Childbirth Memory Processing and Perception of Pain:

The Role of Adult Attachment

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Declaration

This thesis is submitted for the degree of Doctorate in Clinical Psychology at the University of Sheffield. It has not been submitted for any other qualification or to any other academic institution

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Abstract

This thesis contains two parts; a literature review and a research report. The literature review investigates current understandings of the psychological aspects of childbirth pain. Following a systematic search of the literature, 26 papers met the criteria and were reviewed. The review concludes that there are established empirical links in the literature between childbirth pain and; anxiety; pain self-efficacy; social support; expectations of labour; sense of control; satisfaction and social support. Intervention studies have shown that perceived childbirth pain can be reduced using hypnosis, biofeedback and increasing pain self-efficacy. However, there are some areas that are largely unexplored, such as the role of relational or personality factors.

The empirical study aimed to investigate how adult attachment patterns impact on pain perception and memory variables in childbirth, and the relationship between these variables and symptoms of acute stress. Seventy women, having their first baby, were recruited in pregnancy from ante-natal classes. At this first time point participants completed a questionnaire, including an adult attachment measure. Shortly after childbirth, participants completed a second questionnaire about their childbirth experience.

A relationship was found between adult attachment patterns and aspects of pain but this was not robust in further analysis. Avoidant attachment patterns were related to the extent people felt respected by staff. However, no relationships between attachment and memory variables were found. Emotional intensity of the birth experience was predictive of the variance in some acute stress symptoms.

Acknowledgements

I would like to sincerely thank all the women who took the time to take part in the study at a demanding and special time in their lives. To the midwives and hospital staff who embraced the project with enthusiasm and gave their time to help the study keep running, it could not have been done without you. To all my supervisors and advisors who have been so generous with their time and feedback. Finally, I would like to say thank you to my family and friends for their on-going support, encouragement and patience throughout.

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Section 1: Literature Review

Abstract

Purpose. To investigate current understanding of the psychological factors influencing the experience of pain in childbirth.

Methods. A systematic search of the literature was undertaken using the terms pain, psychol* and childbirth or labo*r, for papers after 1992. Following exclusions, 26 papers met the criteria for review. Studies were critiqued using a published rating scale, and generally found to be of high quality.

Results. There are empirically established links between childbirth pain and anxiety, pain self-efficacy, social support, expectations of labour and social support. There is a link between pain and the sense of control women feel in labour, and between pain and satisfaction with labour. However, the direction of the relationship for these variables is unclear. Intervention studies have shown that perceived childbirth pain can be reduced using hypnosis, biofeedback and improving pain self-efficacy. Continuous support during labour may be helpful, but not necessarily in relation to pain. Qualitative and cultural perspectives on childbirth pain provide some exploratory findings indicating further research directions.

Conclusions. There are some links between pain and psychological factors that are well established (e.g. between pain and anxiety). However, other areas remain largely unexplored, such as relational or personality factors, where more research is needed.

Psychological Factors Influencing Pain in Childbirth

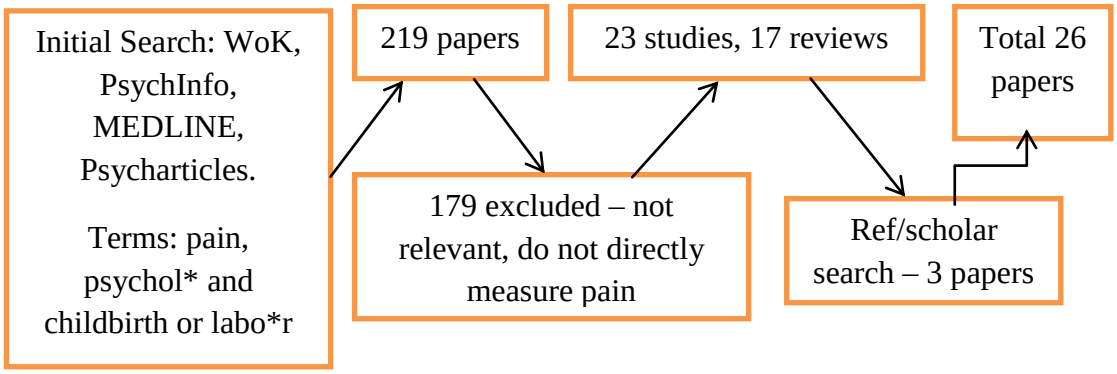
Women often report that childbirth pain is one of the most painful experiences of their lives (Melzack, 1993). There has been much research into the possible factors involved in pain in labour such as physical factors, analgesia use and psychological aspects. The latter is the focus of this review, which aims to investigate current understandings of the psychological factors influencing the experience of pain during childbirth. It will focus on self-reported pain, which incorporates both the sensory experience and potential emotional impact of pain. For the purposes of this review, the reporting of pain could be quantitative, such as through scales or questionnaires, or qualitative descriptions.

This review will focus on studies from 1993 onwards, for a number of reasons. Firstly an important and large research study was published by Green in 1993. This was one of a series of papers following a large cohort of women through pregnancy and childbirth. Over 700 women completed questionnaire measures about attitudes and expectations of childbirth while pregnant, and then measures of pain, birth events, coping strategies used and satisfaction after birth. The main findings were that women's expectations before birth were often lived out in the birth experience. For example, women who expected labour to be painful reported more pain. This study is considered seminal within the area and reflects the understanding at the time of the psychological factors influencing childbirth (as reviewed by Hodnett, 2002). Therefore, this review aims to consider the studies after this time point to assess how understanding has advanced and developed. In addition, the context of maternity services, antenatal education and attitudes have changed considerably over time. For example, the Department of Health published the document *Changing Childbirth* in 1993, which led to a number of changes within maternity services in the UK at the time.

It is arguable that, given this context, only more recent studies should be considered, as earlier work may not be comparable.

A systematic search of the literature was undertaken. This involved searching the databases MEDLINE, PSYCHArticles, PSYCHInfo, from 1993 to present (January 2012). The keywords used were pain, psychol* and childbirth or labo*r. The search was limited to studies in English related to human subjects. This search returned 219 papers. However, of these papers, 179 met one of the two exclusion criteria of not being related to pain in childbirth, or pain not being directly measured as an outcome (e.g. some studies looked at analgesia use, but did not specifically measure pain). Following exclusions, 23 papers were selected for the review. An additional 17 papers were identified as relevant and are referred to here but not directly reviewed because 16 were literature review papers, and one was the Green (1993) study mentioned in the introduction. In addition to the database search, the references of selected papers and Google Scholar were also searched to identify any other relevant studies. This search revealed an additional three studies. This process is summarised in Figure 1.

Figure 1. Flow chart of literature search



Caldwell, Henshaw and Taylor (2005) have developed a tool to evaluate the quality of health related research. They use a flow chart, with separate pathways allowing for qualitative and quantitative studies to be critiqued. This was modified into a scale to rate studies by allocating a score of one or zero within each category in the framework. This allowed for a maximum of 19 points for each study, with a score of 16 or over being regarded as 'good' as defined by the researcher. A sample of four papers was scored by another researcher to ratify the ratings. The ratings were compared using the Interclass Correlation Coefficient (ICC), and high reliability was achieved (ICC= .962, Alpha= . 987). The studies, including ratings scores, are summarised in Table One. A further breakdown of the categories addressed and quality ratings scores can be found in Table 25(a-c) in Appendix D1 (pg.127).

The literature was found to be clustered into three areas, individual psychological factors, psychological interventions for pain and the cultural impact of pain.

Individual Psychological Factors

For the purpose of this review, individual psychological factors were defined as factors that are naturally in existence, or environmental factors that are not imposed through a specific intervention to improve coping.

Anxiety

Several studies focussed on anxiety as a variable that could be important in the experience of childbirth pain. Anxiety has been implicated in the pain experience in a number of theoretical models. For example, Norton and Asmundson (2003) describe a model of pain whereby fear cognitions related to pain impact the physiological pain

Table 1. Papers reviewed and critiqued

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Lang et al. (2006)	Prospective, women completed standardised measures several times during pregnancy and once after birth	35 women over 18 having a single child	Anxiety sensitivity significantly predicts pain	17	Ethical / sample issue of using significant incentive to participate, part of a larger study not described
Beebe et al. (2007)	Prospective, women completed questionnaires in pregnancy and during prehospitalization labour	35 primiparous women, who had a partner and were enrolled on childbirth preparation	Prenatal anxiety significantly associated with pain, self-efficacy and some obstetric variables in labour	16	Sample may not be representative, pre-hospital labour only so difficult to generalise, small sample when consider inductions, financial incentive
Flink et al. (2009)	Prospective, questionnaires during pregnancy and after childbirth	82 primiparous women, recruited through midwives	Catastrophizers anticipated and experienced more pain	18	Median split analysis has limitations

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Alehagen et al. (2006)	Prospective, questionnaires filled out before, during and several points after labour	47 primiparous women, recruited through ante-natal clinics	Pain was not associated with fear before, during or after labour	16	Very brief analysis and results section, many exclusions due to criteria for another part of the study
Larsen et al. (2001)	Prospective, questionnaires before birth, and during each phase of labour	37 primiparous women, recruited at antenatal class	Self-efficacy expectancies were predictive of pain at early and active labour phases but not transitional phase	16	Small percentage of completers, paid incentive, selected sample from antenatal class (not planning epidural)
Fuller Stockman & Altmaier (2001)	Prospective , questionnaires before and after childbirth	43 women, recruited from an obstetric clinic	Self-efficacy significantly predictive of pain scores	16	Self-efficacy scale not fully described, non-representative sample

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Gross et al. (2005)	Prospective, self-report of pain and 'fitness'	50 women recruited on admission to hospital in early labour	Pain and fitness were related to one another, the direction of this relationship is unclear	16	Concept of 'fitness' may be culturally specific, and appears to be multi-dimensional. Participation had significant impact on some women
Tinti et al. (2011)	Prospective, questionnaires at three days and six months after childbirth	123 women recruited from hospital clinic	Higher sense of control associated with less severe pain	18	No validated measures used, two postnatal time points
Green & Baston (2003)	Prospective, questionnaires before and after childbirth	1146 women booked for maternity care at four UK sites	Sense of control of behaviour during labour significantly related to pain level	18	Large representative sample, some non-validated measures

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Waldenstrom et al. (1996)	Cohort, one post-natal questionnaire	295 women who gave birth during a two week period - Sweden	Pain and overall satisfaction with birth experience were related	18	Large representative sample and high response rate, non-validated measures
Waldenstrom (1999)	Prospective, questionnaires completed in early pregnancy and two months after childbirth	1111 women who were participating in a birth centre trial	Pain and overall satisfaction with birth experience were related	17	Very large sample, non-validated measures, part of a larger trial not described
Goodman et al. (2004)	Cohort, one self-report questionnaire after childbirth	60 women post-natally at one of two US medical centres	Pain and satisfaction with childbirth experience were significantly related	17	Validated measures

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Quine et al. (1993)	Prospective, two interviews - one before and one after birth.	59 first-time mothers	Pain related to levels of social support. Social support may mediate between social class and birth variables like pain	16	Parts of abstract unclear, potential sample bias especially if looking at social class
Dannenbring et al. (1997)	Prospective, questionnaires before birth, during early labour and after labour. Nurse-rated measure during labour	70 women recruited at antenatal class	Pain was predicted by depression, some childbirth expectations, 'coach' helpfulness and some obstetric variables	15	Very brief measures of psychological variables, results section unclear, sample may not be representative

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Waldenstrom et al. (1996)	Cohort , one questionnaire a day after birth	278 women who gave birth during a two week period in Sweden	Pain intensity predicted by anxiety during labour, expectations of pain and birth, midwife support and duration of labour	18	Large representative sample and high response rate, non-validated measures
Shiloh et al. (1998)	Within subject design comparing pain experience when looking vs. not looking at contraction monitor	48 women recruited on admission to hospital in labour	Pain was related to pain anxiety, self-efficacy and coping strategies (attention, distraction, control-predictability). Less pain reported when looking at the monitor	17	Excluded women who had pain relief

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Niven & Gijsbers (1996)	Prospective, questionnaires at three time points (during labour, 24-28hrs after childbirth and three months later)	51 women giving birth in a maternity hospital	Number of strategies used negatively correlated with pain level	16	Lost many to follow-up, qualitative coping measure, some results unclear
Ip et al. (2009)	RCT comparing the childbirth experience of women who completed a self-efficacy improvement course vs. those who did not	First time Chinese mothers, 60 experimental, 73 control	Intervention group showed increased self-efficacy, less anxiety, less pain and better coping than controls	18	Could have compared to a group receiving an alternative intervention
Langer et al. (1998)	RCT comparing the experience of women receiving continuous doula support vs. routine care	724 nulliparous women randomised into one of two groups	Continuous support during labour was not related to pain experienced	18	Very brief pain measure, large sample, RCT

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Mairs (1995)	Between subjects comparative, pre-natal and post-natal questionnaires.	28 primiparous women who received hypnosis training compared to 27 women who didn't.	Women in hypnosis group reported less pain and anxiety (no differences in expectations between groups pre-birth)	16	No randomisation, control intervention or validated measures
Abbasi et al. (2009)	Qualitative - one post-natal interview	Six Iranian women who had undergone hypnosis training for labour	Women described themes of lower pain and pain related distress, and pain sensations changing to pressure sensations	15	Highly selected sample, results section contains no quote examples, philosophical approach not described

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Lundgren & Dahlberg (1998)	Qualitative - one post-natal interview	Nine women who had given birth at an alternative birth centre	Four themes: pain is hard to describe and contradictory, trust in self, trust in supporters, transition to motherhood	17	Evaluation of specific service, maybe not transferrable
Leap et al. (2010)	Qualitative - one post-natal interview	10 women who had given birth under the care of a specific midwifery service	Themes identified: midwives promoting ability to cope with pain, building confidence, relationship with midwife, talking to other women	17	Evaluation of specific service, maybe not transferrable

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Clark Callister et al. (2003)	Qualitative - one post-natal interview	100 women from diverse cultural backgrounds	Culturally diverse women describe positive and negative aspects of labour pain, and themes related to coping mechanisms were identified	12	Very brief method and purpose section, re-analysis, brief discussion
Abushaikha (2007)	Qualitative - one post-natal open-ended question	100 women who had given birth at a birth centre in Jordan	Women used a range of physiological, psychological, cognitive and spiritual coping strategies	16	Brief content analysis

Authors and Year	Design	Participants	Results Overview	Quality Score	Comments on Quality Score
Lee & Essoka (1998)	Cohort , one questionnaire after childbirth	67 Euro-American and 57 Korean-American women giving birth in a community hospital	Women from a Korean background reported more pain on one aspect of the measure and used less affect-based words to describe pain	16	Included only women who had episiotomy, results in abstract unclear

experience. The search found three similar studies published in this area; Lang, Sorrell, Rodgers and Lebeck (2006), Beebe, Lee, Carrieri-Kohlman and Humphreys (2007) and Flink, Mroczek, Sullivan and Linton (2009). Lang et al. (2006) investigated anxiety sensitivity as a predictor of pain in labour, using the Anxiety Sensitivity Index (Peterson & Reiss, 1993). During pregnancy, women completed self-report measures including general anxiety and anxiety sensitivity. Shortly after childbirth, women completed measures of pain experienced, and details of the labour. Using regression analysis, pain was predicted by anxiety sensitivity (more pain for those with higher anxiety sensitivity). This study used established and validated measures, making it comparable with other studies. However, the selected sample may not be representative of pregnant women, as they responded to an advertisement, and were paid an incentive to participate. In addition, the study time point was after labour, where other studies have measured pain levels during labour.

Beebe et al. (2007) conducted a similar study investigating prenatal anxiety in relation to labour pain. The study focused on the pain experienced in pre-hospitalisation labour. In the third trimester of pregnancy, participants completed self-report measures of trait anxiety, pregnancy and childbirth related anxiety, and childbirth related self-efficacy. Pain during labour was measured using a short form of the McGill Pain Questionnaire (Melzack, 1987), which women were asked to complete four hours into labour, or just before going to hospital (whichever was sooner). After giving birth, women were interviewed about the pre-hospital labour experience, including what strategies they used to cope with pain. The study found that women with greater prenatal anxiety reported more labour pain. An important point to note in the study is that only 21 of the 35 women recruited went into spontaneous labour (the others were

induced), which makes the sample reasonably small. This study used validated measures within labour but used a self-selected sample.

Flink et al. (2009) looked at the role of catastrophizing about pain in the childbirth experience. Participants completed measures of catastrophizing, anticipated pain and planned analgesia use for childbirth in late pregnancy, then women completed follow up measures after childbirth of pain, recovery and analgesia use. The group were divided into catastrophizers and non-catastrophizers for analysis purposes, using a median-split method. Catastophizers were found to report significantly more anticipated and actual pain, and reported poorer recovery. The strengths of the study are in the use of established and validated measures, and a larger sample size than the other studies. The use of a median-split to compare groups may not be ideal in that people with similar scores become allocated to different groups. A correlational analysis would have been an alternative option.

Shiloh, Mahlev, Dar and Ben-Rafeal (1998) also found a relationship between pain anxiety as reported before birth and labour pain. This study investigated a range of psychological variables and is discussed in more depth in a later section.

Another study which examines the role of anxiety in childbirth, but with a different outcome, is Alehagen, Wijma and Wijma (2006). This study recruited primiparous women during pregnancy, and asked them to complete measures of fear of childbirth before and after the birth, and during early active labour. Pain intensity was measured during labour using a scale rating the intensity of the most recent contraction. Although fear during labour was associated with fear of childbirth before and after labour, pain was not found to be related to fear of labour at any point. This finding is surprising given the other literature described, and could be due to the use of a one item measure rather than a validated scale. This study used a simple design with measures

during labour. However, many participants were excluded as they were unwilling to have a catheter inserted (which was required for another part of the study). This could be problematic as it could have been the more fearful women who refused catheterisation.

In general the evidence suggests that women who experience higher levels of anxiety also report higher pain. However, this has not been found in all studies, which could be due to the differing methodologies used.

Self-efficacy

A number of studies have examined the impact of self-efficacy beliefs for managing pain on the experience of pain in labour. This is related to theoretical models suggesting that self-efficacy affects anticipation and fear of pain, and the ability to use existing pain coping skills (e.g. Bandura, O'Leary, Taylor, Gauthier & Gossard, 1987). Larsen, O'Hara, Brewer and Wenzel (2001) recruited women from ante-natal classes who did not intend to have an epidural during labour. They used a specifically designed questionnaire investigating self-efficacy expectancies of birth. This was administered before labour, asking women about their expectations at each phase of labour (early, active and transitional). Women then completed pain ratings during each phase of labour, and a measure of events during pregnancy, labour and birth was completed after childbirth. The study found that self-efficacy significantly predicted the pain experienced in the early and active labour phases, but not in the transitional phase. This study provides insight into the importance of measuring pain at different phases of labour. However, the sample of the study was somewhat selected, as women from antenatal classes who did not plan to have an epidural may not be representative in terms of their beliefs about pain and coping. Despite a monetary incentive, only 37 of

the original 65 recruited completed all measures, although these groups did not differ statistically.

A similar study by Fuller Stockman and Altmaier (2001) also investigated self-efficacy in relation to labour pain. This study recruited from an obstetric clinic (nulliparous and multiparas) in a university community. During late pregnancy women completed a measure of self-efficacy that had been devised by the research team, around their beliefs that they could perform certain behaviours and avoid potential barriers that may occur during labour. After childbirth, participants were asked to rate their pain using the McGill Pain Questionnaire (MPQ, Melzack, 1975) and visual analogue scales. Medication use was also noted from medical notes. The study found that self-efficacy was significantly predictive of pain scores. In particular the efficacy beliefs around being able to overcome barriers were the strongest predictor of pain, pointing to a potential area to target for intervention. A strength of the study is the triangulation of data by using two different pain measures, and the option to compare different types of pain information (which were found to be statistically related). This study used a non-representative sample and non-validated measure of self-efficacy. However, as the two studies show similar effects when pain is measured during and after labour, this shows that the effect appears to be robust.

Gross, Hecker and Keirse (2005) measured pain levels and the 'fitness' levels women self-reported during their labour. The concept of fitness, in German (the study was conducted in Germany), is translated as a mixture of physical and psychological strength. For the purposes of this review, psychological strength could be interpreted as related to self-efficacy (belief in one's own agency). Fifty women participated, and were approached as they came into a local hospital as they were in labour. Every 45 minutes of their labour, women gave ratings on a scale, one for pain and one for fitness.

The study found that fitness and pain did seem to be inversely related, and that fitness significantly predicted pain for women having their first baby (n=30). However, it was also found that pain predicted fitness in the study, so the direction of the relationship is unclear. Over 30% of women missed at least one measurement during the study, such as when they were very close to a contraction. It may be that those time points represented times of high pain intensity, for example, which could mean that valuable information was missed. In addition to the data collection, the authors also conducted and reported on the evaluation of the study, where they asked women to report on their experiences of participating. These were generally positive, with some women describing it as a helpful distraction. However, a few felt that the study interfered with their birth experience in a negative way. The use of this feedback allowed the researchers to consider their own impact on the birth experience of the women, and explore limitations further. It also raises the issue that participating in the research altered the experience in some way, so it may not be representative of a more 'usual' birth experience. It is unclear if the concept of fitness as described in the study is culturally specific as it is not mentioned within the other studies. In addition, it seems to have a number of dimensions related to both physical and psychological aspects. Therefore, it may not be appropriate to generalise the findings of this study.

In addition, two studies by Ip, Tang and Goggins (2009), and Shiloh et al. (1998) have shown a relationship between self-efficacy and pain experienced, so are in concordance with these two studies. These were intervention studies, and Ip et al. (2009) used an intervention that focussed specifically on improving self-efficacy. These are both more comprehensively discussed in the interventions section.

Most studies that measure self-efficacy before or during labour suggest that it is predictive of pain experienced. However, in contrast to the studies described above,

Beebe et al. (2007) found that self-efficacy as reported in pregnancy was not significantly related to pain. It is not clear why this is, but this study did focus only on the pain of pre-hospitalisation labour, which could be a factor. This study is reviewed more comprehensively in the anxiety section. Dannenbring, Stevens and House (1997) also found no relationship between pregnancy-rated self-efficacy and labour pain. However, they only used one brief question as a measure of self-efficacy in a study looking at multiple psychological factors. This study is discussed in more depth in a later section.

Control

Another factor that seems to be important in the experience of childbirth pain is the sense of control women feel during labour. Tinti, Schmidt and Businaro (2011) investigated this area by asking 123 women to complete simple scaled measures of pain experienced, how in control they felt during labour, how vividly they could recall pain, and the intensity of various emotions. These were measured at three days and then six months after giving birth. Analysis showed that control predicted pain scores at both time points (with high control associated with low pain). In addition, at both time points, lower controllability was associated with more intense negative emotions, and higher controllability with more intense positive emotions.

Green and Baston (2003) also found a relationship between self –reported sense of control of own behaviour during labour and pain levels. This was as part of a retrospective study looking at a range of variables in relation to control, with self-report measures during pregnancy and shortly after giving birth. While the authors conclude that pain levels predict sense of control, as the variables were both measured at the same time point, the direction of the relationship could be that control predicts pain (as found by Tinti et al., 2011).

Satisfaction

The relationship between pain and satisfaction with the birth experience has been explored in several studies. Three similar studies met the criteria for the review; Waldenstrom, Borg, Olsson, Skold and Wall (1996), Waldenstrom (1999) and Goodman, Mackey and Travakoli (2004). These studies all measured satisfaction with childbirth and pain experienced after women had given birth, at the same time point (the Waldenstrom, 1999, study also had earlier time points measuring other variables not related to pain). All three studies found a relationship between satisfaction and pain experienced, with women who reported high satisfaction generally experienced less pain. While these studies suggest that it is pain level that is influencing satisfaction, as these studies all measured both constructs at the same time point, it could be that those who are more satisfied with their experience then report less pain. Further research to establish the direction of this relationship may be helpful.

Coping Strategy Use

Niven and Gijsbers (1996) used a mixed methods design to investigate the coping strategies women use in labour. They measured pain in labour using the McGill pain questionnaire (MPQ, Melzack, 1975), and investigated coping strategies by conducting semi-structured interviews. They included 51 women in the study, who gave pain ratings during and just after labour, and were interviewed about coping strategies three-four months postnatally. The study found that the number of strategies used to cope with pain was negatively correlated with pain levels. The strategies that women used were both taught and acquired informally, and many used strategies that they had used in previous pain experiences. There are some methodological considerations for the evaluation of this study, such as the long time gap before asking the women about

coping strategies. In addition, a quantitative measure of coping may have been useful in addition to the qualitative perspective.

Abushaikha (2007) investigated the mechanisms for coping with pain used by Jordanian women. The study recruited women who had recently given birth in a Jordanian birth centre. Participants were asked an open-ended question about how they coped with labour pain, and their responses were coded into different categories. Five categories were identified: physiological (including breathing or positioning); psychological (such as preparing themselves or screaming); cognitive (e.g. distraction); spiritual (prayers); and those who reported using no coping strategies at all. While the study is intended to be exploratory, it could have been enhanced by using an alternative method of analysis, to obtain richer information. In addition, the impact of the coping strategies on pain was reported in another study and not reported here.

Multiple psychological factors

There are a number of studies that have investigated other psychological factors that would be regarded as individual factors within the definition of this review, but do not specifically fit into one of the above areas. Quine, Rutter and Gowen (1993) conducted a prospective study of 59 women having their first baby. During late pregnancy, at ante-natal class, women completed measures of social support, locus of control, expectations and preparedness for birth. Shortly after giving birth (three weeks) women completed measures of satisfaction with birth, pain, social support and baby's behaviour. The overall aim of this study was to compare childbirth experiences of working and middle class women. However, in the course of doing this, they identified a relationship between social support (as reported at time one) and pain experienced, regardless of the class background of the participants. However, social class was predictive of the level of support (with middle class women reporting feeling more

supported), with mediation analysis indicating that support may mediate the relationship between class and birth experience variables such as pain. Questionnaires were specifically designed for the study, but were modified from previous validated scales, and a high reliability (0.76) was achieved. However, it may be problematic to recruit from ante-natal classes when investigating social class, as attendees may not be representative of the whole population of women (Redman, Oak, Booth, Jensen and Saxton, 1991).

Another study that investigated a range of psychological factors in relation to childbirth pain was conducted by Dannenbring et al. (1997). This was another questionnaire study with multiple time-points (before labour in late pregnancy, during early labour and several days postnatally). Seventy women completed all the measures and were recruited through ante-natal classes. Many of the psychological variables were measured in pregnancy and early labour using a brief 13 item questionnaire which measured past pain experiences, desirability (wantedness) of pregnancy, depression, anxiety, self-efficacy, expectations of childbirth, helpfulness of 'coach' (this role is not clarified, but could be the birth supporter) and how much the coping techniques had been practised. The self-report questionnaires completed postnatally measured childbirth pain, satisfaction, birth details and locus of control. In addition to self-report measures to be sent back to researchers, this study also included a nurse-rated labour stress measure for the early labour phase. Regression analysis showed that sensory labour pain was predicted by desirability of pregnancy and coach's helpfulness, and affective pain was predicted by depression and one of the expectations variables (that ante-natal education would facilitate drug free birth). Pain intensity was predicted by motivation to have a pain-free birth. The analysis also showed that a number of medical variables were significantly related to pain such as length of labour. The use of

multiple perspectives, with the inclusion of a staff-report is a useful addition to the study, although this was not found to be a significant predictor variable. Accelerated labour and 'excessive concern about labour' resulted in 30 exclusions at the 2nd time point (labour phase). Given the known relationship between anxiety and labour pain, it could be that the loss of these participants may have altered the sample characteristics. In addition, some of the constructs that were identified as important were based on very brief measures. For example, there was only one question related to depression. It may be helpful to explore these areas more fully in future work.

Waldenstrom, Bergman and Vasell (1996) asked all Swedish speaking women who gave birth over a two week period in Sweden to complete a questionnaire after giving birth. This is part of the same study, published in a different journal, as the Waldenstrom et al. (1996) study investigating satisfaction. This aspect of the study investigated how a number of variables were related to self-reported pain intensity and attitude. Regression analysis showed that pain intensity was predicted by anxiety during labour, expectations of pain and birth, midwife support and duration of labour. This is, therefore, in agreement with other studies in the area, using a good sized and representative sample. This study also achieved a response rate of 91%, which is excellent for a questionnaire methodology.

Shiloh et al. (1998) investigated a number of psychological factors in relation to pain experienced during childbirth. In a questionnaire study women were asked to complete visual analogue scales of pain experienced during labour whilst looking or not looking at the contraction monitor. They were then interviewed again one or two days postnatally about a range of variables including coping strategy use. The study found that pain was significantly positively related to pain anxiety, and negatively related to self-efficacy, and the use of certain coping strategies (attention, distraction, control-

predictability). Women experienced less pain when viewing the monitor, and used more of the coping strategies associated with less pain. Using a within subjects design is a useful addition to the research in this area as it enables comparison within women, reducing the difficulties associated with comparing groups. This is an intervention study, so is also included within the interventions section.

The improved understanding of what individual factors are important in the experience of pain in childbirth have led to a number of intervention studies in the area. These are discussed below.

Psychological Interventions to Cope with Labour Pain

A second area of consideration is that of psychological coping mechanisms to manage pain in labour. A recent paper by Escott, Slade and Spiby (2009) reviewed the role of antenatal classes in preparation for managing childbirth pain, through the promotion of the use of psychological coping strategies. As part of this work, they review studies from the general pain literature. They outline the evidence showing that cognitive coping strategies have been found to be effective in pain management, and that some coping styles, such as catastrophizing, have been found to be unhelpful. Self-efficacy for the use of coping strategies has also been found to be important, and the use of implementation intentions around carrying out strategies (the intention to carry out a behaviour which helps to reach a person's goal) is another potential area for future investigation. This review provides a useful introduction and overview into the area of interventions. However, only a limited number of the studies referred to met the criteria to be included within this review (due to date, or not being specific to childbirth).

Coping Strategies

A number of studies have investigated the influence of interventions to increase positive coping strategies. Ip et al. (2009) conducted a study researching the effects of an antenatal education programme focussed on improving self-efficacy (based on the model that self-efficacy enables people to use coping skills, Bandura et al., 1987). Women were randomised into the experimental group who received a 90 minute intervention, or to the control group which did not receive this. Following childbirth, within 48 hours, women were asked to complete measures of pain, anxiety and coping strategies used during labour. The experimental group showed greater self-efficacy for childbirth, lower anxiety, pain, and greater coping strategy performance. As a randomised controlled trial, a strength of the study is the randomisation to groups. However, it may have been more appropriate to compare the self-efficacy intervention with another class, rather than having no intervention or educational experience for the controls.

In addition, Shiloh et al. (1998) found that particular coping strategies were associated with less pain in labour. These were distraction, attention and control-predictability. This study is discussed more comprehensively in the individual psychological factors section.

Continuous Support

Hodnett, Gates, Hofmeyr, Sakala, and Weston (2011) published a Cochrane review on the impact of continuous support during labour, concluding that there were some benefits to continuous support, including reduced analgesia use and other obstetric benefits (such as shorter labour). One study from the review met the criteria. Langer, Campero, Garcia and Reynoso (1998) investigated the effect of continuous support from a doula (a lay person who assists/supports a woman through labour) for women during labour in a large randomised controlled trial. They measured a number of

variables including perceived pain (on visual analogue scale). The study found that although continuous support was beneficial in other ways, there was not a significant effect on pain experienced. However, as pain was only measured on a very brief scale, it is difficult to draw firm conclusions. Both this study and the wider review suggest that, while there is some evidence for the benefits of continuous support, these may not specifically be related to pain, and further research is needed to investigate this link more.

Hypnosis

There have been a number of reviews on the efficacy of hypnosis as a way of managing childbirth pain. A systematic review by Cyna, McAuliffe and Andrew (2004), including four randomised controlled trials and 14 other studies, found that hypnosis has been shown to reduce pain ratings and analgesia use in labour. However, they conclude that more high-quality trials would be necessary to confirm the robust nature of the effect. In addition, another review of non-pharmacological interventions for pain in labour by Simkin and Bolding (2004) conclude that there is support for the following interventions: continuous labour support; baths; water blocks; and movement/positions of the women. Hypnosis, and some non-psychological interventions were shown to have positive effects, but more research was thought to be needed in this area. A more recent review by Landolt and Milling (2011) focuses on the methodological issues of the hypnosis studies investigating childbirth pain. Once again, this review showed that there is evidence to support using hypnosis to control childbirth pain, but emphasises that some studies have been flawed methodologically (e.g. no randomisation).

In the literature search conducted here, two studies met the criteria: Mairs (1995) and Abbasi, Ghazi, Barlow-Harrison, Sheikhvatan and Mohammadyari (2009). Both studies investigated the childbirth pain experiences of women who were taught

and used hypnosis interventions. Mairs (1995) used quantitative methodology to compare reported pain and anxiety in women who had received a hypnosis training compared with those receiving usual care. The groups did not differ significantly in pain and anxiety expectations as reported before labour, but postnatally the hypnosis group reported significantly less pain and anxiety during labour. While this is a promising result, the groups were not randomised, and only those who said they were interested in hypnosis received the intervention, which creates a somewhat biased sample. Abbasi et al. (2009) interviewed six Iranian women postnatally who had received a hypnosis training session before labour. The women reported that hypnosis was a positive intervention for them, and they felt that it had substantially reduced their pain in comparison to previous labours. Some also reported feeling the pain transform into a feeling of pressure instead, which was easier for them to manage. A qualitative approach such as this provides interesting information about the pain experienced in childbirth. However, as it is known that parity is a significant predictor of childbirth pain (Melzack, 1993) this is an important variable to consider when women are comparing pain across birth experiences. In addition, the study actually selected and screened a larger number of women, but excluded some due to them not being suggestible to hypnosis, suggesting some bias to the sample. These studies are in general agreement with the reviews previously discussed in that they show some evidence that hypnosis may be a useful intervention for pain management in labour, but are methodologically weak. Further randomised controlled trials in this area are required.

Biofeedback and Antenatal Classes

On a related note, there have been two Cochrane reviews that are relevant to pain in childbirth. Gagnon and Sandall (2007) reviewed the evidence for group and individual

education programmes for childbirth preparation. They concluded that the effects of antenatal education programmes are largely unknown, and that there are a number of flaws within the methodologies of many studies in the area. Barragán Loayza, Solà and Juandó Prats (2011) reviewed the evidence for the use of biofeedback as a pain management strategy during labour. They concluded that the use of biofeedback is largely unproven as effective, although there have been some positive results for the early phase of labour. This evidence provides a useful context for this review. However, no studies from these two reviews came up in the search here, as many were not specifically related to psychological aspects of pain in childbirth. However, the Shiloh et al. (1998) study reviewed previously did use an element of feedback as participants were looking at a contraction monitor. The study found that looking at the monitor lead to lower reports of pain than when women were not looking.

Qualitative Perspectives

In addition to the quantitative studies found, two qualitative studies were included here in the intervention section, as they investigated the experiences of women who had given birth in alternative maternity care provisions, with the aim of understanding how these alternatives contribute to the birth experience. Lundgren and Dahlberg (1998) interviewed 9 women up to four days post-birth, asking them the question; 'can you tell me about the experience of pain during childbirth?' Interviews were taped and transcribed, before analysis using a phenomological approach. Four main themes were identified in the analysis. Firstly, women found using words to describe the pain they experienced difficult, as it can be both positive and negative. The theme of trusting yourself and your own body was being identified, such as trying to be calm, to do as the body indicates, and to view pain as a natural experience. Women also talked about the importance of having trust in their midwife and birth supporter, as this made their pain

easier to cope with. Finally, women talked about the meaning of the pain in the context of the transition to motherhood. The authors conclude that pain in childbirth gives strength and power, and brings the woman closer to her baby. The qualitative literature in this area provides an alternative perspective to the questionnaire studies that dominate. However, the study included a sample of women who had experienced a normal birth in an alternative birth centre, which is designed to be a less medicalised centre using alternative methods for pain relief. This may not be reflective of the experiences of a majority of women.

Another qualitative study was carried out by Leap, Sandall, Buckland and Huber in 2010. This study came from an evaluation of a local midwifery practice that was found to use less analgesia than other services. Women who had laboured under the care of the practice were invited to share their experiences in a semi-structured, taped interview. Ten women were interviewed at approximately four weeks after labour, around their experiences of pain preparation, support by midwives, and continuity of care. These interviews were analysed using a descriptive methodological approach. The themes that emerged in relation to pain were that midwives had helped them to build confidence while pregnant, and supported them to manage pain during labour. It helped that there was good continuity, so the midwife knew the women well by the time they gave birth. Some women reported that hearing other stories of birth in the antenatal group was helpful for the management of pain, and some felt a sense of pride if they managed to give birth with minimal pain relief. This study contributes to the understanding of what is helpful about the nature of support, and how this contributes to pain. The strengths of this study are that the information provided indicates some intuitive implications for practice based on a good example of care. Furthermore, it provides triangulation data for the quantitative studies that demonstrate the importance

of social support (Quine et al., 1993). However, as with the Lundgren and Dahlberg (1998) study, this is a service evaluation and it is clear that the service is not a typical example of care, so these findings may not be indicative of the more general experience of maternity services.

Role of Culture in Pain

The final area to consider is the literature investigating the role of culture in childbirth pain. The search revealed two studies in this area. Clark Callister, Khalaf, Semenic, Kartchner and Vehvilainen-Julkunen (2003) conducted a qualitative study involving a re-analysis of transcripts of interviews with women who had recently given birth. They included 100 women from a diverse range of backgrounds; Scandanavia, America, China, Tonga and the Middle East. Content analysis revealed themes of attitudes, perceptions and meanings of pain, pain behaviour, and ways of coping with pain. In particular, there were cultural differences in the setting, medication use and support available during labour, with many women referring to spiritual beliefs as being helpful to them for managing pain. Women used a mixture of positive and negative words about childbirth, describing the pain as difficult to manage but there being a sense of achievement and joy on the baby's arrival. This study demonstrates some commonality in the childbirth experiences of culturally diverse women, and also the importance of culturally sensitive practice. However, the study could have further investigated how the cultural groups may have differed in the themes that emerged, given the large number of interviews available.

Lee and Essoka (1998) compared the childbirth pain experiences of Korean-American and European-American women. They used the MPQ short form (Melzack, 1987) with women who had recently given birth at a community hospital. The results showed that those from the Korean background reported significantly higher pain scores

on the visual scale, although this may be confounded by the sample having a higher percentage of primiparas in this group. There were no significant differences found with the other pain intensity measures, but there were some differences found in the words women from different backgrounds used to describe pain, with white women using more words relating to the affective aspect of pain.

Three of the studies previously reviewed considered the impact of culture on pain. Abushaikha (2007) conducted a study on the coping strategies used by Jordanian women and concluded that the low levels of cognitive coping strategies and some women saying they could not cope could be due to the lack of childbirth education classes available in Jordan. In addition, the use of spiritual strategies is discussed in the context of Muslim traditional practices being prevalent in Jordan. Abbasi et al. (2009) discussed their hypnosis study in the context of the Iranian health care system where midwives are less involved in labour and birth, and women rarely attend childbirth education classes. Therefore, it maybe that the hypnosis intervention was particularly relevant for the Iranian population of women, as they would not have had access to other ante-natal training on pain coping. Similarly, Langer et al. (1998) discuss their intervention on continuous support in Mexico within the cultural context. For example, traditionally in Mexico women would have received support throughout birth from a 'traditional' midwife, but have increasingly moved to a hospital-based model where doctors and nurses provide the primary source of support. Therefore, the study was investigating a return to the continuous support model that had previously been embedded within the culture of Mexico.

Cultural perspectives such as these studies demonstrate that there may be culturally specific experiences of labour and ways of coping with pain. However, there has been little research comparing different cultural groups, and the very different

maternity care systems of countries may act as a confounding factor. For example, many women do not have access to antenatal education classes, which may influence the range of coping strategies available.

Conclusion

In conclusion, there is some evidence that naturally occurring variables such as anxiety and self-efficacy are related to the experience of pain in childbirth. In addition, psychological coping strategies can be effective for the management of pain in labour. There are some studies on the role of culture in pain in labour, although more research may be needed in terms of fully understanding the impact of culture on the birth experience. In general, the quality of the studies reviewed was found to be high. However, an area of weakness for many studies is how representative their sample might be of labouring women. For example, many studies recruit from antenatal classes, which are known to not be representative (Redman et al., 1991). The area is also somewhat dominated by prospective questionnaire studies, although this is to be expected given the nature of the population and experience of childbirth. It would appear that some psychological aspects of childbirth pain are widely investigated and understood (such as anxiety and self-efficacy), while other areas remain largely unexplored. For example, the role of personality factors, early experiences or attachment styles was not investigated in any of the studies meeting the criteria. This is despite some evidence in the general pain literature that these factors may be important. For example, in the area of adult attachment, Meredith, Strong and Feeney (2006) demonstrated that people with secure attachment patterns report less pain, feel more in control of pain and catastophize less about pain then those will less secure patterns. Therefore, it would be useful to investigate these areas in relation to pain in labour and childbirth in future work.

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Section Two: Research Report

Childbirth Memory Processing and Perception of Pain: The Role of Adult Attachment

Abstract

Objectives. This current study aimed to investigate the role of adult attachment patterns as possible predisposing factors for the development of symptoms of acute stress following childbirth. It also investigated how these patterns impact on pain perception and memory variables, which are possible precipitating factors for the development of acute stress symptoms after childbirth.

Design. The study used a longitudinal questionnaire methodology with two time points.

Methods. Seventy women having their first baby were recruited in late pregnancy from ante-natal education classes and completed measures at both time points. At this first time point participants completed a questionnaire which included an adult attachment measure. Shortly after childbirth, participants completed a second questionnaire about their childbirth experience, which included questions on perceived pain, memory variables, perceived staff support and symptoms of acute stress.

Results. A correlational relationship was found between adult attachment patterns and aspects of pain but this was not robust in regression. Avoidant attachment patterns were related to the extent people felt respected by staff. However, no relationships between attachment and memory variables (disorganisation, emotional valence) were found. Emotional intensity/valence of the birth experience was predictive of some symptoms of acute stress.

Conclusions. The findings indicate a possible link between adult attachment patterns and the experience of pain in childbirth, though more research is needed to establish this further. There also appears to be a relationship between the emotional intensity of the experience of childbirth and symptoms of acute stress.

Childbirth Memory Processing and Perception of Pain: The Role of Adult Attachment

Post Traumatic Stress Disorder (PTSD) can occur following exposure to a trauma, where one's own or other's life or physical integrity is threatened. Symptoms of re-experiencing (flashbacks/nightmares), avoidance of anything related to the trauma, and elevated arousal, lasting more than one month, and causing significant problems in daily functioning, are required for diagnosis (American Psychiatric Association, 1994). Post Traumatic Stress Syndrome (PTSS) is a collection of the symptoms of PTSD following a traumatic event, but may not meet the criteria to be given a formal diagnosis of PTSD. As diagnosis for PTSD requires a gap of at least a month between the traumatic event and diagnosis, the symptoms experienced before this time are referred to as symptoms of acute stress (SAS).

There is a growing body of evidence showing that PTSD/S and SAS can occur following childbirth (Olde, van der Hart, Kleber & van Son, 2006). Slade (2006) outlines studies that have identified factors that contribute to this phenomenon, and proposes a model for understanding PTSS after childbirth. She suggests that these factors can be considered in terms of predisposing, precipitating and maintaining internal, external and interactional factors. This study will investigate adult attachment as a possible predisposing factor, and memory processing as a possible precipitating factor, within the Slade (2006) model.

Adult Attachment

Attachment patterns develop in childhood based on the responses children receive from their caregivers. This affects how the child relates to others, and how they view self and

others within relationships (Bowlby, 1969). These patterns are hypothesised to stabilise and influence how a person behaves and feels within relationships with others as an adult (Hazan & Shaver, 1987). Hazan and Shaver (1987) propose three adult attachment 'styles'; secure, anxious and avoidant, with the latter two described as 'insecure' styles. Secure individuals are confident and comfortable with intimacy and reciprocity within relationships. Anxious attachment presents as an anxiety about rejection in relationships and a desire for greater intimacy than others typically want. Avoidant attachment patterns present as a lack of trust, and less comfort with intimacy or dependency within relationships (Hazan & Shaver, 1987). Further work proposes that attachment patterns are not best understood as fitting into distinct 'styles' and rather should be viewed as on a continuum from secure to anxious or avoidant (Fraley, Waller & Brennan, 2000). Furthermore, individuals can be high in anxiety only, avoidance only or both, and equally could be low in both or either dimension (Fraley et al., 2000).

There is a range of literature suggesting that attachment patterns are an important factor to consider in the development of PTSD. For example, attachment styles have been associated with some PTSD symptoms (O'Connor & Elklit, 2008), and the number of PTSD symptoms following trauma (Fraley, Fazzari, Bonanno & Dekel, 2006). Within the childbirth literature, Iles, Slade and Spiby (2011) found that adult attachment style is related to PTSS following childbirth. This study investigates attachment and SAS in relation to memory processing, an area not previously investigated in childbirth.

Memory Processing and Trauma Symptoms

Memory processing is the mechanism by which information is integrated and changed within the memory system following an event. There are several theories of memory processing in trauma. In relation to memory disorganisation, the models of PTSD

proposed by Brewin, Dalgleish and Joseph (1996) and Ehlers and Clarke (2000) suggest that trauma memories are encoded differently from other memories. The model suggests that memories are disorganised as they are encoded using primarily sensory information. A contrasting theory by Bernsten, Willert and Rubin (2003), the Landmark Hypothesis, suggests that trauma memories should not be disorganised, but well integrated as distinctive 'landmarks' in memory, around which other memories are organised.

However, a distinction between encoding and later integration of memories must be made. Previous work by Briddon, Slade, Isaac and Wrench (2011) showed that memory disorganisation was associated with PTSS following childbirth at six weeks. An earlier measurement point in the study did not find this relationship. Although it is not clear if this difference is related to the time point or the method of measuring disorganisation, these findings would be consistent with memory processing theories that predict changes in the nature of memory over time. For example, the theoretical model proposed by Conway and Pleydell-Pearce (2000), suggests that while non-trauma memories change in nature with processing, trauma memories are more difficult to integrate with existing memories and beliefs, and thus remain 'stuck' at a more disorganised earlier stage. An alternative suggestion is that memories are rehearsed, but in such a way that reinforces negative experiences in trauma memory (as proposed by Wells, 2000).

Memory Processing and Attachment

There is some evidence that adult attachment patterns influence the way information is processed in memory. For example, adult attachment style has been associated with differential recall of positive or negative information, with secure attachment associated with more recall of positive information, and insecure with more recall of negative

information, (Beinstein Miller & Noirot, 1999). Also, Zeijlmans van Emmichoven, van Ijzendoorn, DeRuiter and Brosschot (2003) found that secure adult attachment style was associated with greater recall of threat information. They suggest that this is because securely attached people do not defensively avoid this information. Mikulincer, Shaver and Horesh (2006) propose a model of how attachment patterns relate to the experience of threat, in that insecure attachment can lead to hypervigilance to or detachment from threat and attachment cues. This model provides possible insight into the non-concordant findings of the above studies, and suggests that attachment can influence memory processing. For example, within this model, avoidantly attached people may avoid threat information and therefore be able to recall it less. Anxiously attached people may be vigilant to threat, and thus recall more negative threat-based information.

Memory Valence

The above studies discuss the differential processing of positive and negative information. Valence refers to the emotional value associated with a specific memory. There is evidence within the literature that memory is influenced by arousal (either of positive or negative valence, e.g. review by LaBar & Cabeza, 2006). Briddon et al. (2011) found that experiences with a strong negative valence were associated with greater memory disorganisation (positive valence was not found to be predictive of memory disorganisation). The current study investigates the hypothesis that attachment patterns influence how positively or negatively an experience is perceived. This may be particularly relevant for childbirth, as women use both negative and positive words to describe labour (Slade, MacPherson, Hume & Maresh, 1993).

Pain Perception

Another area where attachment patterns may influence perception of an experience concerns pain and pain-related distress. In the non-childbirth related literature, a relationship has been found between adult attachment patterns and the perception of pain and pain related coping. People with insecure attachment patterns have been found to report more pain, catastrophize more about pain, and feel less in control of pain than securely attached people (Meredith, Strong & Feeney, 2006a). A further study has demonstrated similar effects, but these were restricted to the anxious insecure subtype, with avoidance showing a less strong relationship with level of pain perception and catastrophizing (McWilliams & Asmundson, 2007). This research demonstrates that adult attachment patterns can influence the perception of pain.

Within the childbirth literature, Briddon et al. (2011) found that memory disorganisation was related to pain reported when assessed six weeks after childbirth. However, the role of attachment in the perception of pain and pain related distress during childbirth has not been investigated. In addition, women's expectations of pain have been found to be important for the evaluation of birth experience, with many women underestimating pain intensity and thus being less well prepared for labour (reviewed by Lally, Murtagh, Macphail & Thompson, 2008). Therefore, it is important to consider expectations of pain.

Pain, Trauma and Memory

It should be noted that there is a relationship between pain, memory and SAS/PTSS which needs to be considered. The experience of pain is associated with the development of PTSS in both general trauma (e.g. Fedoroff, Taylor, Asmundson & Koch, 2000) and childbirth (e.g. Czarnocka & Slade, 2000). Norman, Stein, Dimsdale and Hoyt (2008) found that pain after trauma is associated with risk of PTSD. They

review literature that suggests that there are shared neurobiological mechanisms for pain and PTSD, and propose that people who report high pain may be vulnerable to PTSD. They also discuss work on memory and pain, as painful experiences are recalled more readily. Therefore, it is important to consider this relationship between pain, memory and SAS within the analysis, to ensure that the unique contribution of attachment is understood

Perceived Staff Support

An additional consideration is the relationship between attachment and perceived levels of support during labour and birth. Levels of perceived staff support have consistently been found to relate to risk of developing PTSD, with low perceived support being associated with higher risk (see Charuvastra & Cloitre, 2008, for a review of this evidence). In addition, Hodnett (2002) reviews evidence suggesting that the development of memories of childbirth are influenced by relationships with care givers during the birth.

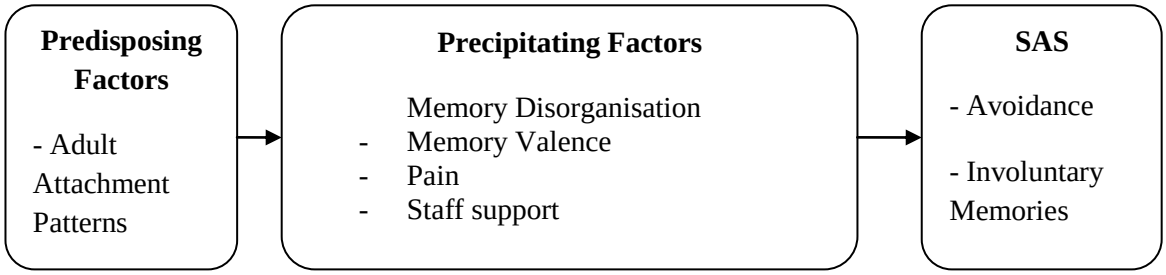
Rationale for Study

This study aims to investigate whether adult attachment patterns act as a possible predisposing factor for developing SAS following childbirth. This involves investigating the influence of attachment on perceived support, pain perception, pain related distress and memory processing following childbirth. These variables have been found to be associated with SAS (and future development of PTSS), and would therefore be regarded as precipitating factors within the Slade (2006) model.

Hypotheses

The hypotheses have been configured around the Slade (2006) model of factors that may contribute to the development of SAS following childbirth. The variables within the hypotheses are outlined in the diagram below, in line with where they would fit in the Slade (2006) model.

Figure 2. Variables investigated in the context of the Slade (2006) model.



In line with the literature described, the following hypotheses will be tested:

Relationship between Attachment and Precipitating Factors

- Less secure adult attachment patterns will be associated with expectations of pain; greater perceived pain; more pain related distress; greater childbirth memory disorganisation; and more negative valence of childbirth memories as reported following childbirth.
- Less secure adult attachment patterns will be predictive of less perceived support by staff during labour and birth.

Relationship between Attachment and SAS

- Less secure adult attachment patterns will be associated with greater symptoms of acute stress.

Relationship between Memory Variables and SAS

- Negative valence of birth experience will be associated with greater memory disorganisation.
- Greater childbirth memory disorganisation and negative memory valence will be associated with higher levels of SAS, including avoidance.

Method

Rationale for Design and Method Chosen

The study recruited pregnant women in the late stages of pregnancy through ante-natal classes. The recruitment through antenatal classes was chosen as a good way of recruiting a large number of pregnant women simultaneously. However, it is acknowledged that the women attending antenatal classes may not be representative of the population of pregnant women. For example, Redman Oak, Booth, Jensen and Saxton (1991) found that people who do not attend antenatal classes are more likely to be younger or have a low educational level. However, this study is investigating how attachment impacts on individual women's experience of childbirth, and looking at trends within that relationship, rather than comparing groups. Therefore, the use of ante-natal classes was felt to be a reasonable compromise as it is less important that the group are representative within this design. The use of two time points within the study is important because the process of having a child may influence the attachment relationships of the parent (e.g. Rholes, Simpson, Campbell & Grich, 2001). Therefore, it was decided to measure attachment before the birth.

The other variables to be taken into account have been carefully considered in line with the research available. The study measured depression levels as depression

has been found to affect memory processing (e.g. Daegleish & Watts, 1990, review). In addition, obstetric factors such as unplanned instrumental births have been found to influence risk of developing PTSD following childbirth (e.g. Ryding, Wijma & Wijma, 1998). Analgesia was measured as it can affect memory by disrupting consciousness (e.g. Robinson, Rosen, Evans, Revill, David & Rees, 1980). This may contribute to memory fragmentation (as discussed by Slade, 2006). Educational level was measured to describe the sample and because this has been found as an important factor in the development of PTSD. For example, Engelhard, van den Hout and Schouten (2006) found that low educational level was predictive of PTSD development following miscarriage or stillbirth.

Participants

Participants were pregnant women (29-37 weeks pregnant), having their first baby and attending antenatal classes in either a town or city in Yorkshire, England (Harrogate or Sheffield). All the participants were over 18 years of age, to ensure that they could consent to the study as an adult, and were proficient in English to a standard that would enable them to fill in the questionnaire measures. If, following the birth, the baby was in special care for over 48 hours, or there was still birth/neonatal death, then this resulted in exclusion from the study for ethical reasons, as this was regarded as a difficult time for women. In addition, multiple births and elective caesarean section births were not included. This is because these women may have a different experience of childbirth, which may not be comparable to those having one baby, and those who go into labour. The inclusion of only women who are having their first child was to ensure that memories of previous births did not influence the current experience described.

One hundred and fourteen women were recruited at ante-natal classes and completed the time one measures. In terms of the two sites, 66 women were recruited

from Sheffield (58%) and 48 from Harrogate (42%). This was due to Sheffield having more frequent and larger classes during the recruitment period. Participation rates at time one were 47% of eligible women attending classes filling in the measures, with 51% of women attending classes at Harrogate participating at time one, and 45% of women attending Sheffield classes. Of the 114 women, four were excluded at the second time point due to their babies being in special care for over 48 hours. Another three women were unavailable for follow up due to having given birth away from the recruitment sites. Four women had elective caesarean sections, so were also excluded. Therefore, 103 women were sent the time two measures, and in total 72 participants returned these, with 31 lost to follow up. This represents a return rate of 70%, which reflects the rate found in other similar studies in the area (e.g. Czarnocka & Slade, 2000, also 70%). Participants were sent time two measures within two weeks of giving birth, with a maximum gap of 35 days allowed from birth to time two measures completed (to ensure women were still in the time bracket to be regarded as having acute stress symptoms). Two women did not send the questionnaires back within this time frame so were excluded. The mean time gap between giving birth and time two completion was 19.17 (s.d. 7.98) and ranged between seven and 34 days.

Procedure

The researcher attended antenatal classes to outline the study to potential participants and give out information sheets. The researcher then returned the next week (or day in the case of weekend classes) with consent forms and questionnaire packs to give to interested and eligible women to complete before the end of the class. As part of the consent form, women were asked for their permission for the researcher to liaise with midwives to establish when their delivery date was (and also any exclusions that needed to be made at the second time point). They were asked for consent to be contacted

again by post or e-mail, and telephone or text. Participants had the option of participating but opting-out of the follow-up telephone call or text message. Copies of the consent form, information sheet and questionnaires are in the Appendices (B1 – information sheet, pg. 108. B2 – consent form, pg.111. B3 & B4 – questionnaires, pg.112)

The second time point was shortly after giving birth. The researcher liaised with local midwives and other staff to identify delivery date and exclusions. A second questionnaire was then sent out to the women via post with a pre-paid return envelope, or if preferred (as specified at time one), via e-mail. If participants had not returned the questionnaires within 10 days of sending, and had consented to telephone or text contact, the researcher telephoned or sent a text message to check that they had received the questionnaires, and to ask if they had any queries. If required the researcher sent out another set of questionnaires.

Measures

Time One

The Edinburgh Depression Scale (EPDS) – Murray and Cox, 1990.

This is a widely used scale for assessing depression in pregnancy and postnatally (where it is referred to as the Edinburgh Postnatal Depression Scale, Cox, Holden & Sagovsky, 1987). Murray and Cox (1990) demonstrated that it can effectively identify major depression in pregnant women. Cox et al. (1987) report a split half reliability of .88, and alpha coefficient of .87, and a sensitivity of 73% when using a cut off score of 12/13. The scale has a minimum score of zero, and a maximum score of 30, with high scores indicating more depression symptoms. In this study the scale showed high reliability at both time one (.800) and time two (.802).

The Experiences in Close Relationships Questionnaire – Revised (ECR-R) Fraley et al., 2000

This is a widely used scale measuring adult attachment, with two subscales measuring attachment anxiety and avoidance. It asks participants to rate how much they agree with statements on a one to seven point likert scale. Sibley, Fischer and Liu (2005) conducted analysis demonstrating that the scale has good levels of reliability and validity. It is convention to present the scales as an average score, and as a result has a minimum score of one (indicating secure patterns) and a maximum of seven (indicating insecure patterns). This scale was used to look at attachment on the two subscales, rather than putting scores into categories of attachment 'style'. This study found a reliability of .875 on the avoidant scale, and .888 on the anxiety scale.

The Pais-Slade Expectations of Childbirth Scale (Pais, 2009)

This is a scale of expectations of childbirth that has been shown to have good construct validity with other widely used measures of anxiety (Pais, 2009). The scale measures a number of expectations on a scale of one to five (strongly agree through to strongly disagree). It has a high alpha (.89), with all subscales highly correlated to the total score. The study used the expectations of labour subsection of the questionnaire (consisting of three highly correlated subscales), which includes questions around expectations of pain, as well as other expectations of labour. This had 23 items, with a minimum score of 23, and a maximum of 115. On this scale a high score represents a more positive expectation of birth. This study found an alpha .819 on this scale, with .999 on the pain subset (which consisted of the five items related to pain).

Demographics

Self-report of age, ethnicity, years of education, occupation and relationship status.

Preference for how time two measures would be sent (via letter or e-mail) and contact details were also collected at this time point.

Time Two Measures

Trauma Memory Questionnaire (TMQ) Halligan, Clark and Ehlers, 2002, Halligan, Michael, Clark and Ehlers, 2003

The Trauma Memory Questionnaire has been shown to assess cognitive processing in a number of studies (in particular Halligan et al., 2002 & 2003). It is divided into two subscales, memory disorganisation and intrusion. In this study, following the methodology of Briddon et al. (2011), the full disorganisation subscale was used to assess memory disorganisation. The scale has six items that are rated from zero to four, with a minimum score of zero and a maximum score of 24. For this scale high scores represent more disorganisation. The alpha coefficient found in this study was .764.

The Experience of Birth Scale (EBS) Slade, MacPherson, Hume and Maresh, 1993

This scale is a measure of valence of birth experience, where women are asked to assess how much they agree with ten adjectives on a likert scale of one to ten. It is divided into positive and negative subscales, which have five items each. Each scale has a minimum score of five and a maximum of 50, with high scores indicating a stronger experience of emotion (i.e. more positive on the positive scale, and more negative on the negative scale). This measure has been shown to be reliable in a number of studies, for example Briddon et al. (2011). For the current study the alphas were .885 for the positive scale, and .559 for the negative scale.

Satisfaction with Life Scale (Diener, Emmons, Larsen & Griffin, 1985)

This is a five item scale relating to general satisfaction with life, where people are asked to judge how much they agree with statements using a scale from one to seven. Scores can range from five to 35, with higher scores indicating greater satisfaction. This scale has been found to be reliable and psychometrically robust (Diener et al., 1985). It is included here as the measure of well-being. In this study the alpha coefficient was .734.

Impact of Event Scale - Revised (IES-R) Weiss and Marmar, 1997

This is a widely used scale assessing trauma responses. Within this study, it was used to look at the level of symptoms of acute stress. It produces scores on three subscales; intrusion, avoidance and hyperarousal. Although this scale has been shown to have good reliability in past studies (e.g. Weiss & Marmar, 1997), within this study the alpha coefficient scores were reasonable (intrusion= .755, hyperarousal= .732, avoidance= .830).

Labour details, Pain and Analgesia use – Briddon et al. (2011)

This study used the same questions used successfully by Briddon et al. (2011) to obtain self-reported information about labour details, analgesia use, pain severity, and pain related distress.

Fear for Self or Baby - Gamble, Creedy, Moyle, Webster, McAllister and Dickson (2005)

These two questions assess fear for self or baby during childbirth, and are regarded as a method for establishing if childbirth is traumatic in line with the DSM IV (American Psychiatric Association, 1994) diagnostic criterion A for PTSD.

The Edinburgh Postnatal Depression Scale, Cox, Holden and Sagovsky, 1987

This measure was repeated at time two to control for depressive symptoms following childbirth.

Perceived Staff Support

The study measured staff support, using questions that have been successfully used in a previous study (Green & Baston, 2003). Although used previously, these questions are not part of a validated staff support measure, as the researchers are unaware of any validated measures currently in use. When a score was allocated to the level of support received based on these questions, an alpha coefficient of .687 was achieved. Due to the relatively low alpha on this scale, individual question items were also analysed (see results section for further information).

Examples of all of these scales, in the questionnaire pack, can be found in the appendices B3 (time one questionnaire pack, pg. 112) and B4 (time two questionnaire pack, pg. 116)

Analgesia Coding

In order to assess the impact of analgesia use on pain and consciousness levels, each participant was given a score of one to four based on how the medication use is judged to impact on pain or consciousness. The same coding system as Briddon el al (2011) was used, as displayed in Table two below, which was devised in liaison with a consultant obstetric anaesthetist.

Table 2. Analgesia coding

Rank	Effect of Analgesia on Pain	Effect of Analgesia on Consciousness
1 (least)	No medication	No medication
2	Gas and Air	Epidural
3	Morphine/Pethidine	Gas and Air
4 (most)	Epidural	Morphine/Pethidine

Ethical Implications

The study gained ethical approval from the South Yorkshire Regional NHS ethics committee. A copy of the ethical approval letter is in appendix A1 (pg. 104). In addition, the BPS (2009) code of conduct for ethical research was followed.

While the act of filling in the questionnaire measures was unlikely to create distress, it was possible that it may highlight some potential areas of difficulty for women. In addition, one week post-birth may be a demanding time for women to participate in research. All participants were made aware that they did not have to participate and could withdraw from the study at any time. In addition, the study information sheet provided information about what to do if participants felt they were in distress (such as contacting their GP). Where participants showed very high scores on the depression or PTSD measures, or suggested suicidal ideation, then the researcher wrote to them asking if they would like them to contact their GP on their behalf. If they did not wish this to happen then they were advised to contact their GP themselves. However, the information sheet made it clear that the questionnaires would not be analysed until all data collection for an individual is complete, which may be some time after those completed in pregnancy. This was to be helpful to women so they were clear

that participating in the research and completing the measures was not a way of accessing services or gaining support for any specific distress.

Service User Involvement

A service user representative from the Harrogate Labour Ward Forum viewed the protocol and information sheet and made comments on these. A number of alterations to the sheet and the protocol were made following this feedback.

Power Analysis

An a-priori power analysis was conducted using the G*Power 3 statistical computer programme (Faul, Erdfelder, Lang & Buchner, 2007). This was conducted based on the hypothesis that adult attachment patterns will be associated with memory disorganisation as an example, as this was judged as one of the hypotheses with the most predictors. Using two predictors (anxiety and avoidance attachment scales), with five additional variables to be taken into account, with a power of 80% and an effect size of $f^2 = .15$ (using Cohen's 'rule of thumb' for a medium effect, due to the lack of studies in this area, Cohen, 1992). A sample of 69 is required. However, as the study used a questionnaire methodology, it was predicted that not all of the participants recruited at time one will return the time two questionnaires, particularly as the second time point may be at a particularly demanding time for women. Based on earlier work using a similar population, approximately 70% of the initial sample might be expected to participate at time two (Czarnocka & Slade, 2000). Therefore, the aim was to recruit 100 - 120 participants at time one with the aim of collecting data from 70 women at both time points.

Analysis Strategy

Following inspection of the data, checks for normality, comparison of responders at both time points versus just the first and descriptive statistics, the following analyses were completed for each hypothesis. All of the hypotheses were examined using correlational analyses, and if these were significant then bivariate regression analyses were conducted. Within the regression models, appropriate variables were controlled for, following analysis of correlations between them (see results section for specific details). In addition, where appropriate, Cronbach's alpha calculations were computed for scales used.

Results

Demographics

Sixty one (61/70, 88.4%) of the sample described themselves as white British, and two (2/70, 2.9%) as white European. Six participants were from non-white backgrounds (6/70 8.6%). Sixty four women (64/70, 92.8%) were currently employed or on maternity leave from employment, and five women described themselves as unemployed. Fifty five (55/70, 78.6%) of the women were married, and the other fifteen were cohabiting. In terms of education, all of the participants were educated to at least GCSE level. Nine women described their highest educational level as GSCE (9/13, 13.0%), four as A-Level (4/70, 5.8%), 12 as diploma or vocational qualification (12/70, 17.4%), 30 women had degrees as their highest educational level (30/70, 43.5%) and 14 had postgraduate degrees (14/70, 20.3%). The ages of women participating ranged from 21 to 38, with an average age of 29.6 (s.d. = 3.66). The sample was, therefore, found to be largely white, highly educated, employed and married.

The demographics of responders and non-responders were compared. There were no significant differences in demographics or time one data between responders and non-responders. This is demonstrated in Table three:

Table 3: Comparison of Responders and Non-Responders

Variable	Test	Test Statistic	P Value
Age	T-test	t(99) = -.844	.401
Pais-Slade Expectations	T-test	t(97)= .161	.873
Time One EPDS	T-test	t(99) = -.385	.701
ECR Avoidance	Komologorov-Smirnov	z= .508	.958
ECR Anxiety	Komologorov-Smirnov	z= .654	.786
Ethnicity	Chi-Squared	x^2(4)= 3.116	.539
Education	Chi-Squared	x^2 (4)= .753	.945
Employment	Chi-Squared	x^2 (1)= .021	.885
Marital Status	Chi-Squared	x^2 (1)= 3.276	.070

Labour and Birth Details

Participants showed high levels of variation in the length of labour they reported ranging from 2 to 96 hours. The mean length of labour was 22.7 hours (s.d.= 20.8). Sixty seven participants were accompanied by a partner, friend or family member during labour, and one person said they were alone (two did not answer this question). Other labour details are displayed in Table four:

Table 4. Labour Intervention and Medication Use

Intervention	Frequency	Percentage
Induced	24	34.3
Pool	8	11.4
Forceps	13	18.6
Ventouse	8	11.4
Emergency Caesarean	16	22.9
TENS	27	38.6
Medication		
Any Medication	64	91.4
Gas and Air	59	84.3
Diamorphine	11	15.7
Pethidine	15	21.4
Epidural	30	42.9

There are some national statistics available for the intervention rates for childbirth in England produced by Hospital Episode Statistics. These relate to all births in a given year (not just first time mothers). For the year 2010/11, which was the most recent available, the induction rate was 21.3%, the emergency caesarean rate was 14.8%, the forceps rate was 6.3% and the ventouse rate was 6.2%. Therefore, the proportion of women receiving interventions during labour within the sample was somewhat higher than the national average. Furthermore, the most recent data available on epidural rates (which was from the year 2008/9) shows that the national rate is 16.8% for all deliveries. Again, the study sample has a higher rate than this at 42.9%.

Descriptive Statistics

Table five shows the descriptive statistics for the sample on the main measures.

Table 5: Descriptive Statistics

Measure	Range	Mean	Standard Deviation
Experience in Close Relationship Scale – Avoidance - item mean	1- 4.39	1.67	.74
Experience in Close Relationship Scale – Anxiety - item mean	1- 4.39	1.71	.81
Pais-Slade Expectations of Childbirth Scale - total	44-105	66.66	12.20
Trauma Memory Questionnaire – Disorganisation - total	0- 18	4.82	4.27
Pain Severity - scale of 1-10	1- 10	7.68	2.21
Pain Distress -scale of 1-10	1- 10	6.43	2.73
Satisfaction with Life Scale - total	19- 35	29.01	3.41
Impact of Events Scale – Intrusion - total	0- 18	4.44	4.24
Impact of Events Scale – Avoidance - total	0- 19	3.49	4.44
Impact of Events Scale – Hyperarousal - total	0- 13	1.91	2.76
Experience of Birth Scale – Positive - total	5- 50	27.78	11.63
Experience of Birth Scale – Negative -total	9- 48	30.85	7.19

The statistics demonstrate that, in general, the study sample show relatively secure attachment patterns. In comparison to other studies using the Experience in Close Relationships Scale – Revised (Fraley et al., 2000), it is clear that the sample shows greater attachment security. For example, Fairchild and Finney (2006) found that the mean attachment score for anxiety was 3.00 and avoidance was 2.63 in their

study. However, a childbirth study recruiting from the same regional area, Iles et al. (2011), found similar levels of attachment security within their sample (anxiety = 1.35, avoidance = 1.37).

The variables were assessed for normality of distribution, and both attachment variables (as measured by the ECR-R) and all three SAS scales (as measured by the IES-R) were found to have significant positive skew. Pain severity was found to have a negative skew. These are outlined in Table six below. All other variables were found to be normally distributed.

Table 6. Skewed Variables

Variable	Skew (Standard Error)	Kurtosis (Standard Error)
Attachment Anxiety (ECR-R)	1.480 (.287)	1.471 (.566)
Attachment Avoidance (ECR-R)	1.606 (.287)	2.864 (.566)
Pain Severity	-1.159 (.289)	0.892 (.570)
Hyperarousal (IES-R)	2.089 (.287)	4.838 (.566)
Avoidance (IES-R)	1.900 (.287)	3.055 (.566)
Intrusion (IES-R)	1.490 (.287)	2.150 (.566)

Due to the skew in some of the variables, it was decided to use Spearman's correlations and non-parametric analyses when investigating these variables. For regression analyses, a log conversion was applied to relevant variables. As pain severity was negatively skewed, it was reversed before log conversion. As

demonstrated in Table seven, this improved the normality of the distribution for all the variables.

Table 7. Skew Corrections

Log Variable	Skew (Standard Error)	Kurtosis (Standard Error)
Attachment Anxiety (ECR-R)	.878 (.287)	-.282 (.566)
Attachment Avoidance (ECR-R)	.719 (.287)	-.200 (.566)
Pain Severity	-.068 (.289)	-.899 (.570)
Hyperarousal (IES-R)	.318 (.383)	-.530 (.750)
Avoidance (IES-R)	.507 (.316)	-.937 (.623)
Intrusion (IES-R)	-.139 (.314)	-.164 (.618)

Demographics and Experimental Variables

The demographic variables were analysed in relation to the experimental variables in the study. The significant relationships are described here, and a full table of all the variables in relation to demographic details can be found in appendix C2 (pg. 124). There was a significant negative correlation between the time taken from the birth to completing the time two questionnaire and pain distress reported (Pearson's $r(68) = -.345$, $p = .003$). In addition, age was significantly negatively correlated with memory disorganisation as measured by the disorganisation subscale of the TMQ (Pearson's $r(68) = -.285$, $p = .017$).

Due to small numbers of women describing their highest level of education as GSCE or A-Level, these two groups were combined for comparison with other educational levels (n= 13). There was a significant difference in the responses of participants with different levels of education across two variables: The Pais-Slade Expectations of birth scale (One-way ANOVA F(3,63)= 6.034, p= .001); and Pain distress (One-way ANOVA F(3,65)= 5.632, Inspection of the means indicates that those in the combined GCSE/A-level group showed more negative expectations of the birth, and reported more pain distress. In addition, those in the diploma and postgraduate groups reported more positive expectations of childbirth, and less pain distress.

Marital status was associated with attachment avoidance as measured by the ECR-R (Mann-Whitney U test, U = 598, p= .008), and also with satisfaction with life (T-test, t(67)= 2.316, p= .024). People who were married were more securely attached (showing lover levels of avoidance) and more satisfied with life than those who were co-habiting.

Labour Details and Experimental Variables

The details of labour interventions were also analysed in relation to the experimental variables. A full table of these analyses can be found in appendix C2 (pg. 125). Induction was associated with pain distress (T-test, t(68)= 3.164, p= .002), with participants who were induced reporting significantly less pain distress. Participants who had a forceps birth reported significantly less intrusion symptoms as measured by the IES-R (Mann-Whitney U test, U= 239.500, p= .046). In addition, participants who had a caesarean section had significantly more avoidance symptoms on the IES-R (Mann-Whitney U test, U= 595.500, p= .020). Finally, pain severity was significantly

related to use of pain relief both in terms of pain relieving and consciousness altering properties of analgesia use. Pain relieving qualities in relation to pain severity showed a significant difference across categories (Kruskal-Wallis, H(4) =10.236, p= .037), with inspection of the means showing that people who scored a three on the analgesia coding (indicating they had morphine or pethidine) reported higher pain severity than the other groups. The consciousness altering properties of analgesia use was also related to pain severity (Kruskal-Wallis, H(4)= 10.271, p= .036). Again, inspection of the means indicated that those having morphine or pethidine reported more pain severity (in this case scoring a four). In addition, women scoring a two on the consciousness coding (epidural only) reported less pain severity, though this was based on only three participants so needs to be interpreted with caution.

Correlations between Mood and Experimental Variables.

The following variables were significantly correlated with mood scores, as outlined in Table eight. A full table of these correlations can be found in appendix C2 (pg. 126).

Table 8. Mood Correlations

Variable (when measured)	R	P Value	Test
Time One Mood (EPDS)			
Pais-Slade Expectations (time one)	r(66) = -.400	.001	Pearson's
Satisfaction with Life (time two)	r(67) = -.257	.033	Pearson's
ECR-R Avoidance (time one)	r(68)= .341	.004	Spearman's
ECR-R Anxiety (time one)	r(68)= .296	.013	Spearman's
IES-R Intrusion (time two)	r(68)= .398	.001	Spearman's
IES-R Hyperarousal (time two)	r(68)= .521	<.001	Spearman's
Time Two Mood (EPDS)			
Pais-Slade Expectations (time one)	r(66) = -.290	.017	Pearson's
Satisfaction with Life (time two)	r(67) = -.316	.008	Pearson's
EBS Negative Valence (time two)	r(67)= .302	.012	Pearson's
Pain Distress (time two)	r(68)= .249	.038	Pearson's
IES-R Intrusion (time two)	r(68)= .432	<.001	Spearman's
IES-R Avoidance (time two)	r(68)= .323	.006	Spearman's
IES-R Hyperarousal (time two)	r(68)= .394	.001	Spearman's

Hypotheses Testing

The experimental hypotheses were analysed, starting with hypothesis one.

Hypothesis One

Less secure adult attachment patterns will be associated with higher expectations of pain; greater perceived pain; more pain related distress; greater childbirth memory disorganisation; and more negative valence of childbirth memories as reported following childbirth.

This hypothesis contains multiple variables to be investigated. Each of these aspects was analysed in turn, beginning with expectations of pain.

Pain Expectations

Pain expectations were measured using the Pais-Slade Expectations of Birth Scale. Although neither attachment scale showed a correlational relationship with the overall expectation of childbirth scale, when the pain items were extracted from this, then there was a significant relationship between avoidant attachment and pain expectations ($r(67) = -.253$, $p = .036$). In terms of the direction of the Pais-Slade scale, this negative correlation indicates that participants with more avoidant attachment patterns showed higher expectations of pain.

In order to assess the amount of variance in pain expectations that could be attributed to avoidant attachment patterns, a bivariate regression analysis was conducted using the log avoidant attachment scale. This showed that avoidant attachment patterns did not significantly predict pain expectations:

Table 9. Attachment Avoidance and Pain Expectations

Variable	Unadjusted R^2	F	P Value	Beta
Attachment Avoidance	.053	F(1,67)= 3.752	.57	-.230

Perceived Total Pain, Pain Severity and Pain Distress

Pain distress and severity scores were multiplied together to produce a distress*severity variable (distress multiplied by severity). This was calculated to provide an overall measure of pain. This variable was significantly correlated with both attachment scales, with those with less secure patterns reporting more pain. Avoidance – r(68)= .237, p= .050, Anxiety – r(68)= .240, p= .047. Bivariate regression analyses were conducted using the log scales for each attachment scale. Neither anxious nor avoidant attachment patterns predicted pain in this analysis, although there were trends in the data:

Table 10: Attachment and Pain

Variable	Unadjusted R^2	F	P Value	Beta
Attachment Avoidance	.050	F(1,67)= 3.552	.064	.224
Attachment Anxiety	.055	F(1,67)= 3.908	.052	.235

In terms of the individual pain dimensions of severity and distress; avoidant attachment patterns were significantly correlated with pain distress (r(68)= .249, p= .038), and anxious attachment patterns were correlated with pain severity (r(67)= .268,

p= .026). Regression analysis showed that avoidant attachment did not significantly predict pain distress:

Table 11: Attachment Avoidance and Pain Distress

Variable	Unadjusted R^2	F	P Value	Beta
Attachment Avoidance (log)	.052	F(1,68)= 3.733	.058	.228

However, anxious attachment did predict pain severity in bivariate regression analysis

Table 12: Attachment Anxiety and Pain Severity

Variable	Unadjusted R^2	F	P Value	Beta
Attachment Anxiety (log)	.062	F(1,67)= 4.463	.038	.250

Attachment in Relation to Memory Disorganisation and Memory Valence

No relationship was found between either attachment scale and memory disorganisation or memory valence. The correlations are presented in Table 13:

Table 13: Correlations between Attachment and Memory Variables

Variable	ECR Avoidance	ECR Anxiety
TMQ Disorganisation	r(68)= .007, p= .954	r(68)= .073, p= .549
EBS Positive	r(65) = -.065, p= .598	r(65)= .009, p= .940
EBS Negative	r(67)= .176, p= .148	r(67)= .053, p= .665

Hypothesis Two

Less secure adult attachment patterns will be predictive of less perceived support by staff during labour and birth.

The four questions related to perceived support by staff were coded and allocated a score, with a high score indicating lower levels of perceived support. The scoring system can be found in appendix C1 (pg. 123). This score was not found to be statistically related to either attachment scale (avoidance - r(68)= .124, p= .305, anxiety – r(68) = -.043, p= .726)

The individual questions on staff support were also analysed in relation to attachment, comparing groups based on different answers. This was felt to be justified because of the relatively low alpha found using the social support score (.687). Using this method, a significant difference in attachment avoidance scores was found between the categories of the question related to how respected women felt by staff (F(2,67)= 4.368, p= .016). Women who reported feeling less respected by staff had more avoidant attachment patterns. None of the other questions showed a difference across responses

in terms of attachment patterns, and a full table of these results is in appendix C1 (pg. 123).

Hypothesis Three

Less secure adult attachment patterns will be associated with greater symptoms of acute stress.

In order to test the hypothesised relationship between attachment and symptoms of acute stress, the attachment scales were correlated with the Impact of Event Scales (Intrusion, Avoidance and Hyperarousal). A relationship was found between both attachment scales and the hyperarousal aspect (the others were not significant). It should be noted that there were very low levels of hyperarousal found in the sample.

Table 14. Correlations between attachment and symptoms of acute stress

Variable		IES-R Intrusion	IES-R Avoidance	IES-R Hyperarousal
Attachment	r(68)	.199	.017	.389
Avoidance (ECR)	P Value	.326	.899	.001
Attachment	r(68)	.119	-.083	.338
Anxiety (ECR)	P Value	.328	.496	.004

Neither attachment scale was also found to be significantly predictive of hyperarousal in regression analyses.

Table 15. Regression analysis, attachment and hyperarousal

Variable	Unadjusted R^2	F	P Value	Beta
Attachment Avoidance (ECR-R)	.016	F(1,36)= .583	.450	.126
Attachment Anxiety (ECR-R)	.034	F(1,36)= 1.266	.268	.184

No relationship was found between the attachment scales and participants' answers to the questions about fear for self or baby, which have been used to assess if women meet criterion A for the DSM IV (American Psychiatric Association, 1994) diagnosis of PTSD following childbirth (Gamble et al., 2005). For analysis purposes this question was coded into responses of zero (no to both questions), one (answered yes to one question), and two (answered yes to both questions). Attachment avoidance as measured by the ECR-R was not significantly related to these answers (Kruskal-Wallis – H(2)= .589, p= .745), and neither was attachment anxiety (Kruskal-Wallis – H(2)= .490, p= .783).

In addition, no relationship was found between attachment, as measured by the ECR-R, and the experience of involuntary memories (either distressing negative memories, or enjoyable positive memories). Table 16 outlines these results:

Table 16. Attachment and Involuntary Memories

Variable	ECR Avoidance	ECR Anxiety
Distress of Negative Memories	r(24) = -.047, p= .821	r(24) = -.051, p= .804
Enjoyment of Positive Memories	r(51) = -.079, p= .572	r(51)= .105, p= .456

Hypothesis Four

Negative valence of birth experience will be associated with greater memory disorganisation.

No relationship was found between negative valence, as measured by the EBS and memory disorganisation measured by the TMQ (r(67)= .224, p= .065), although a trend was found in the data.

Hypothesis Five

Greater childbirth memory disorganisation and negative memory valence will be associated with higher levels of SAS.

No relationship was found between memory disorganisation and any of the IES-R scales. Intrusion – r(68)= . 68, p= .165, Avoidance – r(68)= .153, p= .206, Hyperarousal – r(68)= .080, p= .510.

Negative valence was highly correlated with all scales of the IES-R and a relationship was also found between positive valence and low levels of avoidance symptoms as measured by the IES-R. This is shown in Table 17.

Table 17. Correlations - memory valence and symptoms of acute stress

Variable		IES-R Intrusion	IES-R Avoidance	IES-R Hyperarousal
Negative	r(67)	.453	.385	.359
Valence	P Value	<.001	.001	.002
Positive	r(65)	.004	-.366	.045
Valence	P Value	.973	.02	.718

Negative memory valence was also significantly predictive of the variance in the intrusion and avoidance scales (not hyperarousal) when analysed using simple bivariate regression. Positive memory valence was predictive of the variance in avoidance as measured by the IES-R.

Table 18. Regression analyses, memory valence and symptoms of acute stress

Variable	IES-R Scale	Unadjusted R^2	F	P Value	Beta
Negative	Intrusion	.252	F(1,55)= 18.560	<.001	.502
Valence	Hyperarousal	.085	F(1,36)= 3.342	.076	.291
	Avoidance	.155	F(1,55)= 10.065	.002	.393
Positive	Avoidance	.235	F(1,54)= 16.545	<.001	-.484
Valence					

Depression symptoms at time two were correlated with the IES-R scales and negative valence (see Table eight in demographics section). Hierarchical multiple regression analysis showed that negative valence was significantly predictive of both

intrusion and avoidance symptoms after the effect of depression at time two was accounted for. This is summarised in Table 19 below.

Table 19. Hierarchical regression, negative memory valence and IES-R scales

IES-R Scale	Block	Variable	Unadjusted R^2	F	P	Beta	P Value of Beta
Intrusion	1	Depression	.179	F(1,55)= 11.957	.001	.423	.001
	2	Depression	.357	F(2,54)= 14.979	<.001	.331	.005
		Negative Valence				.432	<.001
Avoidance	1	Depression	.057	F(1,55)= 3.338	.073	.239	.076
	2	Depression	.172	F(2,54)= 10.497	.006	.136	.299
		Negative Valence				.354	.009

Positive memory valence was predictive of IES-R Avoidance even when depressive symptoms were accounted for.

Table 20. Hierarchical regression, positive memory valence and IES-R avoidance

Block	Variable	Unadjusted R^2	F	P Value	Beta	P Value of Beta
1	Depression	.059	F(1,54)= 3.383	.071	.243	.071
2	Depression	.274	F(2,53)= 10.012	<.001	.200	.095
	Positive Valence				-.466	<.001

Discussion

It is well established within the research that some women who have childbirth experiences that they perceive as traumatic can go onto develop PTSD (Olde et al., 2006). The mechanisms for this have been explored, and a link has been found between attachment and PTSS following childbirth (Iles et al., 2011), and between memory variables and PTSS (Briddon et al., 2011). However, this study is the first to investigate attachment patterns in relation to memory variables and pain perception in childbirth. This is within the context of the Slade (2006) model, which proposes that there are a range of predisposing and precipitating factors involved in the development of PTSS after childbirth. Within this model, attachment patterns can be seen as potential predisposing factors, and pain and memory variables would be regarded as precipitating factors.

The results show that there does appear to be a relationship between attachment patterns and pain, in terms of expectations of pain, severity and distress. However, this result was not robust in that attachment patterns did not significantly predict the variance in pain, except in the case of attachment anxiety predicting pain severity. This may be due to a number of factors discussed more fully in the limitations section.

The hypothesised relationship between attachment and emotional valence/the emotional intensity of the birth experience was not found in the study. In addition, no relationship was found between attachment and memory disorganisation within the study sample. Attachment was found to be related to hyperarousal symptoms of acute stress, but this finding was not robust in that attachment did not significantly predict hyperarousal levels.

Avoidant attachment patterns were significantly related to how respected women felt by the staff during labour, with women with more avoidant patterns reporting feeling less respected by staff. Attachment patterns were not related to any of the other

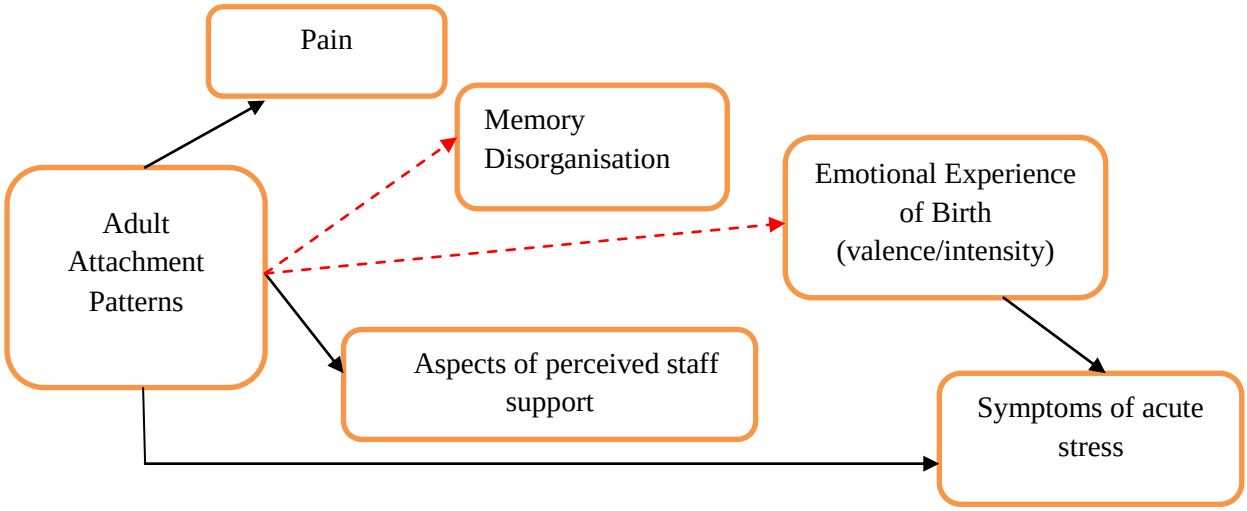
staff support dimensions (such as how in control women felt of what the staff were doing).

Negative emotional birth experiences (valence) were significantly related to symptoms of acute stress following childbirth, suggesting a link between valence and PTSS. This finding was more robust, in that negative birth experiences did predict the variance in symptoms of acute stress in the intrusion and avoidance scales, and this remained significant when depression symptoms were accounted for. In addition, positive emotional birth experiences were predictive of the variance in avoidance symptoms even when depression was accounted for. However, the hypothesised relationship between the valence of the experience and memory disorganisation was not found in this sample.

Theoretical Implications

The study findings have implications for a number of theories and models. In particular the Slade (2006) model, would regard attachment patterns as a possible predisposing factor, with pain and memory variables as precipitating. Using this model, the study data would suggest that attachment patterns may be influencing the experience of pain, but that memory variables do not seem to be influenced by attachment in the same way. The model, using the present study findings can be summarised in the below diagram, where the solid lines represent relationships found in the study, and the dashed lines represent the absence of a relationship:

Figure 3. Study findings within Slade (2006) model



In terms of the pain related findings, the relationship between pain and attachment has been studied in the non-childbirth literature. Meredith, Ownsworth and Strong (2008) have developed a model of the role of attachment in pain based on the evidence they have reviewed in the area. This model also views attachment patterns as predisposing factors influencing the experience of pain. They propose that attachment patterns influence the cognitive appraisal of: pain; the self; and support. These appraisals are responded to with coping strategies, emotions and seeking of support. Appraisals (and their responses) and attachment patterns both influence the experience of pain in the model. They outline evidence that less securely attached individuals are more likely to perceive pain as threatening (e.g. Mikulincer & Florian, 1998), and that anxious attachment is associated with lower levels of pain self-efficacy (Meredith, Strong & Feeney, 2006b). In addition, securely attached individuals are more likely to be satisfied with their social support and to perceive more providers of support as potentially available (e.g. Sarason, Pierce, Shearin, Sarason, Waltz & Poppe, 1991). Therefore, the link between attachment patterns and cognitive appraisals has been empirically established. This latter point may also be theoretically relevant for the

finding that avoidant attachment patterns were associated with women feeling less respected by the staff. Although this is a model primarily based on the experience of chronic pain, where most of the research has been conducted, the findings of the current study suggest that it could also be applied to the experience of childbirth.

The study found a relationship between adult attachment patterns and hyperarousal symptoms following childbirth, although it should be noted that this was not robust, and levels of hyperarousal were very low in the study population. This is partly in support of the findings of Iles et al. (2011) who also found a relationship between attachment and PTSS. This finding has a number of theoretical implications, relating to work in the non-childbirth literature. For example, Declercq and Palmans (2006) found that adult attachment patterns and the perception of social support acted as moderators between experiencing a potentially traumatic event and the development of PTSD symptoms. This also relates to the model proposed by Mikulincer et al. (2006) who suggest that insecure anxious attachment can lead to hypervigilance to threat and avoidant attachment can lead to detachment from threat cues.

Another study finding was that the emotional intensity of the birth experience (valence) is associated with symptoms of acute stress. This has implications for theories of memory processing. For example, Dale-Hewitt, Slade, Wright, Cree and Tully (2012) examined attentional biases in women who had experienced traumatic childbirth. They found that avoidance (attentional bias away from words about childbirth) was related to PTSS and having a negative childbirth experience. They conclude that avoidance may act as a maintaining factor for PTSS. In relation to the findings of this current study, negative experiences were found to be related to symptoms of acute stress, including to avoidance. Positive memory valence was negatively associated with avoidance symptoms, which again would be concordant with the findings of Dale-Hewitt et al. (2012). Therefore, in the context of childbirth, where

women often report both positive and negative emotions (Slade el al, 1993), having access to some positive memories may enhance recall and processing of memories as a whole.

Limitations

The main limitation of the study is the sample in terms of the range of attachment patterns, and how representative it is of women delivering their first baby. Women were generally found to have secure attachment patterns, and were largely white, highly educated, employed and married, which is somewhat different from the population characteristics of first time mothers (Office for National Statistics, 2011). It is known that, in general, attendees of antenatal classes tend to have different characteristics from the population of pregnant women as a whole (Redman et al., 1991). In addition, the study targeted classes that were in the evenings and at weekends, which may have biased the sample towards employed women, or women who were accompanied by partners who were not available during weekdays. In terms of the method chosen, the use of a questionnaire methodology may have made it more difficult for women for whom English is not a first language to participate. Women were asked to fill in the time one questionnaire at the class, where they were usually accompanied by their partner, which may have biased the answers to the attachment questions. Therefore, the findings may not be generalisable to the population of pregnant women as a whole. The within subjects design of the study, and the use of log scales for the attachment variables sought to minimise the impact of the limited diversity of the sample. However, this could have influenced the findings, and a number of the correlational relationships were not found to be robust when analysed using regression (with a log conversion).

Another area of limitation is that the use of a questionnaire measuring multiple variables did not allow for the exploration of some of the concepts in depth. This was for practical reasons, to allow women to complete the time two measures in a reasonable time scale, given that two weeks after having a baby may be a demanding time. However, some concepts, such as pain, could benefit from further exploration, especially given that the study indicates that attachment patterns do seem to be important in the pain experience. For example, the McGill Pain Questionnaire (Melzack, 1975) is a widely used questionnaire measure that has been used in a number of studies on childbirth pain.

A number of the hypotheses tested related to previous work, particularly the study by Briddon et al. (2011) which found a relationship between memory disorganisation and valence, and that disorganisation was related to PTSS at six weeks post-partum. These results were not replicated in this study. This could be for a number of reasons. Firstly the methodologies and samples of the studies were different. The relationship found in the Briddon et al. (2011) study was measured at a later time point than this study, for example, as the current study had a maximum time point of five weeks post-partum. Within the theoretical context, models such as that by Conway and Pledyll-Pearce (2000) which proposes that trauma memories remain 'stuck' at a disorganised stage while other memories change over time, could be useful frameworks if the time point of measurement is important.

Further research

A number of the limitations of the study could be addressed by further research in the area. For example, the dimensions of pain could be explored more fully, using a more comprehensive measure of pain. Given the model outlined by Meredith et al. (2008), which suggests that attachment patterns influence cognitive appraisal of pain in

the chronic pain setting, further research looking at the cognitive appraisal of the pain experience in childbirth may be useful to test this model in an acute pain setting. Therefore further research exploring pain concepts in more depth and breadth could be useful.

In addition, further research using a population that is more generalisable is indicated to investigate the relationships found, and to test if they are more robust when investigating a wider range of attachment patterns. For example, a different recruitment method, such as through primary care or community midwives may reach women who do not attend ante-natal classes. An alternative to this might be to focus on women who have perceived childbirth as traumatic and to look at attachment patterns within this sample, as the current study found very low levels of symptoms of acute stress, making analysis of these concepts more difficult.

Finally, within the Slade (2006) model, some links were found between predisposing factors (such as attachment) and precipitating factors (such as pain). In addition, there were links between some precipitating factors like emotional intensity of the birth experience and symptoms of acute stress. However, there are some arms of the model that were not investigated within this study, and further research may be useful to enhance understanding of the phenomena of acute stress after childbirth. For example, the influence of other individual factors (such as personality factors) on the experience of pain in childbirth has not been widely investigated.

Clinical Implications

In terms of implications for future practice, the findings point to a number of potential clinical interventions. If women with insecure attachment patterns are more likely to perceive birth as painful, and indeed expect this to be the case, then these women could be targeted for interventions around managing labour pain antenatally. For example, a

number of psychological interventions have been found to be helpful in managing labour pain, such as improving pain self-efficacy (Ip, Tang & Goggins, 2009). If women with insecure attachment patterns are likely to expect labour to be painful, then interventions to improve their pain self-efficacy may be useful.

The finding that women with more avoidant attachment patterns tend to feel less respected by staff is also clinically relevant. For example, staff training about attachment, or how individual factors may influence the way women perceive they are being supported, may be beneficial

Finally, the finding that negative memory valence is associated with symptoms of acute stress, and that positive memory valence is negatively related to avoidance symptoms has clinical implications. The rehearsal of positive memory aspects of the birth may be a useful intervention for reducing avoidance, as Dale-Hewitt et al. (2012) found that avoidance is associated with PTSS.

Conclusion

This study aimed to investigate the relationship between adult attachment patterns and the experience of childbirth. In particular, the experience of pain, memory variables, staff support and the emotional intensity of the childbirth experience were investigated.

A relationship was found between adult attachment and pain reported during childbirth. However, this was not robust, and attachment did not, generally, predict the variance in pain experienced. Adult attachment was not found to be related to the memory variables of valence (intensity of emotional experience) or disorganisation. Attachment did not predict the level of symptoms of acute stress experienced, although there was a trend in the data in that attachment patterns were correlated with levels of hyperarousal in the sample.

Women who had more avoidant attachment patterns reported feeling less respected by staff, but attachment was not related to any other aspects of staff support.

The emotional intensity of the birth experience (valence) was related to the levels of symptoms of acute stress experienced. In particular, women who reported more intense negative emotions experienced more avoidance and intrusion symptoms, and more intense positive emotions were related to less avoidance symptoms.

These findings have implications for a number of models and theories, in particular they contribute to the understanding of factors that may be important for the development of acute stress symptoms after childbirth, as outlined in the Slade (2006) model.

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Section 3: Appendices

Contents

Appendix Note: During the course of the study the researcher changed her surname from Warren to Quinn. Therefore, the study documents use the surname Warren.

Appendix A1 – Ethical Approval Letter

NHS
National Research Ethics Service

NRES Committee Yorkshire & the Humber - South Yorkshire
Millside
Mill Pond Lane
Meanwood
Leeds
LS6 4RA

Telephone: 0113 305 0128

04 August 2011

Miss Kate Warren
Trainee Clinical Psychologist
Sheffield Health and Social Care NHS Foundation Trust
Clinical Psychology Unit
University of Sheffield
Western Bank
S10 2TN

Dear Miss Warren

Study title:	**Childbirth Memory Processing and Perception of Pain: The Role of Adult Attachment**
REC reference:	**11/YH/0269**
Protocol number:	**STH16158**

The Research Ethics Committee reviewed the above application at the meeting held on 28 July 2011. Thank you for attending to discuss the study.

Ethical opinion

The Committee expressed its view that this was a well written application and that it was evident that a lot of consideration had been given to the ethical issues.

You were asked whether pain relief taken during birth would be taken into account; you confirmed that it would be. A coding system for the type of analgesia will be used.

The Committee asked if study data would be anonymised; you confirmed that it would be and that all identifiable information would be stored separately from the study data.

Members informed you that there were some minor clarifications needed with regard to the participant information sheet and these are detailed below.

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below.

Ethical review of research sites

NHS Sites

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

Conditions of the favourable opinion

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

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

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

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

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

1. **Please make the following changes to the participant information sheet:**

   a) **Under the heading *What the study is about* please change the first sentence as follows: How women remember the birth of their baby can affect how they feel afterwards.**

   b) **Add the following text i.e. not twins, triplets etc at the end of the sentence 'We can only include women having single births' under the heading *Who can take part***

   c) **Under the heading Organisations involved please state that it has been reviewed and given a favourable opinion by South Yorkshire Research Ethics Committee.**

2. **Please send information about the study to GPs if you contact them.**

3. **Insert the following statements into the participant consent form:**

   I agree to my GP being informed of my participation in the study

   I understand that relevant sections of data collected during the study may be looked at by individuals from [*university name*], from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.

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

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. Confirmation should also be provided to host organisations together with relevant documentation

Approved documents

The documents reviewed and approved at the meeting were:

Document	*Version*	*Date*
Covering Letter		27 June 2011
GP/Consultant Information Sheets	3	31 May 2011
Investigator CV		01 July 2011
Letter of invitation to participant	3	31 May 2011
Other: Pauline Slade CV		
Other: Helen Spiby CV		
Other: Helen Baston CV		
Other: Claire Isaac CV		
Other: Costing form	3	31 May 2011
Other: Adverse incident	3	31 May 2011
Other: Research contract	3	31 May 2011
Participant Consent Form	3	31 May 2011
Participant Information Sheet	3	31 May 2011
Protocol	3	31 May 2011
Questionnaire: Time 1	3	31 May 2011
Questionnaire: Time 2	3	31 May 2011
REC application		01 July 2011
Referees or other scientific critique report		

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

There were no declarations of interest. Prof Nigel Beail knows one of the academic supervisors but has no involvement in the study.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

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

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

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

Feedback

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

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

11/YH/0269	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

Ms Jo Abbott
Chair

Email: sinead.audsley@nhs.net

Enclosures: *List of names and professions of members who were present at the meeting and those who submitted written comments*

"After ethical review – guidance for researchers"

Copy to: *Miss Angela Driscoll, Sheffield Teaching Hospitals NHS Foundation Trust*

Appendix B1 – Information Sheet

Information for Participants

How do feelings in relationships relate to childbirth memories and childbirth pain?

You are being invited to participate in a piece of research. Before you make a decision about whether or not to take part, here is some information about why the research is taking place and what it will involve for you. Please read this information, and let us know if you would like anything clarifying or any further information (details at the end of the sheet). Take as much time as you need to consider if you would like to take part in the study.

What the study is about

How women remember the birth of their baby can affect how they feel afterwards. This study explores what factors influence these memories. One area that could be important is women's feelings in their relationships with others.

Researchers conducting the study

The study is being carried out by Kate Warren, a trainee clinical psychologist at Sheffield University, as part of the Doctoral qualification in clinical psychology. It is being supervised by Professor Pauline Slade and Dr Claire Isaac, clinical psychologists at Sheffield University, Helen Baston, Consultant Midwife at Sheffield Teaching Hospitals and Helen Spiby, senior lecturer in evidence based practice in midwifery at York University

Who can take part

We are asking pregnant women, over the age of 18 years, who are having their first baby to take part. In order to do this you must be fluent in English and not be planning to have an elective caesarean birth. We can only include women having single births (i.e. not twins, triplets etc). We hope to include around 120 women for the study.

Withdrawal from the study

If you agree to take part then you will be asked to sign a consent form saying that you are happy to participate. You do not have to take part, and can withdraw from the study at any time by letting me know that you no longer want to take part. You do not have to give any reason for withdrawing from the study. Whether or not you take part will not affect the care you receive in any way.

What taking part will involve

If you agree to take part, we will ask you to fill in some questionnaires at 2 time points. First, at one of your antenatal classes you will be asked to complete a questionnaire about relationships and how you are feeling in pregnancy. This should take about 10 minutes to complete. We will ask for consent to find out from your medical records when you have had your baby so we can then send out another questionnaire to you about 1 week after you have given birth. This will be about details of your labour and memories of birth. They can be sent via post or e-mail, and we will ask you to send them back within 2 weeks (with a pre-paid envelope for postal ones). The second set of questionnaires will take about 15-25 minutes to complete. With your consent, we may telephone or text you to make sure you have received the questionnaires and to

answer any queries you may have. You do not have to consent to being telephoned or texted to take part in the study.

All women who have completed the first questionnaire will be asked to fill in the second unless they withdraw from the study, or their baby has significant health problems following birth.

Risks/Benefits of taking part
Taking part does not involve any physical risk. Some of the questions you will be asked are of a potentially sensitive nature, particularly for women who have some difficult memories of labour. However, thinking and talking about childbirth is a natural, normal and usually helpful process postnatally. If you find any questions difficult to answer, you can leave these out or you can contact the researcher to discuss any issues you may have.

Some of the questions we will be asking relate to how you are feeling and this can highlight any existing distress. If your answers indicate you were experiencing major difficulty that you could require further help with then we would write to you, suggesting that you talk to your GP or health visitor about this, or we can contact them on your behalf. However, please be aware that will only look at your answers to your questions some time after you have given birth, once all the data for a person has been collected at both time points. Therefore, if you are concerned about your health at any time, please contact your GP or speak to your midwife or health visitor.

While there may not be any direct benefit of taking part in the study, many women enjoy participating in research that may help other women with their pregnancy care in the future.

Confidentiality
All the information provided from the questionnaires, including the name and address of participants will be kept confidential and secure. However, as with all research of this nature, any information suggesting a participant or someone else is at risk may need to be shared with other relevant professionals, such as your GP.

What happens to study results
The results of the study are likely to be published in an academic journal and/or presented to a conference. Any results presented will be anonymous. All participants will have the option of receiving a summary of the study results.

Complaints Procedure
If you need to make a complaint about this research or the way you have been treated during the study you can contact Professor Slade at the University of Sheffield. Alternatively, you can use the University of Sheffield complaints procedure by contacting Philip Harvey at Registrar & Secretary's Office, University of Sheffield, Firth Court, Western Bank, S10 2TN

Organisations Involved
The research is part of the Doctorate of Clinical Psychology at the University of Sheffield. It is funded by the University. The study has been reviewed and given a favourable opinion by South Yorkshire Research Ethics Committee, who help to ensure that the study will not compromise your safety, dignity, rights or wellbeing.

Further Information
If you would like any further information or have any queries about the study then please contact:

Kate Warren
Trainee Clinical Psychologist
Clinical Psychology Unit
University of Sheffield
Western Bank
Sheffield S10 2TP
0114 2226650 (please leave name and number with the research support officer, Christie Harrison, and your call will be returned by the researcher)
e-mail: Kate.Warren@Sheffield.ac.uk
In addition, the research supervisors may also be contacted at the address above or on the following numbers:
Professor Pauline Slade 0114 222 6568 Dr Claire Isaac 0114 271 3770

Thank you for reading this information.

Appendix B2 – Consent Form

Consent Form

Title of Study: How do feelings in relationships relate to childbirth memories and childbirth pain?

Researcher: Kate Warren, Trainee Clinical Psychologist, Clinical Psychology Unit, University of Sheffield, Western Bank, Sheffield, S10 2TP

Supervisors: Professor Pauline Slade & Dr Claire Isaac, Clinical Psychology Unit, University of Sheffield, Western Bank, Sheffield, S10 2TP

Please Initial Box:

I have read the information sheet (Aug 2011, v4) for this study. I have been able to consider the information, ask questions and have these questions answered to my satisfaction	
I understand that taking part in the study is voluntary and I may withdraw at any time. I do not have to give any reason for withdrawal, and withdrawing will not affect my care.	
I agree to participating in the study	
I agree to my GP being informed of my participation in the study	
I consent to relevant sections of my medical notes being accessed by the above researchers where relevant to the study.	
I understand that relevant sections of data collected during the study may be looked at by individuals from the University of Sheffield, from regulatory authorities or from the NHS trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.	
I consent to being contacted by post or e-mail by the researchers where relevant to the study	
I consent to being contacted by telephone/text by the researchers where relevant to the study (n.b. participants can still take part in the study without being contacted by telephone/text)	
I would like to receive a summary of the study results when the research is complete, using the contact details provided	

Preferred method of telephone contact (please circle): Call Text None

Name of Participant……

Date…….Signature…….

Name of Person taking Consent……

Date…….Signature…….

Appendix B3 – Time One Measures

Time 1 Questionnaire Pack

Name _____ Date of Birth _____

Today's Date _____

Address

_____

_____

Contact Telephone Number_____

Ethnicity _____

Highest level of education (please circle);

None GCSE/O-level A-Level Degree Postgraduate Degree

Diploma/Vocational qualification

Please circle: Employed (including if currently on maternity leave) Unemployed

Estimated Due Date of Baby _____

Please circle most appropriate:

Married Cohabiting Single Divorced Widowed N/A

Follow Up questionnaires to be sent by post or e-mail _____

E-Mail Address _____

We would like to know how you are feeling. Please check the answer that comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

Here is an example, already completed

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

This would mean "I have felt happy most of the time" during the past week. Please complete the other questions in the same way.

In the past 7 days:

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

2. I have looked forward with enjoyment to things
☐ As much as I ever did
☐ Rather less than I used to
☐ Definitely less then I used to
☐ Hardly at all

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

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

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

6. Things have been getting on top of me
☐ Yes, most of the time I haven't been able to cope at all
☐ Yes, sometimes I haven't been coping as well as usual
☐ No, most of the time I have coped quite well
☐ No, I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping
☐ Yes, most of the time
☐ Yes, sometimes
☐ Not very often
☐ No, not at all

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

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

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

The statements below concern how you feel in emotionally intimate relationships. You can use them to assess how you tend to feel in close relationships generally, or you can use them to focus on a particular relationship or type of relationship. Typical examples include relationships with romantic partners, family members or friends, in general or focusing on a specific person.

Relationship Described_____

Using the 1-7 scale, after each statement write a number to indicate how much you agree or disagree with the statement.

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

No.	Question	Score
1	I'm afraid I will lose this person's/others love	
2	I prefer not to show this person/others how I feel deep down	
3	I often worry that this person/others will not want to stay with me	
4	I feel comfortable sharing my private thoughts and feelings with this person/others	
5	I often worry that this person/others don't really love me	
6	I find it difficult to allow myself to depend in this person/others	
7	I worry that this person/others won't care about me as much as I care about them	
8	I am very comfortable being close to this person/others	
9	I often wish that this person's/others' feelings for me were as strong as my feelings for them	
10	I don't feel comfortable opening up to this person/others	
11	I worry a lot about my relationship(s)	
12	I prefer not to be too close to this person/others	
13	When this person/others are out of sight, I worry that they might become interested in someone else (and leave/exclude me)	
14	I get uncomfortable when this person/others want to be very close	
15	When I show my feelings for this person/others, I'm afraid they will not feel the same about me	
16	I find it relatively easy to get close to this person/others	
17	I rarely worry about this person/others leaving me	
18	It is not difficult for me to get close to this person/others	
19	This person/others makes me doubt myself	
20	I usually discuss my problems and concerns with this person/others	
21	I do not often worry about being abandoned	
22	It helps to turn to this person/others in times of need	
23	I find this person/others don't want to get as close as I would like	
24	I tell this person/others just about everything	

25	Sometimes this person/others change their feelings about me for no apparent reason	
26	I talk things over with this person/others	
27	My desire to be very close sometimes scares this person/others away	
28	I am nervous when this person/others get too close to me	
29	I'm afraid that once this person/others get to know me, they won't like who I really am	
30	I feel comfortable depending on this person/others	
31	It makes me mad that I don't get the affection and support I need from this partner/others	
32	I find it easy to depend on this person/others	
33	I worry that I won't measure up to other people	
34	It's easy for me to be affectionate with this person/others	
35	This person/others only seems to notice me when I'm angry	
36	This person/others really understands me and my needs	

Please read each statement and circle the number that best describes how much you have agreed with it over the last month

		Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
1	I worry that labour will be extremely painful	1	2	3	4	5
2	I worry about the length of my labour (either too long or too short)	1	2	3	4	5
3	My body will fail me during labour	1	2	3	4	5
4	I will not be able to give birth naturally	1	2	3	4	5
5	I will not be able to cope with the pain	1	2	3	4	5
6	I will need medication to manage the labour pain	1	2	3	4	5
7	I will not get the pain relief I want	1	2	3	4	5
8	I am emotionally strong enough to cope with labour	1	2	3	4	5
9	I will be hysterical	1	2	3	4	5
10	I will feel extremely anxious when in labour	1	2	3	4	5
11	I will be very worried when I am in labour	1	2	3	4	5
12	Labour will be scary	1	2	3	4	5
13	Labour is unknown	1	2	3	4	5
14	Labour will be complicated	1	2	3	4	5
15	I worry I will lose control during labour	1	2	3	4	5
16	I worry I will embarrass myself	1	2	3	4	5
17	I will feel physically exposed during labour	1	2	3	4	5
18	I worry I will need emergency surgery	1	2	3	4	5
19	I will be worried about the health of my baby	1	2	3	4	5
20	I will be too tired to appreciate the birth	1	2	3	4	5
21	I will feel calm during labour	1	2	3	4	5
22	I worry about trauma to my body	1	2	3	4	5
23	My body will hurt during labour	1	2	3	4	5

Appendix B4 – Time Two Measures

Time 2 Questionnaire Pack

Name_____ Date of Birth _____

Your Baby's Date of Birth _____

Labour and Birth Details

Was your partner/friend/family member present during labour and/or birth? Yes/No

How long were you in labour for? _____

Was your labour induced? Yes/No

Did you use a birth pool during the birth? Yes/No

Did you have forceps birth? Yes/No

Did you have a vacuum birth? Yes/No

Did you have a caesarean section? Yes/No

If yes, was this an emergency? Yes/No

Did you use a TENS machine? Yes/No

Were you given any medication during your labour or during your baby's birth? Yes/No

If yes, what medication did you receive? (please circle)

Gas & Air Diamorphine Pethidine Meptazino Epidural

Did anything happen that you did not expect during your labour and birth?

_____

During labor or birth were you at any point fearful for your life or the baby's life? Yes/No

During labor or birth were you at any point fearful of serious injury or permanent damage to you or your baby? Yes/No

We would like to know how you are feeling. Please check the answer that comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

Here is an example, already completed

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

This would mean "I have felt happy most of the time" during the past week. Please complete the other questions in the same way.

In the past 7 days:

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

2. I have looked forward with enjoyment to things
☐ As much as I ever did
☐ Rather less than I used to
☐ Definitely less then I used to
☐ Hardly at all

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

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

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

6. Things have been getting on top of me
☐ Yes, most of the time I haven't been able to cope at all
☐ Yes, sometimes I haven't been coping as well as usual
☐ No, most of the time I have coped quite well
☐ No, I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping
☐ Yes, most of the time
☐ Yes, sometimes
☐ Not very often
☐ No, not at all

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

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

10. The thought of harming myself has occurred to me
☐ Yes, quite often
☐ Sometimes
☐ Hardly ever

☐ No, not at all ☐ Never

Please indicate below what your labour and birth were like by circling one number. The higher numbers indicate that the feeling was very much present during your labour and birth.

Was labour and birth exciting?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth frightening?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth satisfying?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth exhausting?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth exhilarating?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth anxiety provoking?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth enjoyable?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth embarrassing?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth pleasant?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

Was labour and birth difficult?
Not at all 1 2 3 4 5 6 7 8 9 10 Extremely

The following questions are about the ways in which people sometimes describe their memories of labour and childbirth. Please rate the extent to which these statements apply to your memories of the labour and birth by circling the appropriate number. There are no right or wrong answers; we are interested in your personal reaction.

		Statement applies to me				
		Not at all	**A little**	**moderately**	**strongly**	**Very strongly**
1	There are periods of time during the labour and birth that I cannot account for	0	1	2	3	4
2	I have trouble remembering the order in which things happened during the labour and birth	0	1	2	3	4
3	My memory of the labour and birth is muddled	0	1	2	3	4
4	I cannot get what happened during the labour and birth straight in my mind	0	1	2	3	4
5	I remember different parts of the labour and birth like separate experiences	0	1	2	3	4
6	When I remember a particularly upsetting part of the labour and birth, it is hard to remember that I was safe in the end	0	1	2	3	4

In the last week approximately how many times did *unwanted* memories of labour and birth pop into your mind? (please circle)

Never Once Twice Every other day Once a day Several times a day Many times a day

How distressing were these memories?

10 20 30 40 50 60 70 80 90 100
not at all moderately very strongly

In the last week approximately how many times did *pleasant* memories of labour and birth pop into your mind? (please circle)

Never Once Twice Every other day Once a day Several times a day Many times a day

How enjoyable were these memories?

10 20 30 40 50 60 70 80 90 100
not at all moderately very strongly

Now I would like you to rate your experience of labour and birth on a scale of 1-10, where 1=none at all/lowest possible score, and 10=the most/highest possible score. Please circle one number which most accurately describes your feelings.

On average, how severe was your pain during labour and birth?

Not at all painful 1 2 3 4 5 6 7 8 9 10 The most painful experience you could imagine

How distressing did you find the pain you experienced?

Not at all distressing 1 2 3 4 5 6 7 8 9 10 Extremely distressing

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 – Agree
- 5 – Slightly agree
- 4 – Neither agree nor disagree
- 3 – Slightly disagree
- 2 - Disagree
- 1 – Strongly disagree

_____ In most ways my life is close to ideal

_____ The conditions of my life are excellent

_____ I am satisfied with my life

_____ So far I have gotten the important things I want in life

_____ If I could live life over, I would change almost nothing

Below is a list of difficulties people sometimes have after having a baby. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to childbirth, how much were you distressed or bothered by these difficulties?

	Not at all	**A little bit**	**Moderately**	**Quite a bit**	**Extremely**
Any reminder brought back feelings about the birth.	0	1	2	3	4
I had trouble staying asleep	0	1	2	3	4
Other things kept making me think about the birth	0	1	2	3	4
I felt irritable and angry	0	1	2	3	4
I avoided letting myself get upset when I thought about the birth or was reminded of it	0	1	2	3	4
I thought about the birth when I didn't mean to	0	1	2	3	4
I felt as if it hadn't happened or wasn't real	0	1	2	3	4
I stayed away from reminders of the birth	0	1	2	3	4
Pictures about the birth popped into my mind	0	1	2	3	4
I was jumpy and easily startled	0	1	2	3	4
I tried not to think about the birth	0	1	2	3	4
I was aware that I still had a lot of feelings about the birth, but I didn't deal with them	0	1	2	3	4
My feelings about the birth were kind of numb	0	1	2	3	4
I found myself acting or feeling like I was back at that time of the birth	0	1	2	3	4
I had trouble falling asleep	0	1	2	3	4
I had waves of strong feelings about the birth	0	1	2	3	4
I tried to remove it from my memory	0	1	2	3	4
I had trouble concentrating	0	1	2	3	4
Reminders of the birth caused me to have physical reactions such as sweating, trouble breathing, nausea or a pounding heart	0	1	2	3	4
I had dreams about the birth	0	1	2	3	4
I felt watchful and on-guard	0	1	2	3	4
I tried not to talk about the birth	0	1	2	3	4

Please circle the option most appropriate to your experience of labour:

1. Did you feel in control of what the staff were doing to you during labour?

Yes, always Yes, most of the time No, hardly at all

3.Do you feel that you were treated as an individual?

Yes, always Yes, by most of the staff Only by a few of the Staff No, not at all

4. Do you feel that you were treated with respect?

Yes, always Yes, by most of the staff Only by a few of the Staff No, not at all

5. Were you (and your partner) ever alone at any stage when it worried you to be alone?

Yes, during labour Yes, after the birth in the delivery room No, neither

Appendix C1 – Staff Support

Scoring For Staff Support Scale

Question (abbreviation)	Score
1. Did you feel in control of what the staff were doing to you during labour? (control)	
Yes, always	2
Yes, most of the time	1
No, hardly at all	0
2. Do you feel that you were treated as an individual? (individual)	
Yes, always	3
Yes, by most of the staff	2
Only by a few of the staff	1
No, not at all	0
3. Do you feel that you were treated with respect? (respect)	
Yes, always	3
Yes, by most of the staff	2
Only by a few of the staff	1
No, not at all	0
4. Were you (and your partner) ever alone at any stage when it worried you to be alone? (alone)	
Yes, during labour	2
Yes, after the birth in the delivery room	1
No, neither	0

Table 21. Staff support and attachment non-parametric analyses

Question	ECR Anxiety	ECR Avoidance
Control	H(2)= . 025	H(2)= . 917
Individual	H(2)= . 611	H(2)=2.233
Respect	H(2)=5.050	H(2)=6.701*
Alone	H(2)= . 088	H(2)=1.548

*Sig at <0.05 level

Appendix C2 – Statistical Tables

Table 22. Demographic and experimental variables, analysis

Variable	Age	Gap to Time 2	Education	Employment	Marital	Ethnicity
Pais-Slade	r(66) = -.078	r(66)= . 158	F(3,63)=6.034*	t(65)=1.490	t(66)= . 260	F(4,62)=1.100
ECR_Avoidance	r(68)= . 169	r(68) = -.024	H(3)=3.122	U(69)=160.500	U(70)=598.000*	H(4)=4.055
ECR_Anxiety	r(68)= . 074	r(68) = -.070	H(3)= . 754	U(69)=180.000	U(70)=528.000	H(4)=3.560
TMQ_Disorganisation	r(68) = -.285*	r(68) = -.115	F(3,65)=1.214	t(67) = -.117	t(68)=1.123	F(4,46)= . 520
Pain Severity	r(67) = -.120	r(67) = -.219	H(3)=4.490	U(68)=203.500	U(69)=443.000	H(4)=10.816*
Pain Distress	r(68)= . 120	r(68) = -.345*	F(3,65)=5.632*	t(67) = -.643	t(68) = -.166	F(4,64)= . 738
Satisfaction with Life	r(67)= . 008	r(67)= . 017	F(3,64)= . 096	t(66) = -.989	t(67)=2.316*	F(4,63)= . 372
IES_Intrusion	r(68) = -.104	r(68)= . 037	H(3)=1.310	U(69)=189.500	U(70)=433.000	H(4)=2.700
IES_Avoidance	r(68)= . 038	r(68) = -.007	H(3)=5.415	U(69)=151.000	U(70)=350.000	H(4)= . 921
IES_Hyperarousal	r(68) = -.024	r(68) = -.222	H(3)=5.279	U(69)=196.000	U(70)=482.500	H(4)=3.104
EBS_Positive	r(65) = -.087	r(65)= . 064	F(3,62)=2.740	t(64) = -.565	t(65)= . 016	F(4,62)= . 092
EBS_Negative	r(67)= . 021	r(67) = -.123	F(3,64)= . 716	t(66) = -.080	t(67)=1.382	F(4,63)= . 206

*Sig at <0.05 level

Table 23. Labour and experimental variables, analysis

Variable	Induced	Pool	Forceps	Ventouse	C-Section
Pais-Slade	t(66)= . 577	t(66)=-1.389	t(66)=1.255	t(66) = -.328	t(66)= . 433
ECR_Avoidance	U(70)=502.000	U(70)=182.000	U(70)=437.000	U(70)=199.500	U(70)=439.500
ECR_Anxiety	U(70)=537.000	U(70)=230.00	U(70)=336.500	U(70)=248.000	U(70)=479.000
TMQ_Disorganisation	t(68)=-1.372	t(68) = -.295	t(68)=1.064	t(68)= . 142	t(68)= . 083
Pain Severity	U(69)=387.500	U(69)=270.000	U(69)=274.500	U(69)=187.500	U(69)=345.000
Pain Distress	t(68)=3.164*	t(68) = -.902	t(68)= . 850	t(68)=1.022	t(68)=1.027
Satisfaction with Life	t(67)=-1.357	t(67)= . 086	t(67) = -.946	t(67)=-1.130	t(68)=-1.042
IES_Intrusion	U(70)=561.000	U(70)=252.000	U(70)=239.500*	U(70)=300.500	U(70)=491.500
IES_Avoidance	U(70)=670.000	U(70)=320.000	U(70)=286.500	U(70)=167.500	U(70)=595.500*
IES_Hyperarousal	U(70)=534.000	U(70)=235.500	U(70)=306.500	U(70)=224.500	U(70)=447.500
EBS_Positive	t(65)= . 379	t(65) = -.379	t(65)= . 664	t(65)=-1.162	t(65)=1.729
EBS_Negative	t(67)=-1.592	t(67)= . 251	t(67) = -.076	t(67) = -.008	t(67)=-1.618

*Sig at <0.05 level

Table 24. Analgesia and mood variables in relation to experimental variables, analyses

Variable	Analgesia - Pain	Analgesia - Consciousness	Time One EDS	Time Two EPDS
Pais-Slade	F(4,63)= . 945	F(4,63)= . 104	r(66) = -.400*	r(66) = -.290*
ECR_Avoidance	H(4)=1.072	H(4)=2.627	r(68)= . 341*	r(68)= . 104
ECR_Anxiety	H(4)=5.727	H(4)=7.199	r(68)= . 296*	r(68)= . 113
TMQ_Disorganisation	F(4,65)= . 341	F(4,65)= . 475	r(68)= . 147	r(68)= . 228
Pain Severity	H(4)=10.236*	H(4)=10.271*	r(67) = -.236	r(67)= . 170
Pain Distress	F(4,65)=1.013	F(4,65)=1.837	r(68)= . 216	r(68)= . 249*
Satisfaction with Life	F(4,64)=1.165	F(4,64)=1.755	r(67) = -.257*	r(67) = -.316*
IES_Intrusion	H(4)=1.690	H(4)=4.948	r(68)= . 398*	r(68)= . 432*
IES_Avoidance	H(4)=3.226	H(4)=2.362	r(68)= . 197	r(68)= . 323*
IES_Hyperarousal	H(4)=1.496	H(4)=5.379	r(68)= . 521*	r(68)= . 394*
EBS_Positive	F(4,63)=1.048	F(4,63)= . 178	r(65)= . 028	r(65) = -.137
EBS_Negative	F(4,64)= . 777	F(4,64)= . 028	r(67)= . 150	r(67)= . 302*

*Sig at <0.05 level

Appendix D1 – Literature review tables

Table 25a. Quality rating scores, quantitative studies

Quantitative Studies	Quine et al. (1993)	Lang et al. (2006)	Beebe et al. (2007)	Flink et al. (2009)	Alehagen et al. (2006)	Gross et al. (2005)	Ip et al. (2009)	Larsen et al. (2001)	Fuller Stockman & Altmaier (2001)	Dannen-bring et al. (1007)	Walden-srom et al. 1996a
Title reflect Content	1	1	1	1	1	1	1	1	1	1	1
Credible Authors	1	1	1	1	1	1	1	1	1	1	1
Abstract	0	1	1	1	1	1	1	1	1	1	1
Rationale Outlined	1	1	1	1	1	1	1	1	1	1	1
Literature Review	1	1	1	1	1	1	1	1	1	1	1
Aim Clearly Stated	1	1	1	1	1	1	1	1	1	1	1
Ethical Issues	1	0	0	1	1	0	1	0	1	1	1
Methodology Identified	1	1	1	1	1	1	1	1	1	1	1
Design Clearly Identified	1	1	1	1	1	1	1	1	1	1	1
Hypotheses Clearly Stated	1	1	1	1	1	1	1	1	1	1	1
Key Variables Defined	1	1	1	1	1	0	1	1	1	1	1
Population Identified	1	1	1	1	1	1	1	1	1	1	1
Sample Described/Representative	0	0	0	1	0	1	1	0	0	0	1
Method Valid/Reliable	1	1	1	1	1	1	0	1	0	0	0
Analysis Valid/Reliable	1	1	1	0	1	1	1	1	1	1	1
Results Clearly Presented	1	1	1	1	0	1	1	1	1	0	1
Comprehensive Discussion	1	1	1	1	1	1	1	1	1	1	1
Generalizable	0	1	0	1	0	0	1	0	0	0	1
Comprehensive Conclusion	1	1	1	1	1	1	1	1	1	1	1

Table 25b. Quality rating scores, quantitative studies

Quantitative	Walden-strom (1999)	Goodman et al. (2004)	Walden-strom et al. (1996b)	Green & Baston (2003)	Tinti et al. (2011)	Niven & Gijsbers (1996)	Langer et al. (1998)	Shiloh et al. (1998)	Lee & Essoka (1998)	Mairs (1995)
Title reflect Content	1	1	1	1	1	1	1	1	1	1
Credible Authors	1	0	1	1	1	1	1	1	1	1
Abstract	1	1	1	1	1	1	1	1	0	1
Rationale Outlined	1	1	1	1	1	1	1	1	1	1
Literature Review	1	1	1	1	1	1	1	1	1	1
Aim Clearly Stated	1	1	1	1	1	1	1	1	1	1
Ethical Issues	1	1	1	1	1	1	1	1	1	1
Methodology Identified	1	1	1	1	1	1	1	1	1	1
Design Clearly Identified	0	1	1	1	1	1	1	1	1	1
Hypotheses Clearly Stated	1	1	1	1	1	1	1	1	1	1
Key Variables Defined	1	1	1	1	1	1	1	1	1	1
Population Identified	1	1	1	1	1	1	0	1	1	1
Sample Described/Representative	1	0	1	1	1	0	1	1	0	0
Method Valid/Reliable	0	1	0	0	0	0	1	0	1	0
Analysis Valid/Reliable	1	1	1	1	1	1	1	1	1	1
Results Clearly Presented	1	1	1	1	1	0	1	1	1	1
Comprehensive Discussion	1	1	1	1	1	1	1	1	1	1
Generalizable	1	1	1	1	1	1	1	0	0	0
Comprehensive Conclusion	1	1	1	1	1	1	1	1	1	1

Table 25c. Quality rating scores, qualitative studies

Qualitative	Clark Callister et al. (2003)	Abushaikha (2007)	Lundgren & Dahlberg (1998)	Leap et al. (2010)	Abbasi et al. (2009)
Title reflect Content	1	1	1	1	1
Credible Authors	1	1	1	1	1
Abstract	1	1	1	1	1
Rationale Outlined	1	1	1	1	1
Literature Review	1	1	1	1	1
Aim Clearly Stated	1	1	1	1	1
Ethical Issues	1	1	1	1	1
Methodology Identified	1	1	0	0	0
Philosophical Background	0	0	1	1	0
Study Design identified/rationalised	0	0	1	1	1
Major Concepts Identified	1	1	1	1	1
Context of Study Outlined	1	1	1	1	1
Selection of Sample Identified	0	1	1	1	1
Auditable method of Collection	0	1	1	1	1
Analysis Credible/Confirmable	0	0	1	1	1
Results Clearly Presented	0	1	1	1	0
Comprehensive Discussion	0	1	1	1	1
Transferrable	1	1	0	0	0
Comprehensive Conclusion	1	1	1	1	1