any difficulties. If you have concerns about how you are feeling, please contact your GP or health visitor. They will be able to offer you support and advice, and signpost you to relevant support services. There are also organisations that offer support to women during the prenatal and postnatal period. These include:

PANDAS (Pre and Post Natal Depression Advice and Support Service). PANDAS run a helpline (0843 28 98 401), which is open 9am-8pm Monday to Sunday, and offer email support via info@pandasfoundation.org.uk. They also have a website: http://www.pandasfoundation.org.uk.

The Birth Trauma Association. The Birth Trauma Association has a website: http://www.birthtraumaassociation.org.uk/.

Additionally, if you have any questions or want to discuss this study further, then please do not hesitate to contact me on:

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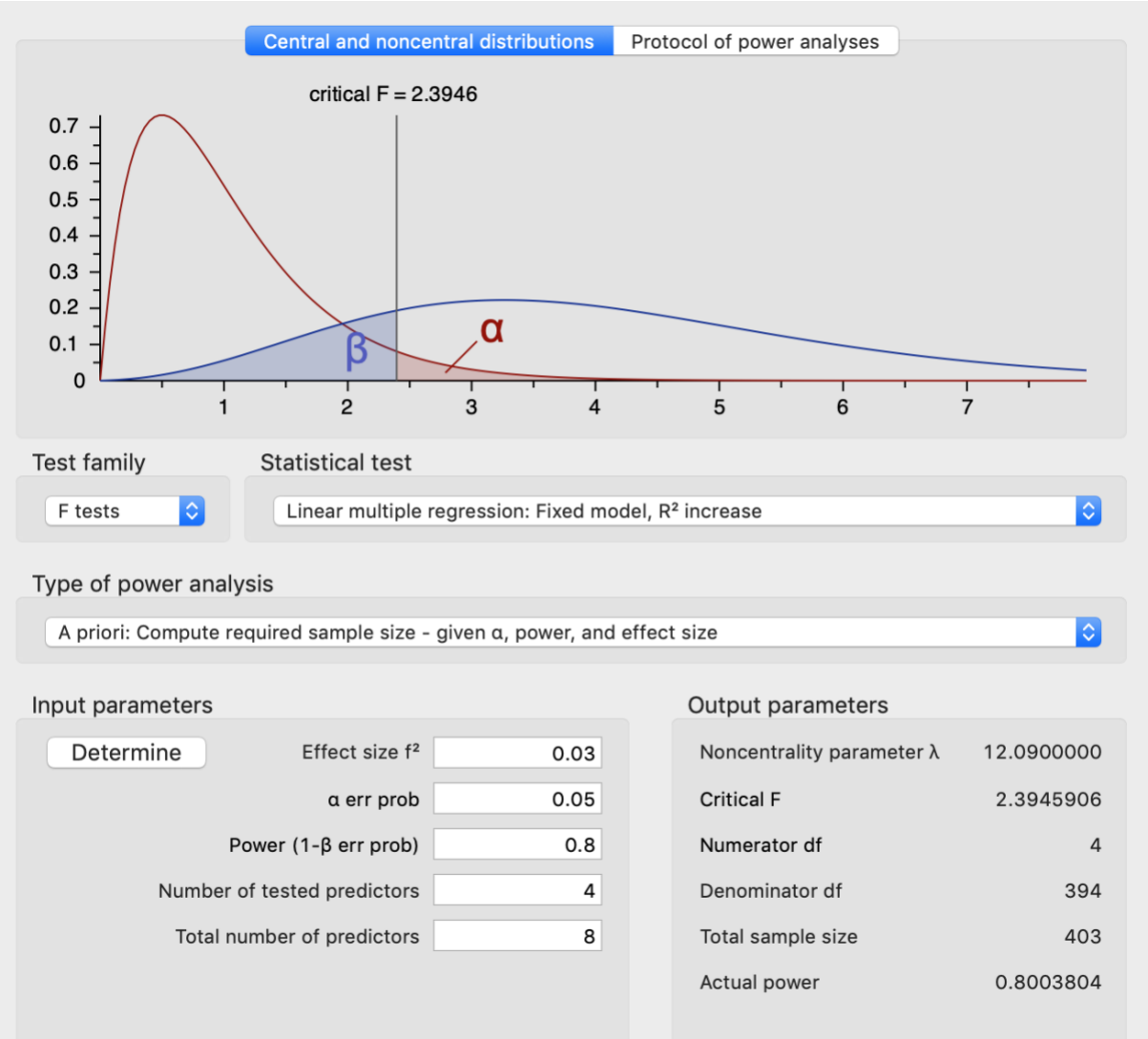
Thank you again for taking part in this study.

Appendix M: G*Power calculation



	Variable
Number of tested predictors:	Perfectionism, organisation, intolerance of uncertainty, childbirth experience (CEQ)
Total number of predictors	Prenatal mood, perfectionism, organisation, intolerance of uncertainty, childbirth experience (CEQ), Perfectionism*CEQ, organisation*CEQ, intolerance of uncertainty*CEQ

Note. * = interactions