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Attachment patterns and post traumatic stress: A review

and

A study of attachment patterns and acute stress following childbirth

Thesis submitted for the degree of Doctor of Clinical Psychology

University of Sheffield

Robynne Boyd

July 2011

DECLARATION

This work has not been submitted to any other institution, or for any other qualification.

STRUCTURE AND WORD COUNT

The literature review has been written in accordance with the guidelines for authors of the *British Journal of Clinical Psychology*, the intended journal of submission. The research report has been written in accordance with the guidelines for authors of the *Journal of Reproductive and Infant Psychology*, the intended journal of submission. Copies of the University approval letter and guidelines for authors are provided in Appendix A and B respectively.

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ABSTRACT OF WHOLE THESIS

This thesis includes a literature review and a research project. The literature review describes and appraises twenty four studies investigating the relationship between adult attachment and post traumatic stress symptoms experienced after traumatic events in adulthood. Thirteen studies focused on combat related trauma samples, four on interpersonal violence related trauma, and seven on specific critical events such as violence at work. Clinical implications of the findings and recommendations for future research are addressed.

The research report presents a study investigating whether antenatal adult attachment patterns are related to women's experiences of birth and the development of acute stress symptoms in women following childbirth. The sample comprised of 58 women recruited between 28 and 36 weeks gestation in the Harrogate area who completed self report questionnaires at two time points. The first questionnaires were completed antenatally to collect demographic information and assess attachment patterns. The second questionnaires were sent within 14 days of giving birth and gathered information about women's experiences of birth. Attachment anxiety was associated with increased acute stress symptoms. Attachment avoidance predicted lower levels of perceived staff support which was in turn associated with higher levels of acute avoidance symptoms and total acute stress symptoms. These findings are discussed in relation to previous research findings, directions for future research and clinical implications.

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LITERATURE REVIEW

What is the role of attachment patterns in relation to post traumatic stress symptoms following traumatic events in adulthood?

Abstract

Research in the area of Post Traumatic Stress Disorder (PTSD) is increasingly focused on identifying vulnerability factors for PTSD and post traumatic stress (PTS) symptoms so as to better understand which individuals are likely to suffer from PTS symptoms and PTSD following a traumatic event. Little research has examined the role of attachment patterns as a vulnerability factor. The aim of this literature review is to describe and appraise the research that has investigated the relationship between adult attachment and post traumatic stress symptoms experienced after traumatic events in adulthood. A review of articles was carried out searching the databases PsycArticles, PsycINFO, Medline and Web of Knowledge using the search terms 'Adult attachment'/ 'Adult attachment style' and 'posttraumatic stress'/ 'post traumatic stress'/ 'post traumatic stress disorder'/ 'post traumatic stress symptoms'/ 'PTSD'. Twenty four studies were identified; thirteen studies focused on combat related trauma samples, four on interpersonal violence related trauma, and seven on specific critical events such as violence at work. Insecure attachment patterns were consistently associated with greater levels of PTS symptoms, particularly attachment anxiety. Attachment avoidance was more likely to be associated with PTS symptoms when trauma was of an extreme nature, for example, war captivity. Key methodological limitations are associated with this body of research, in particular inconsistency in attachment measures used. Further research is necessary to determine the underlying mechanisms of the relationship between insecure attachment and PTS symptoms. Clinical implications include the possibility of delivering treatment for PTSD within an attachment framework.

1. Introduction

Post traumatic stress disorder (PTSD) is not an inevitable consequence following the experience of a traumatic event (Paris, 2000). Vulnerability and resilience factors can help to distinguish between those who do and do not develop post traumatic stress (PTS) symptoms following a traumatic event. A review of empirical findings summarised vulnerability factors for PTS symptoms into three categories; pre-trauma, peri-trauma, and post-trauma factors (Ozer, Best, Lipsey & Weiss, 2003). Pre-trauma factors are present prior to the index traumatic event and increase the likelihood of an individual experiencing PTS symptoms, for example, prior trauma history and family history of psychopathology (Ozer et al., 2003). Peri-traumatic factors are those that occur during the trauma itself, for example, perceived life threat during the traumatic event (fear), peritraumatic emotionality (high levels of emotion during or immediately after the event), peritraumatic dissociation (dissociative experiences during or immediately after the event) and trauma severity (Ozer et al., 2003). Post-trauma factors maintain distress following a traumatic event such as perceived social support following the traumatic event (Ozer et al., 2003).

Attachment theory proposes that early attachment relationships are internalised as a working model which guides the expectations and evaluations of relationships throughout the life span (Bowlby, 1980; Bowlby, 1988). In adulthood these models are thought to affect the way in which individuals interact and build close relationships (Hazan & Shaver, 1987), influence the way

they will cope with anxiety, illness and stressful events (Muklincer & Florian, 1995) and regulate their emotions (Fuendeling, 1998).

Given the influence of attachment patterns on factors known to increase the risk of PTS symptoms, namely, perceived social support, experience of emotions and coping in stressful situations, it is important to understand more clearly the role of attachment as a potential vulnerability or protective factor for the development of PTS symptoms.

2. Aim of Review

The aim of this literature review is to describe and appraise the research that has investigated the relationship between adult attachment and post traumatic stress symptoms experienced after traumatic events in adulthood.

3. Search Strategy

A review of articles published between 1985 and March 2011 was completed by searching PsycArticles, PsycINFO, Medline and Web of Knowledge using the search terms 'Adult attachment'/ 'Adult attachment style' and 'posttraumatic stress'/ 'post traumatic stress'/ 'post traumatic stress disorder'/ 'post traumatic stress symptoms'/ 'PTSD'.

Inclusion criteria were;

- Studies must have investigated the relationship between attachment and post traumatic stress disorder or symptoms
- Traumatic event studied must have taken place in adulthood
- Studies written in English
- Studies with human participants
- Published in a peer review journal

Exclusion criteria were;

- The traumatic event being assessed took place in childhood
- The article was not peer reviewed
- Studies not written in English
- Child participants

A diagram showing the search process can be found in Appendix A. Twenty four published, peer reviewed studies were identified; thirteen of these studies focused on combat related trauma samples, four on interpersonal violence related trauma, and seven on specific critical events such as violence at work.

An overview of the studies reviewed can be found in Appendix B.

4. Outline of Review

To provide the context for this review, the key concepts of attachment theory and measurement will be described, followed by key concepts and models of PTSD. Literature investigating the relationship between attachment and PTSD symptoms will be summarised and appraised in sections according to type of trauma; combat related trauma, interpersonal trauma and specified critical events. Specific factors involved in the relationship between adult attachment and PTSD symptoms will be discussed followed by conclusions, clinical implications of the findings and recommendations for future research.

5. Attachment theory

Attachment is an 'affectional' bond, between an individual and an attachment figure (usually a caregiver) (Bowlby, 2005). Such bonds between a child and their caregiver are centred around the child's need for safety, security and protection (Ainsworth, 1989). In conditions of perceived threat or danger, the attachment system is activated and the child seeks proximity with the primary caregiver in order to obtain protection and comfort, thus alleviating distress (Ainsworth, Blehar, Waters & Wall, 1978; Bowlby, 1980).

Attachment theorists have identified two main categories of attachment in infants; secure and insecure. Secure attachments develop when a caregiver is warm, responsive and sensitive to the child's needs (Bowlby, 1969). When this response is given consistently to the child, they will perceive a sense of love and

security. Insecure attachment styles are thought to develop when the child finds that interacting with the caregiver leads to rejection or conflict (Izard & Kobak, 1991). These early experiences of relationships with caregivers shape how children make sense of themselves and the world around them (Ainsworth, 1979) and are internalised as a working model which guides the expectations and evaluations of relationships throughout the life span (Bowlby, 1980; Bowlby 1988). A securely attached child will have an internal working model of himself as deserving and others as trustworthy and responsive, whereas an insecurely attached child's internal working model would be of himself as undeserving and of others as untrustworthy, unresponsive and rejecting (Bowlby, 1973).

5.1. Measurement of attachment in adulthood

Attachment models are thought to continue into adulthood (Bowlby, 1973) and have been found to be relatively stable from infancy into early adulthood (Hamilton, 2000; Waters, Merrick, Treboux, Crowell & Albersheim, 2000) and from middle to late adolescence (Allen, Boykin McElhaney, Kuperminc & Jodl, 2004). However, attachment theorists and researchers recognise that change in attachment style can occur both in childhood and adulthood. Attachment security declines are evident in response to adversity (Bowlby, 1953; Davila & Cobb, 2004; Hamilton, 2000; Waters et al., 2000; Weinfield, Sroufe & Egeland, 2000) while attachment security has improved in response to social work intervention (Iwaniec & Sneddon, 2001).

Researchers measure adult attachment in two ways; narrative assessment via interview and self report. Both approaches conceptualise adult attachment as being derived from early attachment experiences, but the measures used to assess attachment differ considerably. The Adult Attachment Interview (AAI; George, Kaplan & Main, 1985) was designed to identify adult representations of early attachment relationships and the meaning given to past experiences (Crowell & Treboux, 1995). Individuals are asked for general descriptions of their childhood, specific memories that support these descriptions and descriptions of attachment related experiences e.g. being ill, separation, loss. The interview narrative is scored according to quality and coherence of information from which one of four attachment classifications is assigned; i.e. secure-autonomous, dismissing (a type of avoidant attachment), preoccupied (anxious attachment) and unresolved (associated with loss, abuse, and disorganisation in discussing the topic) (Crowell, Fraley, & Shaver, 1999).

In contrast, self report measures were designed to capture the way an individual feels about themselves in current adult relationships, including romantic relationships. Hazan and Shaver (1987) developed the Adult Attachment Styles questionnaire (AAS) which consisted of three sets of statements each representing an attachment style; secure, avoidant, anxious/ ambivalent. Individuals choose the set of statements that describes them best. In 1991 Bartholomew and Horowitz introduced a self report measure that assessed four attachment styles; secure, dismissive (avoidant), preoccupied (anxious) and fearful (avoidant). More recently, self report measures have been developed to

assess adult attachment through ratings on independent items rather than self selection from three or four sets of statements. Ratings on individual items yield attachment scores on two underlying dimensions of adult attachment rather than classification. The dimensions; anxiety (about abandonment and separation) and avoidance (of intimacy and dependency) are thought to be continuums (Brennan, Clark & Shaver, 1997; Fraley, Waller & Brennan, 2000).

The different approaches to measurement and conceptualisation of attachment mean that terminology is often confused between attachment style (for categorical measures) and attachment orientation or pattern (for dimensional measures). For consistency during this review, the term 'attachment pattern' will be used throughout.

6. Post traumatic stress disorder

PTSD is an anxiety disorder that can occur following the experience of a psychologically traumatic event; defined as an event in which a person perceives risk of injury or death to self or others and experiences feeling of fear, horror and helplessness (Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revised (DSM-IV-TR); American Psychiatric Association (APA), 2004). Symptoms of the disorder include 'persistent re-experiencing' of the event, 'persistent avoidance and emotional numbing' and 'increased arousal' (DSM-IV-TR; APA, 2004). A diagnosis of PTSD is only applicable if all types of symptoms have been present for more than one month.

Models of post traumatic stress disorder (PTSD) include individual differences that may serve as vulnerability factors for PTSD. Foa and Riggs (1993) suggest that an individual's pre-trauma schemas, memory of the event, and memory of the experiences prior to the event could interfere with the emotional processing of trauma and thus contribute to the development of PTSD. Ehlers and Clark (2000) suggest that PTSD develops when an individual processes the traumatic event in a way that leads to a sense of serious, current threat. This sense of threat is thought to arise due to excessively negative appraisals of the trauma and/ or its consequences and disturbance of autobiographical memory. Brewin, Dalgleish and Joseph (1996) also suggest that different types of memory are involved in PTSD; verbally accessible memories (VAM) and situationally accessible memories (SAM) which are unconscious and when triggered bring experiences of the traumatic event to mind in the form of flashbacks.

In addition, cognitive factors such as coping styles and cognitive schemas or attributions appear to mediate an individual's response to traumatic experiences. Problem centred coping is more effective than emotional coping in dealing with traumatic stress (Agaibi & Wilson, 2005; Lazarus & Folkman, 1984); with three key areas of cognitive belief most related to the development of PTSD i.e. negative cognitions about the self; negative cognitions about the world; self-blame for the trauma (Foa, Ehlers, Clark, Tolin & Orsillo, 1999).

7. Attachment and PTS symptoms

Attachment styles are associated with coping strategies that an individual may employ as distress management (Bowlby, 1988). Evidence suggests that the attachment style of an individual determines the way they will cope with anxiety, illness and stressful events. Individuals with secure attachment styles perceive themselves in a positive and coherent way, possess good problem solving skills, view stressful situations optimistically and believe that others will help them in times of need (Mikulincer & Florian, 1995). These individuals are therefore able to manage stress with a sense of mastery, choose effective coping strategies and make use of social support in stressful situations. In contrast, individuals who have an insecure attachment style have less confidence in their ability to cope with difficulties, have poorer problem solving skills, view difficult situations as less controllable and more threatening, tend to distrust others, and are more anxious, hostile and distressed in stressful situations (Kobak & Sceery, 1988; Shaver & Hazan, 1993). Anxiously attached individuals are highly attentive to their own emotions, particularly negative emotions, and emotionally relevant stimuli, both internal and external (Fuendeling, 1998) and are more likely to ruminate on bad thoughts and memories (Mikulincer & Florian, 1998). Avoidant attachment is characterised by inattention to and repression of emotion and a proneness to make high appraisals of threat (Fuendeling, 1998), inhibiting signs of distress and using repressive and dissociative mechanisms (Mikulincer & Florian, 1998).

These descriptions highlight key differences in functioning between secure and insecure attachment styles that may be linked to some of the risk factors for PTSD already identified namely coping strategies, perceived social support and the experience of emotions in stressful situations. It is therefore important to consider the role of attachment in the development of post traumatic stress (PTS) symptoms and PTSD.

8. Studies investigating attachment patterns and PTS symptoms

The literature reviewed in the following sections includes both categorical and dimensional measures of attachment. For clarity, the types of measures used will be specified. Similarly, the articles reviewed vary in their measurement and reporting of PTS symptoms; some studies measure the presence of PTSD as a clinical disorder that meets diagnostic criteria (DSM-IV-TR; APA, 2004), while others refer to the presence and severity of post traumatic stress symptoms. Once again, for clarity it will be specified whether studies report presence of PTSD or PTS symptoms.

8.1. Combat related trauma

Most of the research investigating the relationship between adult attachment and post traumatic stress has been conducted with populations that have experienced prolonged exposure to trauma and threat. The earliest study identified in this literature review examined the Iraqi 'scud' (the NATO reporting

name for a series of tactical ballistic missiles developed by the Soviet Union) missile attack on Israeli cities during the Gulf War in 1991 (Mikulincer, Florian & Weller, 1993). One hundred and forty Israeli undergraduate students (female and male) were recruited 2 weeks after the end of the Gulf War (March 1991) and were split into two groups; those who had been living in an area that had been identified as the most dangerous area during the war due to being targeted by most of the Iraqi Scud missiles, and those who had been living in a less dangerous area which did not receive missile attacks. Participants completed a set of self-report questionnaires assessing attachment styles, post traumatic distress and coping. Participants' attachment styles were measured using the Adult Attachment Style Scale (Mikulincer, Florian, & Tolmatz, 1990) which measures attachment in terms of three categories; secure, avoidant or ambivalent (anxious). The findings indicated that participants classified as having ambivalent (anxious) attachments experienced more emotional distress than avoidant and secure participants. Participants with avoidant styles reported higher trauma related avoidance than secure participants. In terms of coping styles, securely attached participants used more support seeking strategies to cope with the trauma, ambivalent participants relied more on emotion focused strategies, and avoidant participants utilised distancing strategies.

Since this study, the association between insecure attachment patterns and PTS symptoms was replicated in other war trauma populations. Two studies focused on veterans of the 1973 Yom Kippur War (Dekel, Solomon, Ginzburg & Neria, 2004; Ein-Dor, Doron, Solomon, Mikulincer & Shaver, 2010) found that insecure

attachment was associated with greater severity of PTS symptoms than secure attachment. It should be noted that the methodology of these studies differed greatly. Despite using the same attachment measure, the Adult Attachment Style Scale (Mikulincer et al., 1990), the two studies conceptualised participant attachment patterns differently. Dekel et al. (2004) categorised participants as either 'secure', 'avoidant' or 'anxious-ambivalent' while Ein-Dor et al. (2010) used only the items on the measure relating to avoidance and anxiety (not secure) and calculated two scores for each participant (avoidance and anxiety). Furthermore, while PTS symptoms in both studies were assessed at the time of data collection (between 28 and 30 years post war), Dekel et al. (2004) additionally asked participants to recall if they had experienced symptoms 'since the war'.

Ghafoori, Hierholzer, Howsepian and Boardman (2008), while also collecting data many years post war, replicated the relationship between insecure attachment styles and increased PTS symptoms in a sample of American war veterans who had fought in a number of wars. Similarly studies with populations of ex prisoners of war (POWs; including Israeli, American and Palestinian), found that insecure attachment patterns (as measured on both categorical and dimensional measures) was associated with more severe PTS symptoms (measured as present at time of data collection which was between 4 and 30 years post war) than participants who were relatively secure, and that secure attachment patterns were associated with reduced vulnerability to PTSD (Dieperink, Leskela, & Thuras, 2001; Kanninen, Punamaki & Qouta, 2003;

Solomon, Ginzburg, Mikulincer, Neria & Ohry, 1998; Solomon, Dekel, & Mikulincer, 2008; Zakin, Solomon, & Neria, 2003). In fact, two of these studies found that ex POWs reported more current PTS symptoms than control veterans who had fought in the war, but not been held captive (Solomon et al., 1998; Solomon et al., 2008).

As already highlighted, a significant limitation of the studies since Mikulincer et al. (1993) is that data was collected retrospectively between 4 and 30 years after the wars had ended. The most obvious difficulty with this is the risk that the presence of current PTS symptoms might be related to an event or experience that had taken place in the many years since the war. Researchers in two studies asked participants to complete post traumatic stress measures in relation to a second time point; symptoms experienced 'in the past' (Zakin et al., 2003) and 'since the war' (Dekel et al., 2004). While this might be an attempt to identify the presence of symptoms closer to the time of war, the reliability and accuracy of recall about events over a period of 20 to 30 years is likely to be subject to error.

Research into populations where civilians are living in life-endangering conditions, or living under threat has an advantage over the retrospective war research in that data collection has occurred at the longest, one year after the traumatic event or situation (Besser, Neria, & Haynes, 2009; Mikulincer, Horesh, Eilati & Kotler, 1999). Mikulincer et al. (1999) studied a group of Israeli Jewish

settlers living within the Palestinian authority territory (high-threat group) and a control group of Israeli Jewish people living within Israel. The authors found higher PTS symptoms in the high-threat group and found that insecure attachment styles were positively related to PTS symptoms. Similarly, Besser et al. (2009) found trauma exposed individuals had higher levels of insecure attachment (measured on anxiety and avoidance dimensions) and PTS symptoms than the controls (where trauma was a town which had, at the time of the research, endured nearly 8 years of exposure to rocket and mortar fire threatening personal and family safety, destruction of property, and fatalities). More recently, Besser & Neria (2010) conducted a longitudinal study with Israeli students who were evacuated out of Southern Israel due to increased missile attacks, at two time points; 1) at war and 2) four months after ceasefire. Insecure attachment (specifically higher attachment anxiety scores) was found to be associated with elevated PTS symptoms at Time 1 and over time to increased levels of symptoms and reduced social support at Time 2.

8.1.1. Attachment anxiety or attachment avoidance

Of the thirteen studies of chronic exposure to trauma that have been discussed in this review so far, ten identified outcomes related specifically to the different types of insecure attachment patterns. The remaining three studies combined all insecure attachment styles into one category 'insecure attachment' for the purposes of analysis and reporting and therefore cannot be commented on in

this section (Dieperink et al. 2001; Ghafoori et al., 2008 & Zakin et al., 2003 - see summary table for further details of specific studies).

Findings from several studies suggest that while general insecure attachment patterns were associated with elevated levels of PTS symptoms, attachment anxiety specifically (measured both on categorical and dimensional questionnaires) was associated with greater global distress and PTS symptoms than avoidant and secure patterns (Dekel et al., 2004; Ein-Dor et al. 2010; Mikulincer et al., 1993). Other studies found even stronger links between attachment anxiety dimension and severity of PTS symptoms; finding only an association between attachment anxiety and PTS symptoms, not avoidant or secure attachment styles (Besser et al., 2009; Besser & Neria, 2011) and finding attachment anxiety to be a vulnerability factor for increased PTS symptoms at a 4 month follow up (Besser & Neria, 2010).

Studies where attachment avoidance was found to be related to PTS symptoms was specific to ex prisoners of war (POWs) (Dekel et al., 2004; Ein Dor et al, 2010; Kanninen et al., 2003; Solomon et al., 2008) and participants in close proximity/ living within high threat of attack areas (Mikulincer et al., 1993; Mikulincer et al., 1999). One study of ex POWs reported greatest distress levels in participants with attachment avoidance, not attachment anxiety (Solomon et al., 1998). Attachment avoidance was associated with a higher level of distress on all outcome measures, (number of PTS symptoms, general symptomatology,

war-related intrusive and avoidant tendencies, and impaired functioning) whereas attachment anxiety was associated with elevated levels of distress on trauma specific outcome measures only (Solomon et al., 1998). The findings of this study however, must be interpreted with caution due to data collection occurring 18 years retrospectively which is associated with recall problems as discussed previously.

The two sets of general findings, firstly that attachment anxiety is a greater vulnerability factor for PTS symptoms than attachment avoidance and secondly that avoidant attachment was only associated with ex POWs and high threat location samples can be understood within an attachment framework. Attachment theorists suggest anxiously attached individuals cope with stress by directing their attention towards distress and becoming hypervigilant to stress (Kobak & Sceery, 1988; Mikulincer et al., 1990). It is likely that this process increases their experience of distress and might explain why this group is consistently associated with higher PTS symptom levels. Avoidantly attached individuals however, tend to use distancing coping strategies which may be helpful in a variety of everyday settings and perhaps even protect them to an extent in traumatic settings. However, when facing extreme life-endangering situations, distancing is no longer an effective coping strategy and their vulnerability is exposed resulting in an increase in distress (Mikulincer & Florian, 1998). It is possible that the experience of being held captive and living with high threat of attack was more extreme and life-threatening than the experience of control veteran groups and therefore could explain the different findings.

Furthermore, it has been noted that in these situations avoidantly attached individuals can become so distressed that their responses resemble anxiously attached patterns, which might help to explain the high distress outcomes found by Solomon et al. (1998).

8.1.2. Methodological issues

There are a number of methodological limitations that apply to all of the chronic combat related studies reviewed so far. Firstly, none of the studies assessed (or reported assessment) for participants' subjective experience of situations as traumatic, or their experience of the event as traumatic in accordance with the guidance in the DSM-IV-TR (APA, 2004) criterion A for PTSD, i.e. an event which involves a death threat or serious injury, or a threat to physical integrity of self or others, and elicits an intense feeling of fear, helplessness and horror. While it is a reasonable assumption that war and war captivity is traumatic, and certainly it has been recognised as such (Hunter, 1991; 1993), it is possible that the events being studied were not necessarily perceived as traumatic by the participants. This methodological limitation opens up the possibility that the trauma symptoms recorded were due to some other event which was not recorded, that could have taken place since the war but before the research project, the chances of which increase when data was being recorded up to 30 years in retrospect.

Secondly, all except two of the studies used a cross-sectional design. While these designs have been sufficient to establish a relationship between insecure attachment patterns and PTS symptoms, they do not enhance understanding of whether there is a causal relationship between these variables. The interpretation of the findings within an attachment theory framework would be that attachment patterns are a risk or resilience factor for the development of PTS symptoms following combat related trauma. However, it is also possible that the experience of trauma affects attachment style by challenging beliefs about the self, other people and the world thus causing changes in people's resources and resiliency resulting in deterioration in their feelings of attachment security. This particularly may be more likely to happen where trauma has been chronic and ongoing, as in the studies reviewed so far.

Mikulincer et al. (1993) found no difference in attachment insecurities between those in the danger zone and those out of it. Dieperink et al. (2001) found that trauma severity (measured objectively by weight loss in captivity and scores on the self report Combat Exposure Scale measuring exposure to various combat situations, such as firing rounds at the enemy and being on dangerous duty (CES, Keane et al., 1989) and attachment style in a sample of ex POWs made independent contributions to PTS symptom prediction with no interaction effect between the two variables suggesting that these participants' attachment patterns had not altered in response to trauma exposure. A recent study found that levels of attachment orientations, PTS symptoms and perceived support did not differ between participants in the different alarm zones (which represented

different levels of threat from missiles) (Besser & Neria, 2011). These findings suggest that attachment styles had probably not been altered by the exposure to the trauma.

Solomon et al. (2008) in their prospective study found that PTS symptoms 20 years after the war predicted an increase in attachment insecurities 8 years later better than attachment insecurities predicted severity of PTS symptoms. This finding cannot be easily explained by attachment theory and therefore would suggest that attachment insecurities may be affected by the distress and symptoms of PTS. However, Besser & Neria (2010) who also conducted a follow up study of PTS symptoms, found that PTS symptoms did not have an effect on attachment anxiety over time. The time points at which these studies were conducted differed considerably; Solomon et al. (2008) administered measures 18 years and 30 years after the war whereas Besser & Neria (2010) administered measures during the war and 4 months after the ceasefire. It is possible the findings reflect the influence of PTS symptoms on attachment orientation in the short term versus long term.

Clearly, the context of ongoing, repeated, extreme stress that many of the participants in the studies reviewed have spent large portions of their lives living in, and the effect that might have had on their attachment before these studies were even conducted is an important factor. It seems possible that attachment orientation might be both the cause and effect of post traumatic responses to events in populations exposed to chronic ongoing trauma. However, without

measures of attachment prior to the war, it is hard to draw any firm conclusions about a causal relationship between adult attachment and PTS symptoms.

8.2. Interpersonal trauma

Numerous studies report a relationship between insecure adult attachment patterns and PTS symptoms in adulthood in samples who experienced abuse in childhood (Muller & Lemieux, 2000; Muller, Sicoli & Lemieux, 2000; Roche, Runtz & Hunter, 1999; Twaite & Rodriguez-Srednicki, 2004). These studies will not be reviewed here as the focus of this review is specifically on traumatic events in adulthood.

Three studies have specifically investigated the relationship between adult attachment and PTS symptoms following interpersonal violence in adulthood. One additional study included interpersonal violence experiences that took place in either childhood, adolescence or adulthood (Sandberg, 2010). Given that the majority of women reporting victimization experienced it in adolescence/adulthood the findings are included in this review.

Of these four studies, three studied samples of college students (Elwood & Williams, 2007; Sandberg, Sues & Heaton, 2009; Sandberg, 2010) and one studied a community sample of women in violent and non violent relationships (Scott & Babcock, 2010). Findings from all four studies broadly support those

found in combat related trauma populations; that insecure attachment patterns are related to PTS symptoms. However, differences between the findings do exist. In line with findings from combat related studies, Sandberg et al. (2009) and Scott and Babcock (2010) found that attachment anxiety, not avoidance, played a specific role in the relationship between interpersonal trauma and PTS symptoms (mediating the relationship and moderating the relationship respectively¹). Sandberg (2010) however, identified attachment avoidance, not anxiety, as a moderator between trauma and PTS symptoms. Elwood and Williams (2007) found that both attachment anxiety and attachment avoidance were related to increased PTS symptoms but neither had a moderating effect on the relationship between trauma and PTS symptoms.

Sandberg (2010) is the only study of interpersonal trauma reviewed in this paper, to find that attachment avoidance was more strongly related to PTS symptoms than attachment anxiety. It is also the only study to include experiences of trauma taking place in childhood. Although this type of trauma was experienced by a minority of participants, it is possible that the relationship between attachment patterns and PTS symptoms in response to trauma taking place in childhood is different than that in response to trauma in adulthood, thus contributing to the different findings. Additionally, this study was the only one to use a categorical attachment measure, which might also contribute to the

¹ A moderating factor is one that affects the strength of the relationship between an independent or predictor variable and a dependent variable, in this case between interpersonal trauma and PTS symptoms. A mediating factor however, is one that accounts for the relation between the predictor and the dependant variable (Baron & Kenny, 1986).

different findings; however, this cannot be confirmed as the distributions of attachment patterns across the sample were not reported.

A finding regarding interpersonal trauma from the combat related trauma literature emerged from a study investigating attachment and PTS symptoms in ex political prisoners (Kanninen et al., 2003). The researchers made a distinction between participants who had experienced physical torture and those who had experienced psychological torture. As with the other studies discussed, they found a relationship between insecure attachment patterns and elevated PTS symptom severity. However, this finding was primarily in response to physical torture and ill treatment. In the case of psychological and interpersonal torture, there was no significant difference in PTS symptoms between secure and insecure participants. It is possible that this finding can be understood in terms of attachment theory; that the interpersonal nature of psychological torture presents a new view of the world and fellow humans to secure individuals that does not match their existing model. The suggestion is that the reality of the cruelty done by other humans shatters their existing internal working model, causing the resulting distress symptoms (Kanninen et al., 2003). Whereas insecurely attached individuals, particularly preoccupied/anxious, experience psychological torture as confirmation of what they already believed about themselves, humans and the world. These findings provide support for Crittenden (1997) who described secure individuals as 'naively secure' because they generally cope well with adverse situations, but not when threat originates within human relationships. This finding regarding the vulnerabilities of secure

attachment patterns was not evident in the four studies reviewed in this section, possibly because interpersonal violence cannot be compared to psychological torture as equivalent forms of trauma.

8.2.1. Methodological issues

The studies investigating the relationship between attachment and PTS symptoms in the context of interpersonal violence are subject to many of the same limitations as combat related studies. Most of the studies identified that participants had experienced more than one traumatic event but none of them identified which traumatic event the data was in response to. Furthermore, classification of an event as traumatic was made according to researchers' criteria of objective traumatic events. Subjective experiences were not assessed, and therefore no conclusions can be drawn as to whether the events being studied satisfied criterion A of PTSD diagnostic criteria (DSM-IV-TR; APA, 2004). Additionally, all of the research was cross sectional in design and therefore the causal nature of the relationship between adult attachment and PTS symptoms is not any clearer.

8.3. Specific identified critical incidents

Several studies have investigated populations who have experienced specific traumatic events. In line with the research already reviewed, these studies identified a significant relationship between insecure attachment and PTS

symptoms, particularly attachment anxiety. This finding was shown in two samples of Belgian security workers who had experienced violence at work in the previous year (Bogaerts, Daalder, Van Der Knaap, Kunst & Buschman 2008; Bogaerts, Kunst & Winkel, 2009), two samples of Belgian red cross workers (Declercq & Palmans, 2006; Declercq & Willemson, 2006), civilians after the 9/11 world trade centre attacks (Fraleigh, Fazzari, Bonanno & Dekel, 2006), a young student population (O'Connor & Elklit, 2008) and people at an emergency room following a traumatic accident (Benoit, Bouthillier, Moss, Rousseau & Brunet, 2010).

O'Connor & Elklit, (2008), in contrast to most research in this area, did not find a relationship between attachment anxiety of the preoccupied sort and number of PTS symptoms in a sample of young students in intermediate education (nurses' aids, social workers and craftsmen). The authors suggested that a linear relationship might exist between the four attachment styles they measured and PTS scores (with secure attachment at one end, then preoccupied (anxious), dismissive (avoidant) and fearful (avoidant) at the other end) that represents a uni-dimensional construct with a high/ low security dimension. However, it is also possible that this finding could be due to methodological flaws in the study. This study was the only one to use the Revised Adult Attachment Scale (RAAS; Collins & Read, 1990) to measure attachment which could contribute to the different findings. Importantly, as the authors themselves point out, the distributions of attachment patterns in this sample differed from other similar populations; secure patterns were higher (66%) and there was a relatively small

proportion of fearfully attached participants (6.6%) (O'Connor & Elklit, 2008). It is also possible that in measuring trauma by asking participants to choose the most traumatic event experienced in their lifetime, participants answered in relation to childhood events. If so, participant responses might be less accurate due to the time that had passed since the event.

Overall, the quality of the studies in this section is superior to the ones reviewed earlier and addressed some of the limitations of this type of research already discussed. Three studies (Benoit et al., 2010; Declercq & Palmans, 2006; Declercq & Willemssen, 2006), the only three out of all 24 studies reviewed, assessed for satisfaction of criterion A of the DSM-IV-TR PTSD criteria (APA, 2004). It is therefore possible to be relatively certain that these studies are actually assessing trauma responses to an event intended to be measured within a recent time frame. Furthermore, there has been much criticism about research in this area relying on self report measures. Fraley et al. (2006) used friend/relative ratings of adjustment as additional information about levels of distress. Not only did this provide additional support for the findings, but it highlighted some interesting discrepancies between ratings; that highly dismissing participants self reported high levels of PTS symptoms but their friends and family had not identified any change in them, suggesting no difficulties with adjustment following the incident. This could reflect that individuals with avoidant attachment patterns were in relatively less intimate relationships with friends/ relative informers and therefore those around them did not pick up on their distress. They may also have tried hard not to show signs of

distress. It is not possible from the data available to identify exactly what the cause of this discrepancy was, but the finding does suggest that new insights can be gained by taking multiple perspectives on measurements and may enhance our understandings of attachment patterns further.

9. Factors involved in the relationship between adult attachment and PTS symptoms

Many of the studies discussed in this review conceptualised adult attachment as either a mediator or a moderator of the relationship between a traumatic event and PTS symptoms. Several studies however, starting from the premise that a relationship between attachment and PTS was already established, investigated factors that might be considered underlying mechanisms explaining the relationship between attachment and PTS symptoms. These are discussed below.

9.1. Coping strategies/ Emotion regulation

Besser et al., (2009) identified that insecurely attached individuals appraised events as more stressful than securely attached individuals and that appraising events as more stressful was, in turn, related to the development of psychopathology. According to attachment theory, when individuals experience stress their attachment systems are activated and they start to cope in habitual ways. As such, attachment patterns could be seen as a stress regulation or

emotion regulation mechanism. Findings regarding coping strategies seem to offer support for this idea. Secure individuals were more likely to use active problem –focussed coping strategies in captivity (Solomon et al., 1998), as well as more support-seeking strategies in coping with the trauma (Mikulincer et al., 1993). Ambivalent (anxious) participants used more emotion focused strategies and avoidant participants used more distancing strategies (Mikulincer et al., 1993). These findings offer support for the descriptions of attachment patterns and coping identified in Section 7 of this review (Mikulincer & Florian, 1995). Interestingly in Mikulincer et al.'s (1993) study, the impact of objective situational stress (actual missile attacks) on the pattern of coping strategies used was minimal. However, Mikulincer et al. (1993) also found that coping did not mediate the association between attachment style and emotional distress. Instead it appeared that attachment style had a direct effect on both coping and distress.

Conversely, Benoit et al. (2010) found that two specific emotion regulation strategies mediated the relationship between adult attachment and PTS symptoms; emotion focused strategies and substance use, accounting for 47.5% of variance. In contrast to Mikulincer et al. (1993), Benoit et al. (2010) found that attachment security was not correlated with social support seeking or with the capacity for emotional expressivity. These two studies used different measures to assess coping; Benoit et al. (2010) used The Coping Inventory for Stressful Situations (CISS; Endler & Parker, 1994) that has showed better psychometric properties than Folkman and Lazarus's (1988) Ways of Coping

Checklist as used by Mikulincer et al. (1993). It did emerge that the different attachment patterns do all demonstrate social support seeking behaviour but may ask, use and perceive this support in different ways, some adaptive and some maladaptive – subtle differences which the CISS measure was not sensitive enough to detect (Benoit et al., 2010).

The findings regarding the weaker association between avoidant attachment and PTS symptoms could be interpreted as support for a hypothesis that attachment avoidant individuals have decreased sensitivity to stress (Lopez & Brennan, 2000; Besser et al., 2009). Further support for the partially protective role of attachment avoidance was found by Bogaerts et al. (2009) who found that participants with dismissive (avoidant) attachment patterns have less risk of developing PTSD, perhaps due to appraisal of situations within an avoidant attachment framework of positive view of self and negative view of others.

While there are mixed findings in this area, the results consistently indicate the importance of subjective elements in appraising stress and the use of coping strategies. As mentioned, current tools measuring coping might not be designed to pick up on this particular aspect of coping. Where emotion regulation strategies have demonstrated a mediating role, they have only accounted for approximately half of the variance. Clearly, this implies that there may be other variables that also mediate the relationship between attachment and PTS

symptoms. This area warrants further research to establish firmer conclusions about the role for emotion regulation strategies.

9.2. Perceived Social Support

Another factor that has been researched as a potential mediator or moderator of the relationship between adult attachment and PTS symptoms is perceived social support. Declercq & Palmans (2006) looked at both attachment and perception of social support as moderators between a critical incident and PTS symptoms. They found that relationships are perceived as being less supportive via the internal working models of attachment patterns. That is, insecure people who have negative working models of others report less social support and more distress. They found that negative interactions, in addition to perceived social support, are relevant to understanding PTS symptoms.

Besser & Neria (2010, 2011) also found a role for low levels of perceived social support and increased levels of PTS symptoms. They found that the relationship between attachment anxiety and PTS symptoms was mediated, not moderated, by low levels of perceived social support. The model they propose is that people with high attachment anxiety report low levels of support, which in turn is associated with PTS symptoms.

Although it is not clear what the link between attachment anxiety and perceived low levels of support is, a link between attachment anxiety and reassurance seeking (Davila, 2001; Lopez, 2001) is established. It is possible that anxiously attached individuals overuse their support systems with excessive reassurance seeking which has a negative effect on their social relationships and/ or relationships are not perceived as supportive if not responding to reassurance seeking demands.

10. Methodological Considerations

Throughout this review several key methodological limitations were apparent. Firstly, the inconsistency of measures used is a problem for this body of research. Numerous differences between attachment measures exist; categorical measures versus dimensional measures (there was inconsistency in measures used within these categories too); self report versus interview; focus on adult attachment relationship versus recall of childhood relationships. Additionally, a variety of different PTSD measures were used, which also varied in whether they were self report or interview based. The variation in measures used makes it hard to confidently compare findings across studies.

A second limitation is the cross sectional design used by the majority of studies. In all studies, including those few prospective or follow up studies, first measurements took place after the traumatic event had occurred resulting in an

absence of measurement taken prior to traumatic events occurred. The types of trauma being measured were arguably of an unpredictable nature and therefore measurement prior to the event is not possible. Nonetheless, the primarily cross-sectional designs mean that it is impossible to draw firm conclusions about the direction of the relationship between attachment and PTS symptoms.

A third limitation, applicable to the majority of the studies reviewed, was a lack of assessment of the traumatic event as traumatic in accordance with DSM-IV-TR criteria for PTSD (APA, 2004). Furthermore most studies either did not ask participants to identify a specific event and respond on the basis of that event, or did not report that they had done so. This means it is hard to be sure to which event the trauma symptoms being recorded corresponded to.

11. Conclusion

Studies investigating the role of adult attachment in the development of PTS symptoms were reviewed in different areas of trauma; chronic, ongoing, combat related trauma; interpersonal trauma; and specific critical events including incidents at work, 9/11 world trade centre attack and accidents. Overall, after taking the methodological limitations of this field of research into account, research from all three key areas of trauma indicates an association between insecure adult attachment and the development of PTS symptoms, particularly attachment anxiety. The varied findings regarding attachment avoidance

suggests that its relationship with PTS symptoms is more complicated and it appears that it can be protective against traumatic experiences to an extent.

Several subjective factors can be considered underlying mechanisms contributing to the relationship between adult attachment and PTS symptoms; perceived stress, coping strategies/ emotion regulation and perceived social support.

12. Clinical implications of current findings

The general findings that indicate insecure adult attachment patterns are associated with PTS symptoms have implications for the treatment of people suffering from PTS symptoms and PTSD. For people entering treatment for trauma, it might be useful to assess attachment patterns as their internal working models of attachment and the associated emotion regulation strategies may influence the way in which the client relates to the therapist and the therapeutic programme on offer, as well as their capacity to benefit from the therapeutic relationship (Fonagy, Gergely, Jurist & Target, 2002). One could hypothesise that insecurely attached people, given they use support-seeking strategies less or ineffectively, may also be less likely to seek and adhere to treatment. Therefore when they use services, assessment of their attachment style could ensure the therapeutic relationship is tailored to address their needs and keep them engaged in therapy.

The findings of this review might also have implications for the types of therapy that should be offered to people suffering from trauma. Individuals suffering from PTSD, following interpersonal trauma particularly, may have significant attachment difficulties (whether the consequence or the cause of PTSD) that could be contributing to the maintenance of distress. In this case relationship-based therapies with the aim of developing the capacity for secure attachment might be appropriate (Davies & Frawley, 1994; Pearlman & Courtois, 2005; Slade, 1999).

There might also be a role for equipping insecurely attached people with resources that will help to buffer them against trauma (Scott & Babcock, 2010), and future life stresses, for example, problem-focussed coping skills and effective emotion regulation strategies, that could reduce the damage caused to mental health by further adversity.

13. Areas for future research

This review has identified several key areas for future research which would further knowledge regarding the relationship between adult attachment and PTS symptoms. While the findings have indicated a relationship between these two variables, little is known about underlying factors that might mediate this relationship. Further research investigating those factors already suggested as having a role; emotion regulation, coping strategies, cognitions, perceived social

support and perceived stress would help clarify their relative contributions to the relationship.

Consensus in the field regarding the conceptualisation of attachment, categorical or dimensional, would benefit the research. The decision to move forwards within a dimensional framework for attachment would seem to eradicate the need for decisions regarding which styles of attachment to include, as the dimensions would be able to measure for all different attachment representations in terms of levels of attachment anxiety and avoidance.

Given the clinical implications that arise from this body of research, future studies providing practice based evidence about the treatment of PTSD from an attachment framework would be informative and clinically useful. Furthermore, findings that partners of war veterans with PTS symptoms develop secondary trauma symptoms (Ein-Dor et al., 2010) indicate the need for future research to consider treatment at a systemic level.

Lastly, a key area for future research to address is that of design. Accepting the unique nature of trauma as unpredictable, longitudinal research needs to be conducted, ideally following large groups of participants from childhood into adulthood in order to collect prospective data. An alternative way of collecting prospective data is by conducting research with groups of individuals where a significant event is known to be occurring in the future, for example, planned

medical procedures, childbirth or groups of professionals at the recruitment and training stages of careers (training camps of soldiers, emergency services professional, doctors).

14. References

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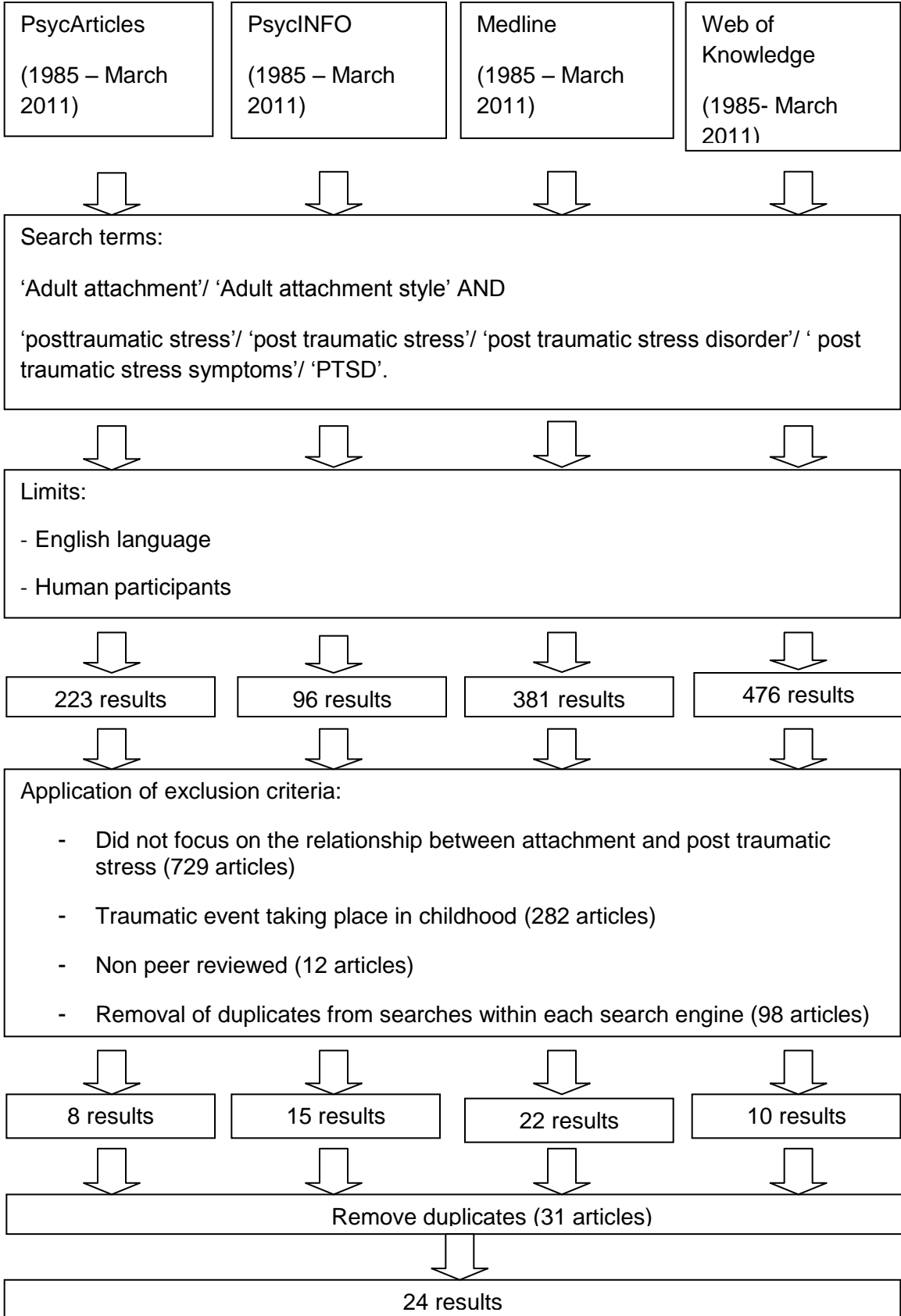
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Appendix A: Search Strategy Diagram



Summary table of articles reviewed

Author, Year, Title	Participants	Measure of attachment used	Measure of post traumatic stress used	Key findings
Combat related trauma studies				
Besser & Neria 2010 <i>'The effects of insecure attachment orientations and perceived social support on posttraumatic stress and depressive symptoms among civilians exposed to the 2009 Israel-Gaza war: A follow-up Cross-Lagged panel design study'</i>	Israeli students who were evacuated out of Southern Israel due to increased missile attacks. Time point 1, At war: 135 (22 = males, 113 = female) Time point 2, 4 months after ceasefire: 133 (21=male, 112=female)	1.Experiences in Close Relationships-Revised (ECR-R) ² - dimensional (avoidance, anxiety)	1.The Posttraumatic Stress Disorder Inventory (PTSDI) ³ - rate symptoms present in last month in relation to Israel-Gaza war - Self report	Overall resilience was found in the sample, with an increase in perceived social support and a decrease in PTS symptoms over time. Attachment anxiety was found to be associated with elevated PTS symptoms at Time 1 and over time to increased levels of PTS symptoms and reduced social support at Time 2.

² Fraley, Waller & Brennan (2000)

³ Solomon, Neria, Ohry, Waysman, Ginzburg (1994)

<p>Besser & Neria 2011 <i>'When Home Isn't a Safe Haven: insecure attachment orientations, perceived social support, and PTSD symptoms among Israeli evacuees under missile threat'</i></p>	<p>135 Israeli students (22 = males, 113 = female) who were evacuated out of Southern Israel due to increased missile attacks but were still under threat in locations they were evacuated to. Individuals in different areas were exposed to different levels of trauma intensity.</p>	<p>1. Experiences in Close Relationships-Revised (ECR-R)² - dimensional (avoidance, anxiety)</p>	<p>1. The PTSD Inventory³ - rate symptoms present in last month in relation to the fighting between Israel and Hamas war - Self report 2. Trauma intensity measured as the amount of time available to run for cover after hearing air-raid sirens.</p>	<p>Intensity of trauma exposure did not affect amount of PTSD symptoms or perceived social support.</p> <p>Attachment anxiety but not attachment avoidance, was related with PTSD symptoms, this relationship was mediated by low levels of perceived social support.</p>
<p>Besser, Neria & Haynes 2009 <i>'Adult attachment, perceived stress, and PTSD among civilians exposed to ongoing terrorist attacks in Southern Israel'</i></p>	<p>254 adults (111= male, 143 = female) who had experienced more than 7 years of ongoing exposure to rocket and mortar fire in Southern Israel and 308 adults (150 = male, 158 = female) with no direct exposure to life threatening experiences due to war.</p>	<p>1. Experiences in Close Relationships-Revised (ECR-R)² - dimensional (avoidance, anxiety)</p>	<p>1. IES-R⁴ - all linked responses to the terrorist attacks on the ongoing exposure area -self report</p>	<p>Trauma exposed individuals reported higher levels of insecure attachment than controls</p> <p>Attachment anxiety, not avoidance, was a vulnerability factor for PTSD.</p>

⁴ Weiss & Marmar (1997)

Dieperink, Leskela, Thuras & Engdahl 2001 <i>'Attachment Style Classification and Posttraumatic Stress Disorder in Former Prisoners of War'</i>	107 male former prisoner of war veterans	1. Bartholomew's Relationship Questionnaire ⁵ - categorical (4 styles) - self report 2. The Experiences in Close Relationships Scale (ECR) ⁶ - used as categorical (4 styles)	1. The PTSD Checklist Military Version (PCL-M) for DSM-IV ⁷ - data collected many years post war -self report -symptoms experienced in last month	Secure attachment related to lower levels of PTS symptoms than insecure attachment.
Dekel, Solomon, Ginzburg, & Neria 2004 <i>'Long-Term Adjustment Among Israeli War Veterans: The role of attachment style'</i>	399 male Israeli veterans who had fought in 1973 Yom Kippur War, divided into three groups; 1) Combat stress reaction (CSR) casualties (n=112) 2) Veterans who received bravery medals (n=98) 3) Controls veterans who neither had a medal nor CSR (n=189)	1. Adult Attachment Style Scale ⁸ - categorical (secure, avoidant, anxious-ambivalent) - self report	1.PTSD Inventory ³ based on DSM-III-R criteria - administration took place approximately 30 years post war - self report - asked to answer for 2 points in time 1) 'since the war' 2) 'during the last month'	Anxious and avoidant individuals in all three groups reported greater PTS symptoms than secure. CSR reported highest levels of PTS symptoms in the past and in the present, and showed lower levels of secure attachment characteristics.

⁵ Bartholomew & Horowitz (1991); Bartholomew (1990).

⁶ Brennan, Clark & Shaver (1997)

⁷ Blanchard, Jones-Alexander, Buckley & Forneris (1996)

⁸ Mikulincer, Florian & Tolmacz(1990)

<p>Ein-Dor, Doron, Solomon, Miklincer & Shaver 2010 <i>'Together in Pain: Attachment-related dyadic processes and posttraumatic stress disorder'</i></p>	<p>157 Israeli couples divided into two groups; 1) former prisoners of 1973 Yom Kippur war (POW) (n=85) and their wives 2) Controls veterans of 1973 Yom Kippur war not held captive (n=72) and their wives</p>	<p>1. Adult Attachment Style Scale⁸ – anxiety and avoidance items only (not secure) - dimensional (each veteran had score of anxiety and avoidance) - self report</p>	<p>1. The Posttraumatic Stress Disorder Inventory (PTSDI)³ - self report - data collected 28 years after the war but veterans asked to answer for symptoms experienced in past month - ex POWs items about 'my captivity' - control veterans items about 'the Yom Kippur War'</p>	<p>Attachment anxiety associated with severity of PTSD in both groups of veterans. Avoidant attachment associated with PTSD only in ex POWs.</p>
<p>Ghafoori, Hierholzer, Howsepian, & Boardman 2008 <i>'The role of adult attachment, parental bonding, and spiritual love in the adjustment to military trauma'</i></p>	<p>102 male military veterans from the United States</p>	<p>1. Relationship Scales Questionnaire⁹ - categorical (this study used 'secure' and 'insecure' only) - self report</p>	<p>1. Clinician-Administered PTSD Scale (CAPS)¹⁰ - data collected years after wars - assessed current PTSD symptomatology</p>	<p>Veterans with current PTSD had lower secure attachment and higher insecure attachment ratings compared to those without PTSD.</p>

⁹ Griffin & Bartholomew (1994)

¹⁰ Blake, Weathers, Nagy, Kaloupek, Charney & Keane (1998)

Kanninen, Punamaki & Qouta 2003 <i>'Personality and Trauma: Adult attachment and posttraumatic distress among former political prisoners'</i>	176 Palestinian men from the Gaza strip who had been detained or imprisoned during the Intifada (national uprising for independence in 1987-1993)	1. A measure based on Adult Attachment Interview ¹¹ -narrative -categorical (secure-autonomous, insecure-dismissing, insecure-preoccupied)	1. The Harvard Trauma Questionnaire (HTQ) ¹² - between 4 and 8 years after their release - self report - assessment of current symptoms	Among insecure men, exposure to high levels of physical torture was associated with increased levels of PTSD.
Mikulincer, Florian, & Weller 1993 <i>'Attachment Styles, Coping Strategies, and Posttraumatic Psychological Distress: The Impact of the Gulf War in Israel'</i>	140 Israeli undergraduate students (96 female, 44 male) divided into 2 groups; 1) those who lived in danger area during war, targeted by missiles (n=80) 2) those who lived in less dangerous area not targeted by missiles (n=60)	1. Adult Attachment Style Scale ⁸ - categorical (secure, avoidant, anxious-ambivalent) - self report 2. Asked to pick one of 3 typical attachment descriptions that represents themselves in relationships ¹³ - categorical (secure, avoidant, anxious-ambivalent) - self report	1. Impact of Events Scale (IES) ¹⁴ - administered 2 weeks after end of war - 'emotional reactions to missile attacks over previous 2 weeks'	Ambivalent (anxious) people reported more distress than avoidant and secure people. Avoidant people reported higher levels of trauma related avoidance than secure people.

¹¹ George, Kaplan & Main (1985)

¹² Mollica & Caspi-Yavin (1991)

¹³ Hazan & Shaver (1987)

¹⁴ Horowitz, Wilner & Alvarez (1979)

Mikulincer, Horesh, Eilati, Kotler. 1999 <i>'The association between adult attachment style and mental health in extreme life-endangering conditions'</i>	40 Israeli Jewish settlers (23 female, 17 male) living within the Palestinian Authority territory (high-threat group) and a control group of 40 Israeli Jewish people (25 female, 15 male) living within the State of Israel	1. Adult Attachment Style Scale ⁷ - categorical (secure, avoidant, anxious-ambivalent) - self report	1. The Posttraumatic Stress Disorder Inventory (PTSDI) ² - self report - identified a 'specific stressful event' they had experienced in the last year and completed measures in response to this - indicated presence of symptoms in last month 2. IES ¹⁴	Anxious-ambivalent attachment related to PTS symptoms in both living conditions. Avoidant attachment only related to PTS symptoms in high threat group.
Solomon, Dekel & Mikulincer 2008 <i>'Complex trauma of war captivity: a prospective study of attachment and post-traumatic stress disorder'</i>	209 male Israeli veterans of 1973 Yom Kippur war divided into two groups; 1) 103 ex POWS 2) 106 controls	1. Adult Attachment Style Scale ⁸ - used as dimensional measure where each participant had a score for anxiety and a score for avoidance - self report	1.The PTSD Inventory ³ Assessed at two time points; 1991 (18 years post war) and 2003 (30 years post war) - Self report - assumed it is based on current symptoms	PTS symptoms and attachment anxiety and avoidance increased in ex POWS over time but decreased slightly or remained stable among controls. PTS symptoms predicted later attachment better than attachment predicted an increase in PTS symptoms.

Solomon, Ginzburg, Mikulincer, Neria, & Ohry 1998 <i>'Coping with war captivity: the role of attachment style'</i>	348 male ex prisoners of war (n=164) and matched controls veterans (n=184) (18 years after war)	1. Adult Attachment Style Scale ⁸ - categorical (secure, avoidant, anxious-ambivalent) - self report	1. PTSD Inventory ³ based on DSM-III-R criteria - administration took place 18 years post war - self report - answered for symptoms 'about the war' present 'during the last month' 2. IES ¹⁴ - answered for symptoms 'about the war' present 'during the previous week'	Avoidant and ambivalent individuals reported greater PTSD symptoms.
Zakin, Solomon & Neria 2002 <i>'Hardiness, attachment style, and long terms psychological distress among Israeli POWs and combat veterans'</i>	164 male ex POWS from 1973 Yom Kippur War and 189 male control veterans	1. Adult Attachment Style Scale ⁸ - categorical (this study used 'secure' and 'insecure' only) - self report	1. Post-Traumatic Stress Disorder (PTSD) Inventory ³ based on DSM-III-R criteria - data collected almost 20 years post war - self report - asked to answer for 2 points in time 1) 'in the past' 2) 'during the last month'	Secure attachment style associated with reduced vulnerability to PTSD among both groups of veterans.

Interpersonal Trauma Studies				
Elwood.& Williams 2007 <i>'PTSD-related cognitions and romantic attachment style as moderators of psychological symptoms in victims of interpersonal trauma'</i>	287 American undergraduate students (female and male)	1. The Experiences in Close Relationships Scale (ECR) ⁶ - used as categorical (4 styles)	1. Posttraumatic Cognitions Inventory (PTCI) ¹⁵ - self report - trauma related cognitions and beliefs 2. Purdue PTWSD Scale-Revised (PPTS-R) ¹⁶ -self report -frequency of symptoms over past month - event not stated	Victims of interpersonal trauma reported higher levels of PTSD related thoughts and higher levels of attachment anxiety but not avoidance, than non victims. High levels of insecure attachment (anxiety and avoidance) and high levels of PTSD related thoughts are associated with higher levels of PTS symptoms in those who had experienced interpersonal trauma.
Sandberg 2010 <i>'Adult Attachment as a Predictor of Posttraumatic Stress and Dissociation'</i>	199 female College students with and without a history of childhood physical abuse, childhood sexual victimization and	1. Bartholomew's Relationship Questionnaire ⁵ - categorical (4 styles) - self report	1. PTSD checklist (PCL-C) ¹⁷ - self report - frequency of symptoms over past	Dismissing (avoidant) attachment moderated (i.e. made stronger) the relationship between victimisation/ abuse

¹⁵ Foa, Ehlers, Clark, Tolin & Orsillo (1999)

¹⁶ Lauterbach & Vrana (1996)

¹⁷ Weathers, Litz, Herman, Huska & Keane (1993)

	adolescent/ adult sexual victimization		month - event not stated	and PTS symptoms.
Sandberg, Sues & Heaton 2009 <i>'Attachment Anxiety as a Mediator of the Relationship Between Interpersonal Trauma and Posttraumatic Symptomatology Among College Women'</i>	224 college students (100% female)	1. The Experiences in Close Relationships Scale (ECR) ⁶ - used as categorical (4 styles)	1. PTSD checklist (PCL-C) ¹⁷ - self report - frequency of symptoms over past month - event not stated	Attachment anxiety partially mediates the relationship between intimate partner violence and PTS and between adolescent/ adult sexual victimisation and PTS. Attachment avoidance was associated with PTS symptoms but did not mediate the relationship between trauma and PTS symptoms.
Scott & Babcock 2010 <i>'Attachment as a Moderator between intimate partner violence and PTSD symptoms'</i>	174 Women in a non violent relationship (n = 35) and women in a violent relationship (n=139)	1.The Adult Attachment Scale (AAS) ¹⁸ -self report - dimensional (attachment closeness, dependency and anxiety)	1.The Posttraumatic Diagnostic Scale (PDS) ¹⁹ -self report - fits with DSM-IV criteria - traumatic event not specified - time frame of symptoms not specified	High attachment anxiety and dependency moderated (strengthened) the relationship between intimate partner violence and PTS symptoms.

¹⁸ Collins & Read (1990)

¹⁹ Foa & Cashman (1997)

Critical traumatic events studies

<p>Benoit, Bouthillier, Moss, Rousseau & Brunet. 2010 <i>'Emotion regulation strategies as mediators of the association between level of attachment security and PTSD symptoms following trauma in adulthood'</i></p>	<p>86 Individuals (female and male) from emergency rooms of trauma centres in Canada within 72 hours of an exposure to a traumatic event</p>	<p>1. Adult Attachment Projective interview²⁰ - narrative measure - categorical (secure, insecure-preoccupied, insecure-dismissing avoidant, insecure-disorganized)</p>	<p>1. IES-R⁴ - self report</p>	<p>Higher attachment security was associated with fewer PTS symptoms at one and three months post trauma.</p>
<p>Bogaerts, Kunst & Winkel 2009 <i>'Dismissive Attachment and Posttraumatic Stress Disorder among securely and insecurely attached Belgian security workers'</i></p>	<p>81 male Belgian security workers who had experienced one traumatic event in the last year</p>	<p>1. Bartholomew's Relationship Questionnaire⁵ - categorical (4 styles) - self report</p>	<p>The Davidson Trauma Scale (DTS)²¹ - self report - based on 17 DMS-IV criteria</p>	<p>Insecurely attached participants reported more PTS symptoms than securely attached.</p>

²⁰ George, West, & Pettem (1997)

²¹ Davidson, Book, Colket, Tupler, Roth, David, Hertzberg, Mellman, Beckham, Smith, Davison & Katz (1997)

<p>Bogaerts, Daalder, Van Der Knaap, Kunst & Buschman 2008 <i>'Critical Incident, Adult Attachment Style and Posttraumatic Stress Disorder: A comparison of three groups of security workers.'</i></p>	<p>212 male Belgian security workers split into three groups 1) who had experienced a critical incident (n = 68) 2)indirectly experienced a critical incident (n = 67) 3)not experienced a critical incident in last 6 months (n = 77)</p>	<p>1.Bartholomew's Relationship Questionnaire⁵ - categorical (4 styles) - self report</p>	<p>The Davidson Trauma Scale (DTS)²¹ - self report -based on 17 DMS-IV criteria</p>	<p>Adult insecure attachment significantly related to PTS symptoms. Most strongly with avoidant rather than intrusive or hyperarousal symptoms.</p>
<p>Declerq & Palmans 2006 <i>'Two subjective factors as moderators between critical incidents and the occurrence of post traumatic stress disorders: 'Adult attachment' and 'perception of social support'.</i></p>	<p>544 participants (458 = male, 86 = female) working for a security company and the Belgian Red Cross who had experienced a critical incident (witnessing or experiencing assault, death threats, witnessing murder, suicide, serious injuries)</p>	<p>1.Bartholomew's Relationship Questionnaire⁵ - categorical (4 styles) - self report</p>	<p>1. The Davidson trauma scale²¹ - self report -based on 17 DMS-IV criteria</p>	<p>Adult attachment style and perception of social support moderate between a critical incident and the incidence of PTSD.</p> <p>Insecure fearful-avoidant and insecure-preoccupied styles predicted PTS symptoms but Insecure dismissive avoidant style did not.</p>

<p>Declercq & Willemssen 2006 <i>'Distress and post-traumatic stress disorder in high risk professionals: adult attachment style and the dimensions of anxiety and avoidance'</i></p>	<p>544 participants (84% male, 16% female) working for a security company and the Belgian Red Cross who had experienced work related critical incident (witnessing or experiencing assault, death threats, witnessing murder, suicide, serious injuries)</p>	<p>1. Bartholomew's Relationship Questionnaire⁵ - categorical (4 styles) - self report -this study used scores on Likert scales to compute attachment styles and the composite scores to compute dimensions of attachment.</p>	<p>1. The Davidson trauma scale²¹ - self report -based on 17 DMS-IV criteria</p>	<p>Fearful- avoidant and preoccupied styles reported more PTS symptoms than securely attached and dismissive avoidant individuals.</p> <p>Looking at underlying dimensions of anxiety and avoidance revealed that attachment anxiety was more related to PTS symptoms and PTSD than attachment avoidance.</p>
<p>Fraley, Fazarri, Bonanno, & Dekel 2011 <i>'Attachment and Psychological Adaptation in High Exposure Survivors of the September 11th Attack on</i></p>	<p>45 individuals (gender not reported) who were in or within several blocks of the World Trade Center on 11/9/2001</p>	<p>1. Relationship Scales Questionnaire⁹ - categorical (this study used 'secure' and 'insecure' only) - self report</p>	<p>PTSD symptom scale, Self Report version (PSS-SR)²²</p>	<p>Securely attached individuals showed fewer symptoms of PTS than insecurely attached individuals.</p>

²² Foa, Riggs, Dancu, & Rothbaum (1993)

the World Trade Center'

<p>O'Connor & Elklit 2008 <i>'Attachment Styles, traumatic events, and PTSD: a cross-sectional investigation of adult attachment and trauma'</i></p>	<p>328 Danish students (65% female) - 14% of traumatic incidents took place in childhood.</p>	<p>1. Revised Adult Attachment Scale (RAAS)¹⁸ -self report -dimensional (1) closeness and dependency merged (2) anxiety -can also be used to classify styles according to Ainsworth's categories; secure, preoccupied, dismissive, fearful.</p>	<p>1. The Harvard Trauma Questionnaire (HTQ)¹² - self report - chose the most traumatic event experienced in their lifetime</p>	<p>In particular, fearful (avoidant) attachment was associated with increased PTS symptoms.</p>
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What is the role of adult attachment patterns in the development of maternal acute stress symptoms following childbirth?

Relationship patterns, interpersonal experiences and maternal birth related stress symptoms.

Abstract

Research has identified that insecure attachment patterns are associated with post traumatic stress (PTS) symptoms following combat related trauma, interpersonal trauma and specific critical traumatic incidents e.g. accidents. One study has identified that insecure attachment patterns are also related to PTS symptoms following childbirth. All studies investigating the relationship between attachment patterns and PTS symptoms have measured attachment after the traumatic event occurred. This study aimed to identify whether adult attachment patterns influence mother's experiences of childbirth and whether attachment patterns are a predisposing factor for the development of acute stress symptoms. The sample comprised of 58 women recruited between 28 and 36 weeks gestation in the Harrogate area that completed self report questionnaires at two time points. The first questionnaires were completed antenatally to collect demographic information and assess attachment patterns. The second questionnaires were sent within 14 days of giving birth and gathered information about the participant's experience, specifically; emotions experienced during birth, perceptions of partner and staff support and presence of acute stress symptoms. Attachment anxiety, not attachment avoidance, was associated with greater acute intrusion symptoms and total acute symptoms. Younger age predicted greater acute intrusion symptoms and total acute symptoms. Attachment avoidance predicted lower levels of perceived staff support which were in turn associated with higher levels of acute avoidance symptoms and total acute stress symptoms. Findings provide preliminary support for insecure attachment patterns being a risk factor for acute stress symptoms.

1. Introduction

1.1. Post traumatic stress

Post traumatic stress disorder (PTSD) is an anxiety disorder that can occur following a traumatic event. It is characterised by persistent re-experiencing of the event, persistent avoidance of stimuli associated with the event, emotional numbing and increased arousal (Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revised (DSM-IV-TR); American Psychiatric Association (APA), 2004). Childbirth is experienced by some women as traumatic; it is suggested that 1-6% of women experience symptoms of post traumatic stress disorder within the first six postpartum months (Alcorn, Donovan, Patrick, Creedy, Devilly, 2010; Ayers & Pickering, 2001; Creedy, Shochet & Horsfall, 2000; Czarnocka & Slade, 2000; Leeds & Hargreaves, 2008; Soderquist, Wijma, Thorbert, Wijma, 2009).

However, PTSD is not an inevitable consequence following the experience of a traumatic event, childbirth or other (Paris, 2000). Research in the area of trauma has therefore investigated risk and resilience factors for the development of post traumatic stress (PTS) symptoms following a traumatic event. A research review summarised vulnerability factors for PTS symptoms into three categories; pre-trauma, peri-trauma, and post-trauma factors (Ozer, Best, Lipsey & Weiss, 2003). Pre-trauma factors are those present prior to the traumatic event, for example, prior trauma history and family history of psychopathology (Ozer et al., 2003). Peri-traumatic factors are those that occur during the trauma itself, for

example, perceived life threat during the traumatic event (fear), peritraumatic emotionality (high levels of emotion during or immediately after the event), peritraumatic dissociation (dissociative experiences during or immediately after the event) and trauma severity (Ozer et al., 2003). Post-trauma factors maintain distress following a traumatic event such as perceived lack of social support following the traumatic event (Ozer et al., 2003).

1.2. Post traumatic stress following childbirth

Research has identified numerous factors involved in the development of these symptoms following childbirth. Pre-trauma (where childbirth is viewed as the trauma) factors include a prenatal proneness to anxiety and previous mental health problems (Czarnocka & Slade, 2000; Keogh, Ayers, & Francis, 2002; Slade, 2006). Castle, Slade, Barranco-Wadlow and Rogers (2008) investigated first time parents' attitudes towards emotional expression. The authors found that a negative attitude towards expressing emotion could make it harder to ask for support and therefore individuals with a negative attitude might be less likely to get their support needs met after childbirth.

Edworthy, Chasey and Williams (2008) conducted a prospective study of the relationship between schemas (cognitive representations of events, people or the world) and PTS symptoms in first time mothers. They found post traumatic stress symptoms were significantly associated with negative appraisal of the

experience of birth and with pre-existing maladaptive schemas. The particular schema related to PTS symptoms was 'Impaired Limits' where women hold positive beliefs about themselves in relation to others. They are characterised by low frustration tolerance and difficulty co-operating with others. The authors suggest that childbirth may trigger this schema because it requires women to cooperate with others and share control of the birth process. The reality of childbirth may also challenge women's expectations and the views they hold about themselves. Factors during pregnancy such as depression in early pregnancy, a severe fear of childbirth and 'pre' traumatic stress (in relation to forthcoming delivery) in late pregnancy predict post traumatic stress symptoms 1 month post partum (Soderquist, Wijma, Thorbert & Wijma, 2009).

Peri-traumatic factors specific to the birth experience include stillbirth, delivery problems, higher levels of obstetric intervention, fear for self and baby, extreme pain, perceived lack of control, emotions during birth (both negative emotions and lack of positive emotions) and the unexpectedness of procedures (Ayers et al. 2007; Allen, 1998; Beck, 2004a; Creedy et al, 2000; Czarnocka & Slade, 2000; Leeds & Hargreaves, 2008; Nicholls & Ayers, 2007; Soet, Brack & Dilorio, 2003). One of the most consistent predictors of post traumatic stress after childbirth is women's subjective perception that care during labour was unsupportive or insensitive (Slade, 2006). Perceptions of feeling uncared for and themes regarding the quality of care have also emerged from qualitative studies (Allen 1998; Beck 2004a; Elmir, Schmied, Wilkes & Jackson, 2010; Nicholls & Ayers, 2007). Creedy et al. (2000) found that inadequate support during delivery

or feeling hurt or neglected by medical staff behaviour predicted levels of PTS symptoms. Two studies identified not only perceived lack of support from staff as a predictor of PTS symptoms but also perceived lack of support from partner (Czarnocka & Slade, 2000; Lemola, Stadlmayr & Grob, 2007). Perceived social support has been identified as a protective factor against distress in both mothers and fathers (Castle et al. 2008; Iles, Slade and Spiby, 2011).

1.3. Attachment and post traumatic stress

1.3.1. Rationale for attachment as a vulnerability factor

Attachment is an affectional bond between an individual and an attachment figure (usually a caregiver) (Bowlby, 2005). Such bonds between a child and their caregiver are centred on the child's need for safety, security and protection (Ainsworth, 1989). In conditions of perceived threat or danger, the attachment system is activated and the child seeks proximity with the primary caregiver in order to obtain protection and comfort, thus alleviating distress (Ainsworth, Blehar, Waters & Wall, 1978; Bowlby, 1980). Secure attachments develop when a caregiver is warm, responsive and sensitive to the child's needs (Bowlby, 1969). Insecure attachments are thought to develop when the child finds that interacting with the caregiver leads to rejection or conflict (Izard & Kobak, 1991). These early attachment experiences influence how individuals perceive themselves and others and are internalised as a working model which guides the expectations and evaluations of relationships throughout the life span (Bowlby, 1980, 1988).

Research has shown that attachment patterns contribute to the way individuals cope with anxiety, illness and stressful events. Individuals with secure attachment styles have been found to perceive themselves in a positive and coherent way, possess good problem solving skills, view stressful situations optimistically and believe that others will help them in times of need (Mikulincer & Florian, 1995). In contrast, individuals who have an insecure attachment style have been shown to have less confidence in their ability to cope with difficulties, have poorer problem solving skills, view difficult situations as less controllable and more threatening and tend to distrust others, and are more anxious, hostile and distressed in stressful situations (Kobak & Sceery, 1988; Shaver & Hazan, 1993). The influence of attachment patterns on factors known to increase the risk of PTS symptoms, namely, perceived social support, experiences of emotions and coping in stressful situations, highlight the importance of considering attachment patterns as a vulnerability factor for PTS symptoms.

1.3.2. Measurement of Attachment

Attachment patterns are thought to continue into adulthood (Bowlby, 1973) and have been found to be relatively stable from infancy into early adulthood (Hamilton, 2000; Waters, Merrick, Treboux, Crowell & Albersheim, 2000). Adult attachment is measured in two key ways; narrative assessment via interview and self report. Narrative measures identify adult representations of early attachment relationships and the meaning given to past experiences (Crowell & Treboux, 1995) whereas self report measures capture the way an individual feels about themselves in current adult relationships, including romantic

relationships. Early research used these measures to classify individuals into specific attachment 'styles' (Crowell, Fraley & Shaver, 1999; Hazan & Shaver, 1987). More recently however, two underlying continuous dimensions of adult attachment have been identified; anxiety (about abandonment and separation) and avoidance (of intimacy and dependency) (Brennan, Clark & Shaver, 1998; Fraley, Waller & Brennan, 2000). Dimensional measures calculate an individual's score on each of these dimensions.

1.3.3. Research findings

Insecure adult attachment has been consistently associated with post traumatic stress symptoms in war veterans (Dekel, Solomon, & Ginzburg, 2004; Ein-Dor, Doron, Solomon, 2010; Ghafoori, Hierholzer, Howespian & Boardman, 2008; Mikulincer, Florian & Weller, 1993), ex prisoners of war (Dieperink, Leskela, & Thuras, 2001; Kanninen, Punamaki & Qouta, 2003; Solomon, Dekel, & Mikulincer, 2008; Solomon, Ginzburg, Mikulincer, Neria and Ohry, 1998; Zakin, Solomon, & Neria, 2003) people living in life-endangering conditions or high threat conditions (Besser, Neria, Haynes, 2009; Mikulincer, Horesh, Eilati & Kotler, 1999) and war evacuees (Besser & Neria, 2010).

Studies investigating differences between attachment anxiety and attachment avoidance generally found that attachment anxiety was associated with higher levels of PTS symptoms than attachment avoidance (Besser et al 2009; Besser & Neria, 2011; Dekel et al., 2004; Ein-Dor et al. 2010; Mikulincer et al., 1993). Attachment avoidance however, was found to be associated with PTS

symptoms in ex prisoners of war (Dekel et al., 2004; Ein Dor et al, 2010; Kanninen et al., 2003; Solomon et al, 2008) and people living in high threat conditions (Mikulincer et al., 1993; Mikulincer et al., 1999). Attachment theory suggests anxiously attached individuals cope with stress by directing their attention towards distress and becoming hypervigilant to stress (Kobak & Sceery, 1988; Mikulincer, Florian & Tolmacz, 1990). This process is likely to increase their feelings of distress and might explain why attachment avoidance has been consistently associated with higher PTS symptom levels. Avoidantly attached individuals however, tend to use distancing coping strategies which may be helpful in a variety of everyday settings and perhaps even protect them to an extent in traumatic settings. However, when facing extreme and prolonged life-endangering situations, distancing is no longer an effective coping strategy thus exposing vulnerability and resulting in an increase in distress (Mikulincer & Florian, 1998). Being held captive and living with high threat of attack could be considered as more extreme and life-threatening than the experience of veteran groups who were not held captive, potentially explaining the different relationship between attachment avoidance and PTS symptoms in these specific populations.

A relationship between attachment and PTS symptoms has also been found in relation to interpersonal violence. Insecure attachment style is significantly related to PTS symptoms in victims of family violence (Stovall-McClough, Cloitre & McClough, 2008), women in violent relationships (Scott & Babcock, 2010), female college students (Sandberg, 2010; Sandberg, Sues & Heaton, 2009) and

a sample of male and female college students (Elwood & Williams, 2007). Similarly, insecure attachment is related to PTS symptoms in adults who were abused as children (Alexander, Anderson, Brand, Schaeffer, Grelling & Kretz, 1998; McCarthy & Taylor, 1999; Muller, Sicoli & Lemieux, 2000; Roche, Runtz & Hunter, 1999, Twaite & Rodriguez – Srednicki, 2004). Findings relating to the separate roles of attachment anxiety and attachment avoidance vary; some studies find support for attachment anxiety (Sandberg et al., 2009; Scott & Babcock, 2010), some find support for attachment avoidance (Sandberg, 2010) and some find no difference between the two (Elwood & Williams, 2007). These differences might be explained by differences in populations studied such as gender and nature of interpersonal violence experienced (chronic abuse within a relationship or a one off abusive attack, physical abuse or sexual abuse and whether the abuse took place in childhood or adulthood).

Research with populations who have experienced specific traumatic events support the findings discussed so far; that insecure adult attachment has a significant relationship with the development of PTS symptoms, particularly attachment anxiety. This was evident in two samples of Belgian security workers who had experienced violence at work in the previous year (Bogaerts, Daalder, Van Der Knaap, Kunst & Buschman 2008; Bogaerts, Kunst & Winkel, 2009), two samples of Belgian red cross workers (Declerq & Palmans, 2006; Declerq & Willemson, 2006), civilians after the 9/11 world trade centre attacks (Fraleigh, Fazzari, Bonanno & Dekel, 2006), a young student population (O'Connor &

Elklit, 2008) and people at an emergency room following a traumatic accident (Benoit, Bouthillier, Moss, Rousseau, & Brunet, 2010).

1.4. Attachment and post traumatic stress following childbirth

There is a paucity of research on the role of adult attachment as a predictor of PTS symptoms in parents following childbirth. Iles et al. (2011) recruited women within the first seven days postpartum and found that less secure attachment, perceptions of low partner support and dissatisfaction with partner support were associated with higher levels of PTS symptoms and depression in women during the first three months postpartum.

1.5. The current study

1.5.1. Rationale

While the body of research reviewed suggests a definite relationship between insecure attachment and PTS symptoms following trauma, studies were primarily cross sectional in nature and all, including those few that employed longitudinal designs, were conducted after the traumatic event had taken place. The types of trauma being measured were arguably of an unpredictable nature and therefore measurement prior to the event was not always possible, nonetheless no conclusions can be drawn about the causal nature of this relationship. The current study aims to expand previous methodologies by using

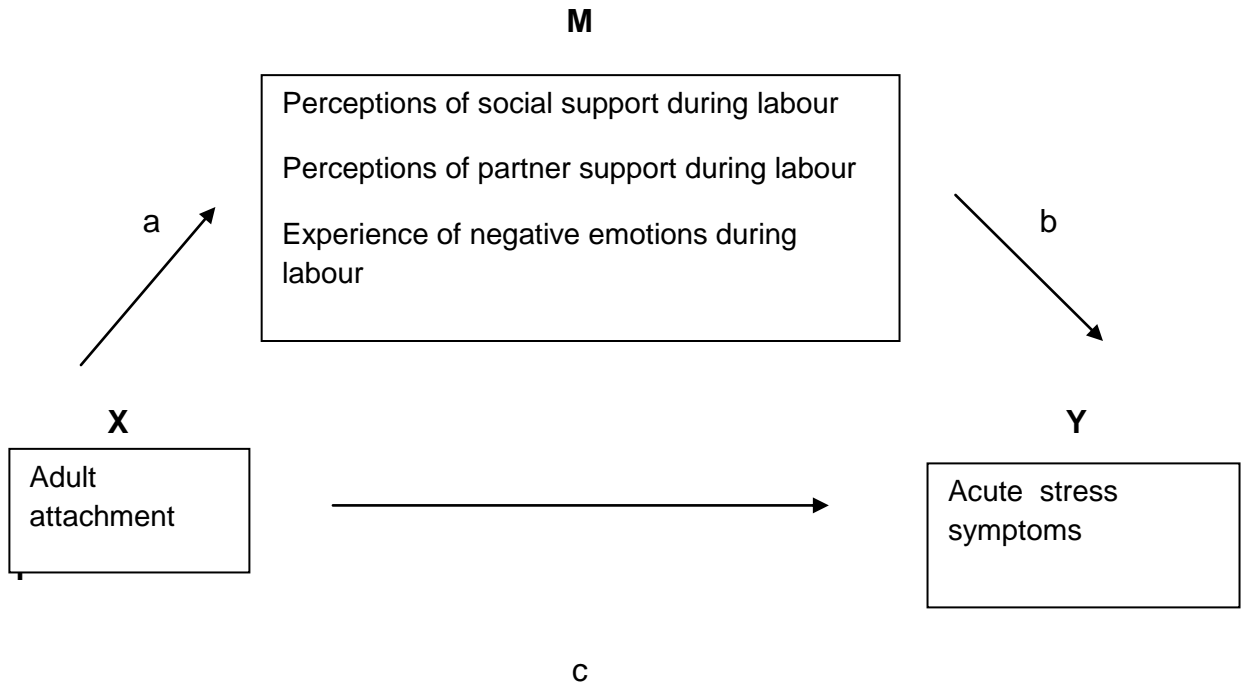
a prospective design with a predictable and potentially traumatic event; childbirth.

1.5.2. Aims and Hypotheses

This study aimed to identify whether adult attachment patterns influence mother's experiences of childbirth and whether attachment patterns are a predisposing factor for the development of acute stress symptoms following childbirth. The following hypotheses were explored;

1. Less secure attachment will be associated with experiencing higher levels of negative emotions during labour and birth
2. Less secure attachment will be associated with lower levels of perceived support from partner during labour and birth
3. Less secure attachment will be associated with lower levels of perceived support from staff during labour and birth
4. Less secure attachment will be associated with higher levels of acute stress symptoms following childbirth
5. Experience of negative emotions, perceptions of partner support and perceptions of staff support during labour and birth may mediate the relationship between attachment security and symptoms of acute stress as shown in Figure 1.

Figure 1: Proposed Model of the relationship between adult attachment and acute stress symptoms (based on Baron and Kenny's (1986) model of mediation)



2. Method

2.1. Design

This study utilised a prospective within-subjects design. Data were collected by self-report questionnaires at two different time points; 1) 28 weeks – 36 weeks gestation and 2) within 14 days of birth (actual completion took place between 3 and 23 days post birth, mean = 10.10 days, S.D. 4.92 days).

2.2. Participants

Participants were first time mothers in their third trimester (weeks 28-42 of pregnancy) receiving NHS maternity care from Harrogate and District NHS Foundation Trust. Inclusion criteria for the study were;

- Women over the age of 18
- In a continuing relationship
- Expect their partner to be present for at least some of the labour and/ or birth
- Sufficient knowledge of the English language to complete the questionnaires

Exclusion criteria for the study were;

- Births planned to be by elective caesarean (because labour would not be experienced)
- Women who have previously experienced a miscarriage or termination of pregnancy at more than 18 weeks (due to its resemblance to labour)
- Women who were currently under care of a Psychiatrist for the management of severe and enduring mental health problems (because they would have

been more likely to experience difficulties with existing mental health problems following birth).

In addition, for ethical reasons, women who were recruited and completed the first questionnaires were not asked to continue with the study if they experienced a stillbirth or neonatal death or if their baby required special care for more than 24 hours. The cut off of 24 hours was also chosen to ensure that data collected following birth reflected accurately the experience of birth and not the experience of having a baby in a special care unit.

2.3. Procedure

Women between 28 weeks and 36 weeks gestation were approached either via community midwives at antenatal clinic appointments or by the researcher at antenatal classes. Eligible women identified by midwives at clinic appointments were given an information sheet (Appendix D) about the study and gave consent (and contact details) to be contacted by the researcher to discuss participation further (Appendix E2). The researcher collected details of women who had consented to this and contacted them to discuss the project and establish their decision about taking part. Recruitment at antenatal classes took place over two consecutive classes; the researcher visited the first week of classes to introduce the project in person, give out information sheets and answer any questions. She then attended the same class a week later to recruit, thus allowing time for potential participants to consider the information provided.

Women who consented to take part in the study chose whether to receive questionnaires by post, which included a prepaid envelope to return the forms, or by email with a link to the questionnaires and consent form online (44.83% post, 55.17% email). The first set of questionnaires collected demographic information and asked women about their experiences in relationships. In order to know when to send the second questionnaires, the researcher contacted a ward clerk at Harrogate District Hospital a minimum of twice per week to find out which women had given birth and confirm that these women satisfied the criteria for continuing in the research. Women eligible to continue were sent the second set of questionnaires within a week of giving birth. The second set of questionnaires asked about their experience of giving birth. If responses had not already been received, participants were sent reminders approximately a week after measures were sent; by text for those participants returning hard copies by post, and by email for those completing the online measures.

2.4. Ethical Considerations

Participants completed a consent form (Appendix E1) to indicate that they had read the information sheet, understood what was involved in the study, understood that their participation was voluntary, that they could withdraw at any point without their care being compromised and that they were willing to take part. Women were encouraged to discuss any concerns about their emotional wellbeing during the course of the study with their midwife or health visitor providing their care.

This project was submitted to and approved by the University of Sheffield and Leeds East NHS research ethics committees (see Appendix C). NHS research and clinical governance approval was gained from North and East Yorkshire Alliance R&D Unit.

2.5. Measures

2.5.1. Time point 1

2.5.1.1. Demographic information

Information about age, education, occupation, relationship status, prior mental health difficulties and prior experience of trauma was collected at time point 1. To assess for prior mental health difficulties participants were asked whether they had ever consulted their General Practitioner for problems with sleep or mental health difficulties and if so, whether they received any treatment. Three questions regarding prior experience of trauma were asked to determine the presence of any pre-existing symptoms of post traumatic stress. These questions corresponded to the DSM-IV (APA, 1994) criteria of posttraumatic stress disorder, based on a structured clinical interview (SCID I – PTSD screening module, First, Spitzer, Gibbons & Williams, 1996). The questions did not require the participants to give any detail about the event (see Appendix F1).

2.5.1.2. Adult attachment patterns

Attachment was assessed using the Experience in Close Relationships Scale – Revised (ECR-R; Fraley et al., 2000). This scale has 36 items and measures

attachment on two continuous dimensions; anxiety (18 items) and avoidance (18 items). Responses are given on a Likert scale from 1 to 7, 'strongly disagree' to 'strongly agree'. The items can be modified to address a relationship with a specific person e.g. mother, boyfriend, spouse etc. or can just refer to 'others', as in this study (see Appendix F2). Sibley and Liu (2004) assessed the psychometric properties of this measure and found high internal reliabilities for the anxiety (alpha = 0.95) and avoidance (alpha = 0.93) scales. The present study found satisfactory Cronbach's alpha statistics for anxiety (0.88) and avoidance (0.76).

2.5.2. Time point 2

2.5.2.1. Birth Information

Information was collected about births including gestation, whether women were induced, length of labour, presence of partner during labour and birth, mode of delivery, pain relief and whether women had an episiotomy. To determine their perceptions of labour as traumatic or not, participants were asked two questions that corresponded with Criteria A1 and A2 of the PTSD diagnostic criteria (DSM-IV-TR; APA, 2004); 'From your perspective was there any risk of serious injury to you or your baby at any point during labour?' and 'Did you experience feelings of fear, horror or helplessness at any point during labour?' (see Appendix F3).

2.5.2.2. Experience of labour

The Experience of Birth Scale (Slade, MacPherson, Hume & Maresh, 1993) is a 10 item measure of women's personal experience of birth, consisting of 5 positive and 5 negative feelings. Participants rated how much each feeling was present during labour and birth on a scale from 1 (not at all) to 10 (extremely). In this study, scores on the positive items were reversed and summed with negative items to create one score representing total negative emotions (alpha = 0.82).

2.5.2.3. Experience of partner support

Three questions to assess how women felt about support from their partner during labour and birth were developed for this study. The questions asked participants for a satisfaction rating from 1 to 5 about emotional support, practical support and overall support. Scores on each question were summed to create a total partner support score (alpha = 0.80).

2.5.2.4. Experience of staff support

The Perceptions of Labour and Delivery Scale (PLDS; Czarnocka & Slade, 2000) contains 23 items and assesses three factors about the experience of labour and delivery; perceptions of staff support, pain and fear. Participants rated their response to each question on a scale from 1 (not at all) to 10 (extremely). Internal reliabilities of these three subscales have been shown to be satisfactory with Cronbach's alphas of 0.81, 0.87 and 0.78 respectively

(Bailham, Slade & Joseph, 2004). Seven items form the staff support subscale (items 6, 7, 14, 16, 17, 18 & 23), four form the pain subscale (items 2, 3, 4 & 5) and four form the fear subscale (items 8, 9, 10 & 11). The remaining 8 items were not analysed. Cronbach's alphas were satisfactory for all three subscales, staff support (0.76), pain (0.77), fear (0.84).

2.5.2.5. Acute stress symptoms

Participants completed the Impact of Events Scale (IES, Horowitz, Wilner & Alvarez, 1979). The IES is a 15 item self-rated questionnaire that measures the presence and magnitude of symptoms of avoidance and intrusions and reflects the intensity of these acute stress symptoms. Labour and childbirth were specified as the event. A score of 19 or more on either dimension is thought to indicate clinically significant distress (Joseph, 2000). The IES shows good internal consistency ($\alpha = 0.86$ for intrusion and 0.90 for avoidance) (Corcoran & Fischer, 1994) and in the current study were 0.80 for intrusion, 0.83 for avoidance and 0.86 for total scores. The IES has been revised to include a measure of hyperarousal (IES-R; Weiss & Marmar, 1997), however, it is suggested that the original version is psychometrically stronger in measuring postnatal post traumatic stress (Olde, Kleber, van der Hart & Pop, 2006). Furthermore, many of the additional hyperarousal items are of a general nature rather than being related directly to the traumatic experience for example, 'I felt irritable and angry' and 'I had trouble concentrating'. In the case of labour and birth, responses to these items might detect aspects of being a new mother not

necessarily related to the experience of labour and birth. Additionally, the shorter length of the IES was appropriate for the current study as efforts were made to keep the length of the measure sets to a minimum in order to maximise participation. Table 1 provides a summary of the measures described previously and the time point at which they were administered.

Table 1: Summary of measures administered at time point 1 and 2

Time point 1 (antenatal)	
Variable	Measure
Demographic information	Age, level of education, occupation, relationship status, prior mental health difficulties and prior experience of trauma
Adult attachment	Experiences in Close Relationships-Revised
Time point 2 (7 – 14 days following childbirth)	
Birth Information	Gestation, induced, length of labour, presence of partner during labour and birth, mode of delivery, pain relief and episiotomy. Two questions that corresponded with Criteria A1 and A2 of the PTSD diagnostic criteria
Experience of labour	The Experiences of Birth Scale
Experience of partner support	Three satisfaction ratings about emotional support, practical support and overall support.
Experience of staff support	The Perceptions of Labour and Delivery Scale
Acute stress symptoms	Impact of Event Scale

2.6. Power analysis

An a-priori power analysis using G-Power (Faul, Erdfelder, Lang & Buchner, 2007) was conducted based on analysing four predictors, with a two tailed alpha level of 0.05, and a medium effect size of $R^2 = 0.13$ for a hierarchical multiple regression analysis. The analysis showed that a sample size of 85 was required to achieve 80% power. Post-hoc power analyses showed that the current study sample of 58 participants achieved 82% power with a medium effect size.

2.7. Statistical analysis

Correlation analyses were used to determine relationships between less secure attachment and negative emotions during labour and birth (Hypothesis 1), partner support during labour and birth (Hypothesis 2), perceived staff support during labour and birth (Hypothesis 3) and acute stress symptoms (Hypothesis 4). Hierarchical regression analyses were used to determine the predictive value of less secure attachment to negative emotions during birth, staff support during labour and birth and acute stress symptoms. Lastly, the experience of negative emotions, perceptions of partner support and perceptions of staff support during labour and birth were investigated as potential mediators of the relationship between attachment security and symptoms of acute stress.

3. Results

Characteristics of the sample will be presented first and compared between responders and non responders at time point 2. Associations between demographic characteristics, birth factors and the dependent variables will be presented, first in relation to experiences of labour (specifically women's experiences of negative emotions, partner support and staff support during labour and birth) and second in relation to acute stress symptoms. Associations between attachment anxiety, attachment avoidance and the dependent variables will then be explored. These data will also be considered first in relation to experiences of labour, and second in relation to acute stress symptoms. Lastly, implications of the findings for the hypothesized mediational model will be considered.

3.1. Sample characteristics

Table 2 outlines the characteristics of the sample. Comparative data for births of all parities at Harrogate District Hospital show induction rates to be 23.1%, caesarean rates to be 25.5%, and instrumental delivery to be 16.2% (BirthChoiceUK data).

Table 2: Characteristics of sample (n=58)

Age		21- 43 years (mean 30.78)
Marital Status	Married	Frequency (Percentage) 39 (67.20)
	Cohabiting	17 (29.30)
	Missing	2 (3.40)
Highest Level of Education	Graduate or Postgraduate	43 (74.10)
	Below graduate level	15 (25.90)
Previously consulted General Practitioner for sleep/ mental health difficulties	Yes	13 (22.40)
	No	45 (77.60)
Previously consulted a Psychiatrist	Yes	2 (3.40)
	No	56 (96.60)
Prior experience of traumatic event as measured during pregnancy	Yes	13 (22.40)
	No	45 (77.60)
For those who answered yes (n=13)		
- Q2 Nightmares, flashbacks or thoughts	Yes	5 (38.46)
	No	8 (61.54)
- Q3 Upset by reminders	Yes	7 (53.85)
	No	6 (46.15)
- Yes to Q1, Q2 and Q3		1 (7.69)
- Yes to Q1 and Q2 or Q3		11 (84.62)
- Yes to Q1 only		1 (7.69)
Birth characteristics		Mean (S.D.)
Gestation at birth		39.93 weeks (1.26) 37 – 42 weeks

Length of labour		17.08 hours (17.18) 1 – 45 hours
		Frequency (Percentage)
Induction		20 (34.50)
Method of delivery	Unassisted vaginal	33 (56.90)
	Assisted vaginal (forceps, ventouse)	13 (22.40)
	Emergency c-section	12 (20.70)
Episiotomy		14 (24.10)
Pain relief	Gas and air	29 (50.00)
	Pethidine	23 (39.70)
	Epidural	30 (51.70)
	Alternative	18 (31.00)
	None	1 (1.70)
Partner present during labour	All of it	46 (79.30)
	Most of it	7 (12.10)
	Some of it	3 (5.20)
	Not at all	2 (3.40)
Partner present during birth	All of it	54 (93.10)
	Most of it	2 (3.40)
	Not at all	2 (3.40)
Perceived risk of serious injury to self/ baby	Yes	12 (20.70)
	No	46 (79.30)
Experienced feelings of fear, horror or helplessness	Yes	26 (44.80)
	No	32 (55.2)
Perceived risk of serious injury to self/ baby AND Experienced feelings of fear, horror or helplessness		8 (13.80)

Scales (range of scores)	Mean (S.D.)
T1 Attachment Anxiety total (18 – 126)	46.16 (19.42)
T1 Attachment Avoidance total (18 – 126)	61.16 (18.70)
T2 Partner support (1 – 5) (1 – 5) (1 – 5) (3 – 15)	Practical Emotional Overall Total
	4.82 0.39 4.67 (0.96) 4.74 (0.95) 14.57 (0.89)
T2 IES total (0 – 35) (0 – 40) (0 – 75)	Intrusion Avoidance Total
	8.24 (6.79) 4.12 (6.02) 12.36 (10.96)
T2 EBS total (5 – 50) (5 – 50) (10-100)	Positive Emotions Negative emotions Total negative emotions
	28.41 (11.16) 28.17 (7.92) 54.55 (16.19)
T2 PLDS (4 – 40) (4 - 40) (7 – 70)	Fear Pain Staff support
	20.11 (8.24) 25.21 (7.02) 53.63 (9.51)

PLDS = Perceptions of Labour and Delivery Scale

EBS = Experiences of Birth Scale

IES = Impact of Events Scale

3.2. Data Screening

Fifty eight participants successfully completed questionnaires at both time points. Ten participants did not complete time point 2 questionnaires, and seven participants were not sent time point 2 questionnaires due to their babies requiring special care for more than 24 hours.

Visual inspection and statistical methods were used to determine whether the data was normally distributed. Histograms and Kolmogorov-Smirnov statistics showed that four of the outcome measures were not normally distributed; IES avoidance scores, IES total scores, total partner support scores and PLDS staff support scores (see Appendix G1 for histograms and normality statistics). IES

avoidance and total scores were positively skewed towards 0 which is not unexpected because most women do not suffer from acute stress symptoms following childbirth. Log transformations were carried out on all three IES scores; intrusion, avoidance and total. The transformations successfully changed IES total scores to be normally distributed, however, IES avoidance scores remained not normally distributed and IES intrusion scores became not normally distributed (Appendix G2). Transformation of IES data therefore, did not improve the distribution of scores and the original distributions were retained. Non-parametric statistics were used for all analyses involving IES avoidance and IES total scores.

Total partner support scores were not normally distributed because all participants who took part in the study reported satisfaction with the support provided by their partners during labour and birth, creating a ceiling effect. Non-parametric statistics were therefore used for all analyses involving partner support scores.

Staff support scores were negatively skewed however, visual inspection of staff support data showed that the distribution followed a normal distribution curve and the negative skew simply reflected the findings that the sample reported on average, high levels of perceived staff support (see Table 2). Kolmogorov-Smirnov statistics also indicated that age and attachment anxiety were not normally distributed (see Appendix G3 for histograms and normality statistics).

Visual inspection revealed that the distribution for age would likely be normal were it not for a large number of participants aged 31. Given the population being studied, this finding is not unexpected and reflects the age of first time mothers in this cohort. That attachment anxiety was not normally distributed reflects the low levels of attachment anxiety that were reported on average, and the large amount of variation in these scores (see Table 2).

It is also possible that these scales were not normally distributed due to the small participant numbers in this sample. Transforming data to create normal distributions is associated with difficulties in interpretation. Considering the issues around expected bias in the sample, sample size and interpretation of findings following transformation of data, the decision was made to accept age, attachment anxiety and staff support data as normal for analysis and findings will be interpreted with caution, particularly in relation to generalisability to other populations.

3.3. Comparisons between responders and non responders at time point 2

T-tests and Fisher's exact tests were used to explore whether there were any differences in characteristics (age, marital status, level of education, previous consultation with GP for mental health problems and treatment, previous

consultation with psychiatrist, reported prior experience of traumatic event²³, attachment anxiety scores and attachment avoidance scores) between responders (n = 58) and non-responders (n = 10) at time point 2. The only dimension of significant difference concerned level of education. Women who did not respond at time point 2 were significantly less likely to have completed a graduate or postgraduate degree (Fisher's p = 0.01). The limited differences suggest that the final sample were reasonably representative of the whole sample. See Appendix G4 for a summary of these findings.

3.4. Associations between demographic characteristics, birth factors and dependent variables

Only two participants had previously consulted a Psychiatrist, this number is too small to make statistical inferences so this variable was not included in any of the following analyses. The two participants had also consulted their GP for problems with mental health so their experiences are captured in the analyses of GP consultation.

3.4.1. Experience of labour and birth

3.4.1.1. Negative emotions experienced during birth

Negative emotions during birth were measured by the fear subscale of the PLDS (PLDS-fear), the pain subscale of the PLDS (PLDS-pain), EBS-negative total

²³ Measured by reports that participants had 1) experienced a 'life threatening situation, such as a major disaster, a serious accident, being physically assaulted, or hearing about or witnessing something horrible that has happened to someone close to you' and 2) was accompanied by 'nightmares, flashbacks or thoughts that people can't get rid of' and/ or 'being very upset when in a situation that reminded them of the terrible event'.

scores (calculated from total scores on 5 items of the negative emotion items summed with total reverse scores of the positive emotion items). Pearson's correlations and t-tests were conducted to determine relationships between demographic characteristics, birth factors and negative emotions experienced during birth.

Reported prior experience of traumatic event²³ was associated with higher levels of PLDS-fear ($t = 2.65$, $p = 0.005$) but not with PLDS-Pain or EBS-negative total. Length of labour was significantly positively correlated with scores on PLDS-fear ($r = 0.23$, $p = 0.043$) but not with PLDS-Pain or EBS-negative total. Unassisted vaginal births were associated with lower levels of EBS-negative total ($t = 2.19$, $p = 0.017$), PLDS-fear ($t = 2.68$, $p = 0.005$) and PLDS-pain ($t = 1.73$, $p = 0.043$). Having an epidural was associated with higher levels of PLDS-fear ($t = 2.49$, $p = 0.016$) but not with EBS-total and PLDS-pain.

No significant associations were found between age, marital status, level of education, previous consultation with GP, reported prior experience of traumatic event²³, being induced, having an episiotomy and scores on PLDS- fear, PLDS-pain or EBS-negative total (see Appendix G5).

3.4.1.2. Perceived partner support during labour and birth

Women who had an epidural reported lower levels of perceived partner support ($U = 292.50$, $z = -2.21$, $p = 0.027$). No significant associations were found between age, marital status, level of education, previous consultation with GP, reported prior experience of traumatic event²³, being induced, length of labour, mode of delivery, having an episiotomy and perceptions of partner support (see Appendix G6).

3.4.1.3. Perceived staff support during labour and birth

Pearson's correlations and t-tests showed no significant associations between age, marital status, level of education, previous consultation with GP, reported prior experience of traumatic event²³, being induced, length of labour, mode of delivery, having an episiotomy, pain relief, and perceived staff support (see Appendix G7).

3.4.2. Acute stress symptoms

Pearson's correlations and Spearman's Rho correlations identified that age was negatively associated with symptoms of acute stress following childbirth, for IES intrusion ($r = -0.38$, $p = 0.002$) and IES total scores ($r = -0.35$, $p = 0.008$). As age increased, IES intrusion and IES total scores decreased.

No significant associations were found between marital status, level of education, previous consultation with GP, previous incidence or experience of

trauma²³, being induced, length of labour, mode of delivery, having an episiotomy, pain relief and symptoms of acute stress (see Appendix G8) .

3.5. Relationships between attachment anxiety, attachment avoidance and dependant variables

3.5.1. Experience of labour and birth

3.5.1.1. Negative emotions during labour and birth

To test hypothesis 1 that less secure attachment will be associated with higher levels of negative emotions during labour and birth, Pearson's correlations were conducted for attachment anxiety, attachment avoidance, PLDS-fear, PLDS-pain and EBS-negative total and are summarised in Table3.

Scores on attachment anxiety and attachment avoidance were not significantly associated with scores on PLDS-pain or EBS-negative total, therefore no further analysis was conducted between these variables. While attachment avoidance did not significantly correlate with PLDS-fear, higher scores of attachment anxiety were significantly associated with higher scores on PLDS-fear ($r = 0.39$, $p = 0.002$).

Table 3: Correlations between attachment, negative emotions during childbirth, perceived partner support and perceived staff support during childbirth and acute stress symptoms

		Experience of negative emotions (T2)			Perceptions of support (T2)		Acute stress symptoms (T2)		
		PLDS- Fear	PLDS- Pain	EBS neg total	Partner support	PLDS- Staff	IES intru- sion	IES avoid	IES total
Attachment (T1)	anxiety	.39**	-.10	.15	.03	-.10	.25*	.18	.22*
	Avoid	.10	-.00	.18	.05	-.31**	-.03	.12	.01
Experience of negative emotions (T2)	PLDS- Fear	-	.41**	.40**	-.09	.19	.29*	.28*	.31**
	PLDS- Pain	-	-	.57**	-.17	-.23*	-.04	.18	.06
	EBS- neg. Total	.-	-	-	-.10	-.54**	.26*	.38**	.31**
	Partner support	-	-	-	-	.11	.11	-.05	.02
Perception of support (T2)	PLDS- Staff support	-	-	-	-	-	-.14	-.31*	-.11

PLDS = Perceptions of Labour and Delivery Scale

EBS = Experiences of Birth Scale

IES = Impact of Events Scale

*. Correlation is significant at the 0.05 level (1-tailed).

** . Correlation is significant at the 0.01 level (1-tailed).

Hierarchical regression analysis was used to explore whether attachment anxiety accounted for a significant proportion of the variance in PLDS- fear over and above other variables significantly associated with PLDS-fear, namely reported prior experience of traumatic event at time point 1 (T1) and length of labour, mode of delivery, pain relief and PLDS-pain at time point 2 (T2). The variables were entered into the regression model in the following order;

Block 1: Prior experience of traumatic event (T1)

Block 2: Length of labour (T2)

Mode of delivery (T2)

Pain relief (T2)

PLDS-pain (T2)

Block 3: Attachment anxiety (T1)

Block 1 explained 11.30% of the variance in PLDS-fear scores, $F(1, 55) = 7.04$, $p = 0.01$. Block 2 explained a further 22.80% of the variance in PLDS-fear scores, $F \text{ change}(4, 51) = 4.40$, $p = 0.004$. Block 3 predicted an additional 11.60% of the variance, $F \text{ change}(1, 50) = 10.72$, $p = 0.002$. Attachment anxiety therefore does help to explain the variance in PLDS-fear scores when other significant variables have been controlled for. See table 4 for a summary of the regression model.

Table 4: Summary of regression model for PLDS-fear

	Unadjusted change	R² F	P
Step 1	.113	7.04	.010**
Step 2	.228	4.40	.004**
Step 3	.116	10.72	.002**
Overall model		7.02	.0001**

PLDS = Perceptions of Labour and Delivery Scale

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

Model parameters for the final regression model showed that PLDS-pain and Attachment anxiety both make a significant contribution to the model, and do so in equal amounts, suggesting they are equally important in predicting PLDS-fear scores, see Table 5.

The assumptions of this regression model were checked. The Durbin-Watson statistic tests whether the assumption of independent errors is acceptable, the closer the value is to 2, the better but as a general rule values between 1 and 3 are acceptable (Field, 2000). For this regression model, the value was 1.96 a value very close to 2 and therefore met the assumption that residuals in the model are independent. Colinearity statistics indicated no colinearity in the data entered in the regression model. Linearity, homoscedasticity, and normality of the data were examined using plots of residual values and these assumptions were met. This model therefore appears accurate and robust.

Table 5: Model parameters for final regression model for PLDS-fear

		B	S.E.	Beta	T	P
Step 1	Prior experience of traumatic event	3.51	2.37	.17	1.48	.14
Step 2	Length of labour	.02	.05	.04	.37	.71
	Mode of delivery	2.47	2.44	.15	1.01	.32
	Pain relief	2.39	2.48	.15	.96	.34
	PLDS-Pain	.43	.13	.37	3.39	.001**
Step 3	Attachment anxiety	.16	.05	.37	3.27	.001**

PLDS = Perceptions of Labour and Delivery Scale

* Significant at the 0.05 level

** Significant at the 0.01 level

3.5.1.2. Perceptions of partner support during birth

Neither attachment anxiety nor attachment avoidance were significantly correlated with perceived levels of partner support, as can be seen in Table 3. Therefore, hypothesis 2 that predicted less secure attachment would be associated with lower levels of perceived support from partner during labour and birth, was not supported and was not investigated further.

3.5.1.3. Perceptions of staff support during birth

In accordance with hypothesis 3, scores on attachment avoidance were significantly negatively correlated with staff support scores ($r = -0.31$, $p = 0.01$); higher scores of attachment avoidance were associated with lower scores of

perceived staff support. Attachment anxiety however, was not associated with staff support scores (see Table 3).

Hierarchical regression analysis was used to explore whether attachment avoidance accounted for a significant proportion of the variance in PLDS-staff support over and above other variables significantly associated with PLDS- staff support, namely EBS-negative total and PLDS-pain at T2. The variables were entered into the regression model in the following order;

- Block 1: EBS-total (T2)
(negative relationship with PLDS-staff support)
- PLDS-pain (T2)
(negative relationship with PLDS-staff support)
- Block 2: Attachment avoidance (T1)
(negative relationship with PLDS-staff support)

Block 1 explained 30.10% of the variance in PLDS-staff support scores, $F(2, 54) = 11.62, p = 0.0001$. Block 2 explained a further 6% of the variance in PLDS-staff support scores, $F \text{ change}(1, 53) = 5.02, p = 0.029$. Attachment avoidance therefore does help to explain variance in PLDS- staff support scores when other significant variables have been controlled for. See table 6 for a summary of the regression model.

Table 6: Summary of regression model for PLDS-staff support

	Unadjusted R²	F	P
	change		
Step 1	.301	11.62	.0001**
Step 2	.060	5.02	.029*
Overall model		9.99	.0001**

PLDS = Perceptions of Labour and Delivery Scale

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

Model parameters for the final regression model showed that while EBS-negative total and attachment anxiety both make a significant contribution to the model, it appears that when all other variables are held constant, EBS-negative total might be slightly more important in predicting staff support than attachment anxiety, see Table 7.

In this model, the Durbin-Watson statistic was 1.47 which is acceptable and suggests that residuals in the model are independent. Colinearity statistics indicated no colinearity in the data entered in the regression model. In an ordinary sample 95% of cases are expected to have standardized residuals between +2 and -2 (Field, 2000). Three cases (5%) in the current regression model had standardized residuals outside +/-2 which to be expected in an ordinary sample. Linearity, homoscedasticity, and normality of the data were checked using plots of residual values and these assumptions were met.

Table 7: Model parameters for final regression model for PLDS-staff support

		B	S.E.	Beta	T	p
Step 1	EBS- negative total	-.35	.08	-.57	-.42	.001**
	PLDS-pain	.14	.18	.10	.75	.46
Step 2	Attachment avoidance	-.13	.06	-.25	-2.25	.03*

PLDS = Perceptions of Labour and Delivery Scale

* Significant at the 0.05 level

** Significant at the 0.01 level

3.5.2. Acute stress symptoms following birth

Higher attachment anxiety scores were associated with higher scores of IES intrusion symptoms and IES total symptoms. Attachment avoidance was not significantly correlated with any IES scores, only partially supporting predictions in Hypothesis 4 (that less secure attachment would be associated with higher levels of acute stress symptoms) (see Table 3 for correlations). Therefore, further analysis on the relationship between attachment avoidance and IES scores was not conducted.

Two hierarchical regression analyses were conducted to explore whether attachment anxiety accounted for a significant proportion of the variance in firstly, IES intrusion scores and secondly, IES total scores at T2 over and above other significant variables; age at T1 and EBS-total, PLDS- fear at T2. Variables were entered into both regression models as follows;

- Block 1: Age (T1)
(negative relationship with IES intrusions scores and IES total scores)
- Block 2: EBS-total (T2)
PLDS-fear (T2)
- Block 3: Attachment anxiety (T1)

Block 1 explained 14.50% of the variance in IES intrusion symptoms, $F(1, 55) = 9.32$, $p = 0.003$. Block 2 explained a further 6.30% of the variance in IES intrusion scores, but this change was not significant F change $(2, 53) = 2.09$, $p = 0.134$. Block 3 predicted an additional 0.40% of the variance, this change was also not significant F change $(1, 52) = 0.27$, $p = 0.603$. Attachment anxiety therefore did not significantly predict IES intrusion scores.

Block 1 explained 7.40% of the variance in IES total symptoms, $F(1, 55) = 4.42$, $p = 0.04$. Block 2 explained a further 14.1% of the variation in IES total scores, $F(2, 53) = 4.78$, $p = 0.012$. Block 3 predicted no further variation in IES total scores, $F(1, 52) = 0.00$, $p = 0.95$. Attachment anxiety therefore did not predict IES total scores. See table 8 for a summary of IES regression models.

Table 8: Summary of regression analysis for IES intrusion and IES total

	Unadjusted change	R² F	P
IES intrusion			
Step 1	.145	9.32	.003**
Step 2	.063	2.09	.134
Step 3	.004	0.27	.603
Overall model		3.49	.013**
IES total			
Step 1	.074	4.42	.040*
Step 2	.063	2.09	.134
Step 3	.000	0.00	.950
Overall model		3.58	.012*

IES = Impact of Event Scale

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

3.6. Implications of the findings on a mediational model

Hypothesis 5 predicted that the relationship between insecure attachment and acute stress symptoms would be explained through a mediational model (based on Baron and Kenny, 1986). Findings from the current study indicate that attachment anxiety and attachment avoidance are associated with different types of acute stress symptoms and different types of potential mediating variables. The two key pathways that emerged from the data will be considered further to determine whether they satisfy the requirements of a mediational

model. Figure 2 displays the relationships found for attachment anxiety and Figure 3 displays the relationships found for attachment avoidance.

Figure 2: Potential mediational model between attachment anxiety and acute stress symptoms

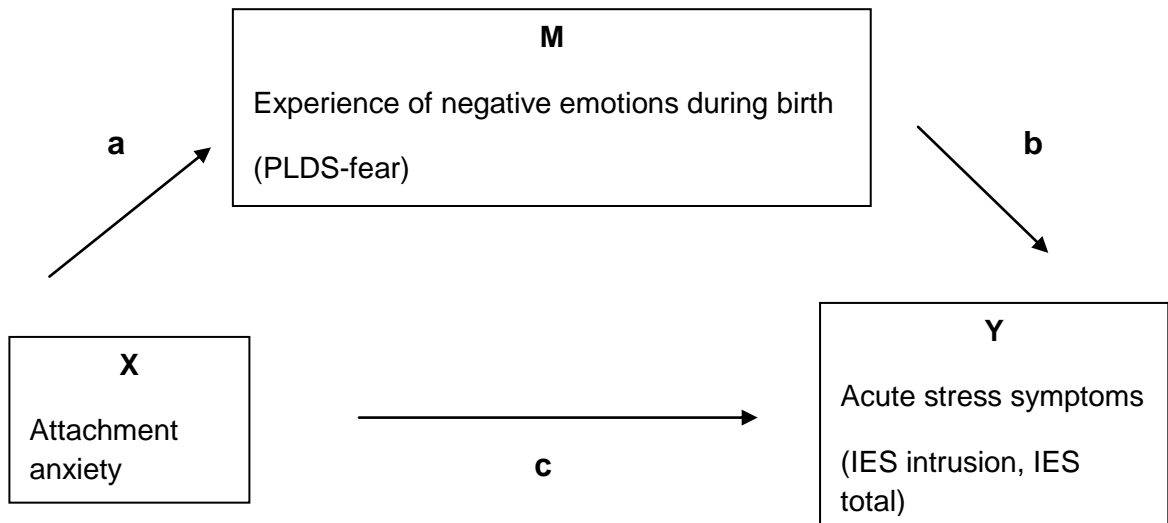
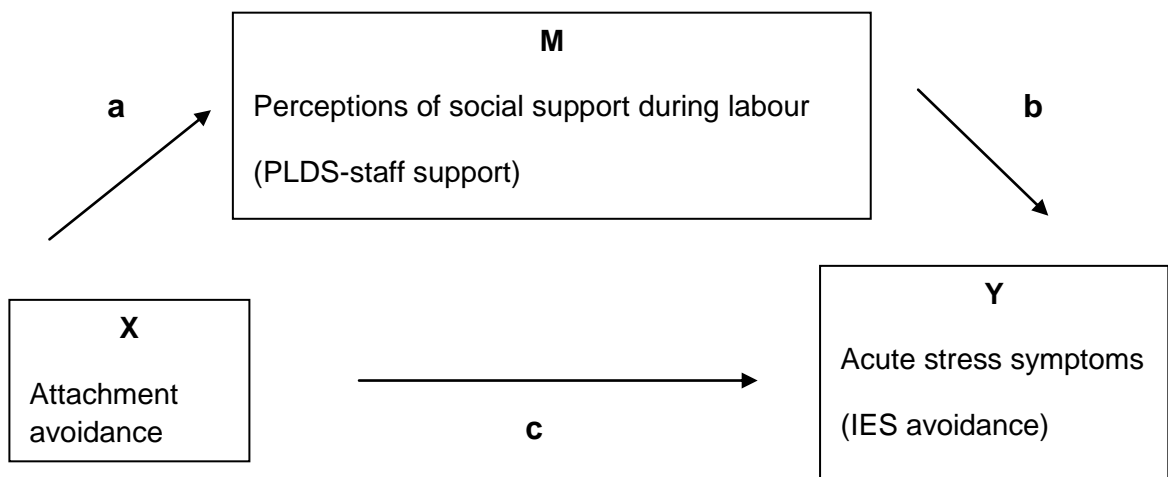


Figure 3: Potential mediational model between attachment avoidance and acute stress symptoms



Baron and Kenny (1986) specify the use of a series of regression analyses to test a mediational model and show that; 1) X predicts Y (path c), 2) X predicts M (path b), 3) M predicts Y (path a). Mediation is indicated when the effect of X on Y, when controlling for M, is zero. If the coefficient is larger than zero but smaller than in the direct regression (path c) then partial mediation is present. In the current study, the first stage of mediation analysis, to show that X predicts Y (path c), was not satisfied for the model shown in Figure 2 as attachment anxiety did not significantly predict IES intrusion or IES total scores in regression analyses or for the model shown in Figure 3 as attachment avoidance did not even significantly correlate with IES avoidance scores, let alone predict them. That there is no effect between X and Y to be mediated means that the current findings cannot be understood through a mediational model, and so Hypothesis 5 is not supported.

4. Discussion

This study had two key aims; first to identify whether adult attachment patterns influenced mothers' experiences of childbirth in terms of negative emotions experienced, perceptions of partner support and perceptions of staff support during labour and birth. Second, it aimed to explore whether attachment patterns predicted the experience of acute stress symptoms following childbirth and could therefore be seen as a predisposing factor.

Prior to considering the main hypotheses, implications of associations between demographic factors and acute stress symptoms will be considered. Age was found to significantly predict acute stress symptoms, specifically intrusion symptoms and total symptoms, that is younger age was associated with greater levels of symptoms. While age has been identified as a predictor of post traumatic stress symptoms in non childbirth related trauma literature (Brewin, Andrews & Valentine, 2000; Ozer et al., 2003) it has, until recently, consistently been found to be unrelated to post traumatic stress symptoms in literature on childbirth (Wijma, Soderquist & Wijma, 1997; Olde, van de Harl, Klaver, van Son, Wijnen, & Pop, 2005; Maggioni, Margola & Filippi, 2006; Czarnocka & Slade, 2000). Iles et al., (2011) however, also found that younger age significantly predicted post traumatic stress symptoms in women at 6 weeks and 3 months post childbirth. While the findings in the current study are different in that they are applicable for acute stress symptoms not post traumatic stress symptoms, these two findings together suggest that age should be given further

consideration as a vulnerability factor for developing acute and post traumatic stress symptoms following childbirth.

A relationship between less secure attachment and the experience of negative emotions during labour and childbirth, as predicted in Hypothesis 1, was only evident for feelings of fear during childbirth, not total reported negative emotions or the experience of pain. Specifically, findings showed that higher levels of attachment anxiety predicted higher levels of fear during labour and birth and uniquely accounted for a significant proportion of the variance. Previous research has identified that anxiously attached individuals are highly attentive to their own emotions, particularly negative emotions (Fuendeling, 1998), which can lead to greater levels of distress in difficult situations (Kobak & Sceery, 1988; Mikulincer et al. 1990). It is possible that women with higher attachment anxiety scores specifically attended to negative emotions and negative aspects of childbirth, which served to increase their feelings of fear. That no other significant relationships were found between attachment patterns and negative emotions during childbirth could be due to the relatively small sample not being able to detect such findings.

Attachment anxiety and avoidance were not significantly associated with perceptions of partner support and therefore Hypothesis 2 was not supported. It should be noted that every participant in the study reported some level of satisfaction, and no dissatisfaction, with the practical, emotional and overall support they received from their partner during labour and birth. The lack of

variation in partner support data created a ceiling effect suggesting that the participants were in relationships they perceived to be supportive and secure. It is also possible that the measure of partner support used in this study was not sensitive enough to adequately measure and detect differences in perceptions of partner support. A previous study measuring attachment patterns and birth experiences postnatally also found low levels of dissatisfaction with partner support in the first week post partum (Iles et al., 2011). Reports of dissatisfaction however, increased at 6 weeks and again at 3 months post birth suggesting that dissatisfaction with partner support could be related to symptoms of post traumatic stress in the months following childbirth, but not in the first few weeks post partum.

Attachment avoidance, but not attachment anxiety, was significantly associated with lower levels of perceived staff support during labour and birth. This finding held in hierarchical regression analyses where attachment avoidance uniquely accounted for a significant proportion of variance in staff support scores and therefore supported hypothesis 3 which predicted that less secure attachment would be associated with lower levels of perceived staff support. This finding, in conjunction with the finding that women reported satisfaction with support from their partner, suggests that their dissatisfaction was specific to the support provided from staff during labour and birth. Dissatisfaction with staff support has been described by women who have experienced traumatic births. Specifically, qualitative studies exploring the nature of traumatic birth experiences have identified childbirth care experiences as intrusive, degrading (Thompson &

Downe, 2008), humiliating and a violation (Nicholls & Ayers, 2007) comparable with rape (Beck, 2004b). Women have also described a lack of body integrity during childbirth, as though they were a 'lump' or 'sack' of 'meat' (Beck, 2004b; Nicholls & Ayers, 2007). Aspects of childbirth have been experienced as exposing, for example internal examinations and having numerous 'strangers' present to see the 'the most intimate parts' of women's bodies on 'display' (Nicholls & Ayers, 2007). Given that attachment avoidance is characterised by difficulties depending on and being intimate with others (Fraley et al., 2000), the highly intimate and potentially exposing nature of childbirth described above, and the requirement to place trust in unfamiliar staff, is likely to be particularly difficult for women with high attachment avoidance to tolerate. Struggling to trust that staff can meet their needs and feeling that their privacy is not respected may lead women with these attachment patterns to perceive staff as unsupportive during labour and at its most extreme, inhumane.

Furthermore, lower levels of perceived staff support were significantly associated with increased acute stress symptoms, specifically avoidance symptoms. This finding is consistent with previous findings that have identified negative perceptions of staff support as predictive of post traumatic stress symptoms (Creedy et al., 2000; Slade, 2006). The finding that higher attachment avoidance predicts lower levels of perceived staff support, and that lower levels of perceived staff support are associated with higher levels of acute stress symptoms is important and suggests that attachment avoidance could be helpful in understanding the relationship between lower perceived staff support and

acute stress symptoms. The potential mediating effects of staff support on the relationship between attachment avoidance and IES symptoms could not be tested further because in this sample, there was no direct relationship between attachment avoidance and IES symptoms.

Attachment anxiety was significantly associated with, but did not significantly predict, greater total acute stress symptoms and symptoms of the intrusion type. This finding partially supports hypothesis 4, that less secure attachment would be associated with acute stress symptoms. These findings are consistent with non childbirth trauma literature which has consistently found a relationship between attachment anxiety and post traumatic stress symptoms over attachment avoidance (Besser et al 2009; Besser & Neria, 2011; Dekel et al., 2004; Ein-Dor et al. 2010; Mikulincer et al., 1993). Iles et al., (2011) is the only other published study to have investigated attachment patterns as a potential predictor of post traumatic stress symptoms following childbirth, although attachment patterns were measured postnatally. In contrast to the current findings, they found that both attachment anxiety and attachment avoidance were significantly associated with post traumatic stress symptoms at 6 weeks and 3 months post partum. In regression analyses however, only attachment anxiety significantly predicted these symptoms. While the current findings are weaker, taken together with findings from Iles et al., (2011) it seems that that women scoring high on attachment anxiety are more vulnerable to experiencing acute stress symptoms and post traumatic stress symptoms than those with high attachment avoidance.

In the current study, the relationship between attachment anxiety and greater levels of total acute symptoms and intrusion symptoms could possibly be understood by considering levels of fear during childbirth. Higher scores of attachment anxiety were significantly correlated with levels of fear during childbirth, and higher levels of fear during childbirth were significantly correlated with total acute symptoms and acute intrusion symptoms. That experiences of fear during childbirth are associated with the presence of acute stress symptoms is unsurprising given that the experience of fear is a fundamental tenet of acute stress disorder and post-traumatic stress disorder diagnoses (DSM-IV-TR, APA, 2004) and models (Ehlers & Clark, 2000). What these findings identify is the potential role for attachment anxiety as a predisposing risk factor for acute stress symptoms through increased levels of fear during childbirth. While, the relationships between these factors in the current study were non-significant in regression models and therefore could not be examined with mediation analyses, it may be a relationship that warrants further exploration.

It should be noted that the current study is the first to measure attachment patterns prior to a potentially traumatic event. Non childbirth literature has measured attachment following a traumatic event and the only other study to investigate attachment and post traumatic stress symptoms following childbirth measured attachment postnatally (Iles et al., 2011). While attachment patterns are thought to be relatively stable they are also susceptible to change in response to ordinary and negative life events during childhood and adulthood such as transition to higher education, marriage and poverty status (Allen,

McElhaney, Kuperminc & Jodl, 2004; Crowell, Treboux & Waters, 2002; Lopez & Gormley, 2002). Therefore it is possible that the weaker relationship between attachment anxiety and avoidance with acute stress symptoms found in this study compared to Iles et al. (2011), is capturing a change in attachment patterns from pregnancy to the post partum period. If so, there may be an important distinction to be made between attachment patterns before and after a potentially traumatic event, one of which might be more relevant to consider as a risk factor for post traumatic stress symptoms. The impact of childbirth on attachment patterns is yet to be evaluated.

4.1. Strengths and Limitations

The findings from this study should be interpreted in the context of the sample on which they are based. This sample was biased towards highly educated women in continuing relationships recruited from an affluent city in the north of the country. Women reported higher levels of attachment avoidance than attachment anxiety, reported mid range levels of fear and pain and high levels of satisfaction with staff support during childbirth. Mean scores for fear and staff support were almost identical to those reported by the authors of the scale but pain scores in the current study were slightly higher (Bailham et al., 2004). Eight women (13.8%) reported perceived risk of serious injury to self/ baby and feelings of fear, horror or helplessness satisfying criterion A of the DSM IV PTSD diagnostic criteria. Nearly half the sample (44.8%) reported feelings of fear, horror or helplessness; over double the number who reported perceived risk of serious injury to self/baby. This suggests that women are experiencing

feelings of fear, horror or helplessness in relation to other aspects of childbirth, not just perceived risk of serious injury to self or baby. Future research would benefit from disaggregating fear, horror and helplessness to measure which feelings women experience more accurately. Women in the current sample reported higher levels of instrumental delivery than the Harrogate District Hospital figures (BirthChoiceUk data). Although some studies found high rates of obstetric intervention are associated with post traumatic stress symptoms (Ryding, Wijma & Wijma, 1997; Creedy et al., 2000), others found no support for this relationship (Czarnocka & Slade, 2000). The current study also found no such association between mode of delivery and acute stress symptoms. These sample characteristics mean that the findings are not necessarily generalisable to different populations, for example younger single parents in areas of lower socio-economic status. Although the final sample was small, adequate power was reached.

The measure of staff support in this study did not distinguish between support provided by different members of staff for example, midwives, anaesthetists, obstetricians, health care workers, nor did it capture which aspects of staff support were perceived as unsatisfactory for example, practical or emotional support. The inclusion of a measure of perceived control during labour and birth would have helped the study to explore specific aspects of staff and partner support in more detail.

The main strength of this study is its use of a prospective design to include antenatal measurement of attachment. While it has added another dimension compared to previous methodologies, the current study would have benefitted from an additional measurement point so that inferences could be made about the presence of post traumatic stress symptoms in addition to acute stress symptoms. It is possible that by only measuring acute symptoms this study has detected normal responses to childbirth.

4.2. Directions for future research

The findings discussed here provide preliminary support for the role of attachment anxiety and avoidance as predisposing factors for the development of acute stress symptoms, both directly and via other key factors such as perceptions of staff support during childbirth. This study is the first to investigate the relationship between attachment patterns measured antenatally and acute stress symptoms and further research is therefore needed to replicate and build on these findings. Specifically, further investigation of the role of staff support in the relationship between attachment patterns and acute stress symptoms would be beneficial; disaggregation of staff support in terms of occupation, type of support provided (emotional, practical) and whether they are known to women would help to identify the aspects of support that are pertinent to acute stress symptoms.

This study found that many more women identified feelings of 'fear, horror or helplessness' than those who experienced perceived risk to themselves or their baby during childbirth. This finding suggests that feelings of fear, horror and helplessness may be related to other aspects of the childbirth experience and therefore may represent different types of negative emotions experienced during labour. Future research should measure these three emotions separately and assess their individual relationships to attachment patterns and acute stress symptoms so as to enhance our understanding of which emotions during childbirth are pertinent to acute stress symptoms.

It is important for future research to retain a prospective design with antenatal measurement of attachment so as to confirm whether attachment patterns predict acute and post traumatic stress symptoms and can therefore be considered a predisposing factor. If these findings are replicated in the case of childbirth then research could also consider attachment patterns as a predisposing factor for post traumatic stress symptoms following other types of traumatic experiences. Retaining a prospective design in future research would enable researchers to usefully explore whether attachment patterns are susceptible to change following childbirth, an as yet unexplored area of the literature. Future research should also include studies with multiple follow up points so as to identify the relationships between attachment patterns with acute stress symptoms and post traumatic stress symptoms and disorder. Lastly, future research should include samples that vary in their age, parity, prior life

experiences, economic status, relationship status and place of birth (hospital, midwife led centres, home births).

4.3. Clinical Implications

This study is only the second to explore relationships between attachment patterns and acute stress symptoms following childbirth and is therefore exploratory in nature. As such, immediate clinical implications are limited. However, if future research is conducted in the ways discussed above, and the findings from the current study are replicated, then important clinical implications will apply. Specifically, the finding that younger age predicts acute stress symptoms suggests a role for clinicians in better preparing younger mothers for childbirth and the post partum. The associations between attachment anxiety, as measured in pregnancy, and acute stress symptoms and attachment avoidance, perceptions of staff support and acute stress symptoms, suggest the potential use of an attachment pattern screening tool in the early stages of pregnancy in order to identify attachment vulnerabilities. This would provide the opportunity to consider the way care is provided through pregnancy and birth and possible prevention strategies, for example, ensuring continuity of care throughout pregnancy and birth so as to help women with high attachment avoidance build trusting relationships with staff and increase their perceptions of staff support during labour and birth thus potentially reducing the chance of post traumatic stress symptoms developing.

Mental health difficulties after childbirth can lead to difficulties within partner relationships, affect choices and feelings about subsequent births (Bailham & Joseph, 2003; Gottvall & Waldenstrom, 2002; Ryding, Persson, Onell & Kvist, 2003; Waldenstrom, Hildingsson, & Ryding, 2006) and affect mother-infant attachment (Reynolds, 1997). Identifying women in distress is vital so that timely support and treatment can be provided. Provision of treatment has been noted to be important not just for women who have the full set of PTSD symptoms but also those with partial symptoms (Ayers, Joseph, McKenzie-McHarg, Slade, Wijma, 2008).

5. Conclusions

To the author's knowledge, this study is only the second to investigate the role of attachment patterns in the development of acute stress symptoms following childbirth and is the first to utilise a prospective design. The findings of this study suggest that high levels of attachment anxiety and attachment avoidance, as measured in pregnancy, are risk factors for the development of acute stress symptoms following childbirth. That no direct relationships existed between attachment dimensions and acute stress symptoms suggests that the relationship is best understood by other factors that are potential mediators of the relationship, namely the experience of high levels of fear during childbirth and low levels of perceived staff support. Attachment anxiety and attachment avoidance appear to be related to different types of acute stress symptoms and different types of potential mediating variables. The findings from this study should be interpreted with caution due to the small sample size and specific

nature of population studied. Further research is therefore needed to replicate these initial findings using larger and more demographically varied samples. Specifically, the role of factors such as perceived staff support need to be investigated further to determine the specific aspects which are pertinent to the development of acute and post traumatic stress symptoms.

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8th February 2011

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Contributions should be as concise as possible and should not normally exceed 3500 words excluding references (2500 words for short reports) with a limited number of tables or figures (not exceeding 6 in number). Any figures should be in black, white and grey tones. The title should not exceed 15 words and the references should be no more than 50 in number. Each paper should be accompanied by a structured abstract - Objective, Background, Methods (to include design and participants), Results, and Conclusion, with a total length of not more than 250 words.

Papers are refereed anonymously. Criteria for review include: importance of topic, theoretical and practical relevance, contribution to knowledge, quality of research design, appropriate analysis and effective interpretation of results.

Style guidelines

Description of the Journal's article style, Quick guide
 Description of the Journal's reference style, Quick guide
 Please use British spelling (e.g. colour, organise) and punctuation. Use single quotation marks with double within if needed. If you have any questions about references or formatting your article, please contact authorqueries@tandf.co.uk (please mention the journal title in your email).

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Tables should be typed double spaced on separate pages, or spaced sufficiently to be distinct in the case of small tables. They should be numbered in sequence in arabic numerals and referred to in the text as 'Table 1' etc. Large tables of more than six lines should be titled in order to make the contents comprehensible independently of the text.

Diagrams, graphs, drawings and half-tone illustrations should be on a separate sheet labelled 'Figure. 1' and so forth. Where possible they should be submitted as artwork ready for photographic reproduction, larger than the intended size. Where more than one figure is submitted, they should as far as possible be to the same scale.

SI units should be used for all measurements. Imperial measurements may be quoted in brackets. Where studies involve small numbers of subjects, both numbers and percentages of groups should be given.

Authors are advised to avoid sexist sentiments and language, except insofar as these form part of a study.

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Page proofs will be sent to the author submitting each article. Correction of typographical errors only will be permitted at this stage. Textual alterations may be charged to authors in exceptional circumstances.

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National Research Ethics Service

Leeds (East) Research Ethics Committee

Yorkshire and Humber REC Office
 First Floor, Millside
 Mill Pond Lane
 Meanwood
 Leeds
 LS6 4RA

Tel: 0113 3050108

Ms Robynne Boyd
 Trainee Clinical Psychologist
 Sheffield Health and Social Care Trust
 Trainee Clinical Psychologist
 Clinical Psychology Unit
 Western Bank
 Sheffield
 S10 2TN

10 September 2010

Dear Ms Boyd

Study title: What is the role of adult attachment style in the development of maternal post traumatic stress symptoms following childbirth? Relationship patterns, interpersonal experiences and maternal birth related stress symptoms.

REC reference: 10/H1306/41

Amendment number: 1

Amendment date: 26 August 2010

The above amendment was reviewed on 10 September 2010 by the Sub-Committee in correspondence.

Ethical opinion

Favourable Opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Participant Consent Form		
Participant Information Sheet		
Notice of Substantial Amendment (non-CTIMPs)		26 August 2010

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

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.

10/H1306/41:	Please quote this number on all correspondence
---------------------	---

Yours sincerely



Miss Jade Thorpe
Assistant Committee Co-ordinator

E-mail: jade.thorpe@leedspft.nhs.uk

Enclosures: List of names and professions of members who took part in the review

Copy to: Ms Lauren Smaller



National Research Ethics Service
Leeds (East) Research Ethics Committee

Yorkshire and Humber REC Office
First Floor, Millside
Mill Pond Lane
Meanwood
Leeds
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Tel:0113 3050108

Ms Robynne Boyd
Trainee Clinical Psychologist
Sheffield Health and Social Care Trust
Trainee Clinical Psychologist
Clinical Psychology Unit
Western Bank
Sheffield
S10 2TN

01 November 2010

Dear Ms Boyd

Study title: **What is the role of adult attachment style in the development of maternal post traumatic stress symptoms following childbirth? Relationship patterns, interpersonal experiences and maternal birth related stress symptoms.**

REC reference: 10/H1306/41

Amendment number: 2

Amendment date: 01 October 2010

The above amendment was reviewed at the meeting of the Sub-Committee held on 21 October 2010.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Questionnaire: additional questions		
Notice of Substantial Amendment (non-CTIMPs)		01 October 2010

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

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.

10/H1306/41:	Please quote this number on all correspondence
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Yours sincerely



Miss Jade Thorpe
Assistant Committee Co-ordinator

E-mail: jade.thorpe@leedspft.nhs.uk

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Ms Lauren Smaller*



National Research Ethics Service

Leeds (East) Research Ethics Committee

Yorkshire and Humber REC Office
 First Floor, Millside
 Mill Pond Lane
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 Leeds
 LS6 4RA

Tel: 0113 305 0116

17 November 2010

Ms Robynne Boyd
 Trainee Clinical Psychologist
 Sheffield Health and Social Care Trust
 Clinical Psychology Unit
 Western Bank
 Sheffield
 S10 2TN

Dear Ms Boyd

Study title: **What is the role of adult attachment style in the development of maternal post traumatic stress symptoms following childbirth? Relationship patterns, interpersonal experiences and maternal birth related stress symptoms.**

REC reference: 10/H1306/41

Amendment number: 3

Amendment date: 27 October 2010

The above amendment was reviewed at the meeting of the Sub-Committee held on 16 November 2010.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Participant Consent Form		
Notice of Substantial Amendment (non-CTIMPs)		27 October 2010

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.


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.

10/H1306/41:

Please quote this number on all correspondence

Yours sincerely



Claire Kelly
Committee Assistant Co-ordinator

E-mail: Claire.kelly@leedspft.nhs.uk

Enclosures: List of names and professions of members who took part in the review

Copy to: Ms Lauren Smaller



National Research Ethics Service

Leeds (East) Research Ethics Committee

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Tel: 0113 3050108

Ms Robynne Boyd
 Trainee Clinical Psychologist
 Sheffield Health and Social Care Trust
 Clinical Psychology Unit
 Western Bank
 Sheffield
 S10 2TN

15 February 2011

Dear Ms Boyd

Study title: What is the role of adult attachment style in the development of maternal post traumatic stress symptoms following childbirth? Relationship patterns, interpersonal experiences and maternal birth related stress symptoms.

REC reference: 10/H1306/41

Amendment number: 4

Amendment date: 01 February 2011

Thank you for submitting the above amendment, which was received on 03 February 2011. It is noted that this is a modification of an amendment previously rejected by the Committee (our letter of 24 January 2011 refers).

The modified amendment was reviewed on 17 February 2011 by the Sub-Committee in correspondence. A list of the members who took part in the review is attached.

Ethical opinion

Favourable Opinion

I am pleased to confirm that the Committee has given a favourable ethical opinion of the modified amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved are:

Document	Version	Date
Consent form for contact	4	24 January 2011
Participant Consent Form	3	24 January 2011
Participant Information Sheet	3	24 January 2011

Modified Amendment		01 February 2011
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R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

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.

10/H1306/41:	Please quote this number on all correspondence
---------------------	---

Yours sincerely



Miss Jade Thorpe
Committee Co-ordinator

E-mail: jade.thorpe@leedspft.nhs.uk

Enclosures: List of names and professions of members who took part in the review

Copy to: Ms Lauren Smaller



The
University
Of
Sheffield.

Department Of Psychology.
Clinical Psychology Unit.

Doctor of Clinical Psychology (DClin
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Clinical supervision training and NHS
research training & consultancy.

**Clinical Psychology Unit
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Telephone: 0114 2226650

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Email: c.harrison@sheffield.ac.uk

Information Sheet

January 2011

Research Project Title: Relationship patterns, interpersonal experiences and maternal birth related stress symptoms.

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take some time to read the following information carefully and discuss it with others if you wish. Feel free to contact me if there is anything that is not clear or if you would like more information (contact details at bottom of sheet). Take time to decide whether or not you wish to take part.

What is the research about?

Childbirth is an emotional time and leads to a whole range of different feelings. Some women experience anxiety and distress after childbirth. The aim of this research is to understand which women might be more likely to experience these symptoms so that better care can be given promptly. The research will specifically be looking at whether women's prior experiences of their relationships and support has an effect on how they experience, feel about and respond to childbirth.

Who is going to be doing the research?

The research is being undertaken by Robynne Boyd who is currently training to be a clinical psychologist at the University of Sheffield. This piece of research will contribute towards her doctoral thesis.

Why have I been chosen?

Women expecting their first baby who are receiving NHS maternity care from Harrogate and District NHS Foundation Trust are being invited to take part either at antenatal classes or during their routine antenatal care with a community midwife.

Do I have to take part?

No. It is up to you to decide whether or not to take part. This project will be introduced to you by your midwife who will ask if you are happy for the researcher to contact you to discuss the project further. If you agree to this, you will be asked to complete a consent form to give your address and preferred telephone number. This form will be given to the researcher so that she can contact you. If after this you do decide to take part you will be asked to sign a further consent form relating to taking part in the study and you can still withdraw at any time without it affecting your medical care. You do not have to give a reason.

What will happen to me if I take part?

There are three stages to this research.

1. You will be asked to complete some questionnaires that will ask about your experiences in relationships and your experience of dealing with emotions in times of stress.
2. You will then be contacted after you have given birth and asked to complete a second set of questionnaires within 7-10 days of the birth of your baby. These will ask you about the experience of giving birth.
3. Lastly, you will be contacted one more time, about 6 weeks later, with a third set of questionnaires. These questionnaires will ask you about how you are feeling emotionally.¹

Each set of questionnaires should take approximately 10 minutes to complete. You will be given the choice of how to receive these booklets of questionnaires. We can either post them to you and include a pre paid envelope to return them in, or you can complete them on the internet (we would send you a link to the website). If we have not heard from you, we would like to send you a reminder to complete these questionnaires. We will ask you whether you would prefer to receive a text or email reminder.

Are there any reasons why I might not be asked to complete the research?

We will be contacting the hospital regularly to find out when women have given birth so that we can send the second booklet of questionnaires. The hospital will advise us of women whose babies required special care for more than 24 hours and of women who experienced a major adverse outcome of labour. We will not contact these women again so as not to impose during what may be a sensitive time.

What will happen to the information collected for the research project?

The consent forms will be collected by the researcher and stored in a locked filing cabinet. An electronic copy of the consent forms will be stored securely for 5 years after the study has closed, in accordance with the policy of the University of Sheffield. All hard copies of consent forms will be destroyed as soon as the research has closed.

¹ Please note that the Information Sheet refers to a third set of data collected 6 weeks postnatally. Ethical approval was sought and received for this time point but the data does not form part of this thesis.

The booklets of questionnaires will have a study number on them, but no identifiable information, and will be stored in a locked filing cabinet separate to the consent forms. All the data collected in the questionnaires will be analysed anonymously and then written up in a final report in 2011. Your answers will not be identifiable in the final report. If you would like a summary of the results you can contact the researcher or her supervisors on the details given below and this can be sent out to you.

What if the study raises concerns for me?

If during the research any of the questions asked in the questionnaires raise any concerns for you then please discuss these with the midwife or health visitor looking after you. If your scores 6 weeks postnatally show severe levels of emotional distress we will contact you to ask if you wish for us to contact your health visitor and GP to let them know how you are feeling.

What are the benefits of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will improve our understanding of the causes of post traumatic stress symptoms after childbirth and the care women may need.

Who has ethically reviewed the project?

This project has been ethically approved via Leeds East Research Ethics Committee and internally within the department of Clinical Psychology at the University of Sheffield.

What if I have any complaints?

If you are not happy about any aspect of the way in which you have been approached or treated during the course of this study and wish to complain, you should contact Professor Pauline Slade, Consultant Clinical Psychologist who is the supervisor of this research, on 0114 2226568. However, if after this you feel that your complaint has not been handled to your satisfaction you can use the normal University complaints procedure and contact Dr David Fletcher, Registrar and Secretary's Office, University of Sheffield, Firth Court, Western Bank, Sheffield S10 2TN.

Who can I contact for further information?

Please feel free to contact Robynne Boyd if you have any questions on 0114 2226560. This is the number of the Research Support Officer, Christie Harrison at the Clinical Psychology Unit at The University of Sheffield. You will be able to leave a message with Christie and then Robynne will return your call. You could also contact Professor Pauline Slade (0114 2226568) or Helen Spiby, Senior Lecturer (Evidence based practice in midwifery) (01904 321825) who are supervising this research.

Thank you for taking the time to read this information sheet.



Department Of Psychology.
Clinical Psychology Unit.

Doctor of Clinical Psychology (DClin Psy)
Programme
Clinical supervision training and NHS
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Sheffield S10 2TP UK**

**Telephone: 0114 2226650
Fax: 0114 2226610
Email: c.harrison@sheffield.ac.uk**

Participant Identification Number:

CONSENT FORM

Title of Project: Relationship patterns, interpersonal experiences and maternal birth related stress symptoms.

Name of Researcher: Robynne Boyd, Trainee Clinical Psychologist

Please initial box

1. I confirm that I have read and understand the information sheet dated January 2010 for the above project and have had the opportunity to ask questions
2. I understand the purpose of the study and how I will be involved
3. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason without my medical care or legal rights being affected
4. I agree for the researcher to check with the hospital that my baby is born and well so that follow up questionnaires can be sent at the right time
5. I understand that my responses will be anonymised before analysis. I give permission for members of the research team to have access to my anonymised responses
6. I agree to take part in the above study

Participant name..... Signature.....
Date.....

Researcher name..... Signature.....
Date.....



Department Of Psychology.
Clinical Psychology Unit.

Doctor of Clinical Psychology (DClin Psy) Programme
Clinical supervision training and NHS research training
& consultancy.

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Telephone: 0114 2226650
Fax: 0114 2226610
Email: c.harrison@sheffield.ac.uk

Participant Identification Number:

CONSENT FORM FOR FURTHER CONTACT FROM RESEARCHER

Title of Project: Relationship patterns, interpersonal experiences and maternal birth related stress symptoms

Name of Researcher: Robynne Boyd, Trainee Clinical Psychologist

Please initial box

1. I confirm that I have received the information sheet dated January 2010 for the above project.

2. I am happy for the researcher to contact me to discuss the project further, address any questions I may have and discuss my thoughts on taking part. I give my consent for my address and phone number (listed below) to be given to the researcher in order for this to happen.

Participant name..... D.O.B.

Signature..... Date.....

Home address.....

Phone number.....

Mobile number.....

Best times for contact (please circle):

Monday AM	Tuesday AM	Wednesday AM	Thursday AM	Friday AM
Monday PM	Tuesday Pm	Wednesday PM	Thursday PM	Friday PM

Midwife name..... Signature..... Date.....

Demographic information

Age:

Marital Status (please circle):

Married

Separated/divorced

Cohabiting

Widowed
together

Single

In a relationship but not living

Highest Level of education completed (please circle):

Left school before completed GCSE

GCSE/O Level

A Level

Diploma

Undergraduate degree

Postgraduate degree

Current Occupation:

Have you ever consulted your GP for any problems with your sleep or mental health?

Yes/ No

If yes, did you receive treatment?

Yes/No

Have you ever seen a Psychiatrist?

Yes/ No

If yes, why?

.....
.....
.....
.....

Previous life experiences

Sometimes things happen to people that are extremely upsetting or distressing, like being in a life threatening situation, such as a major disaster, a serious accident, being physically assaulted, or hearing about or witnessing something horrible that has happened to someone close to you.

Please circle the answer that relates to you.

- 1. At any time in your life, have any of these kinds of things happened to you?**
Yes/ No

If 'yes' please continue with the next questions. If 'no', please ignore the following questions.

- 2. Sometimes these things keep coming back in nightmares, flashbacks or thoughts that people can't get rid of. Has this ever happened to you?**
Yes/ No

- 3. What about being very upset when you were in a situation that reminded you of one of these terrible things?**
Yes/ No

**The Experiences in Close Relationships-Revised (ECR-R) Questionnaire
Fraley, Waller, and Brennan (2000)**

This questionnaire has not been included for copyright purposes.

Birth Information

Please answer the following questions about the birth of your baby.

How many how weeks pregnant were you when you went into labour?

.....

Were you induced?

Yes/ No

How long did your labour last (in hours) from when your contractions became regular to the birth of your baby?

.....

Please tick one box from each column below to indicate whether, and how much, your romantic partner was present during labour and birth.

During labour		During the birth	
All of it	<input type="checkbox"/>	All of it	<input type="checkbox"/>
Most of it	<input type="checkbox"/>	Most of it	<input type="checkbox"/>
Some of it	<input type="checkbox"/>	Some of it	<input type="checkbox"/>
Not at all	<input type="checkbox"/>	Not at all	<input type="checkbox"/>

How was your baby delivered?

Unassisted vaginal birth Forceps
 Ventouse (vacuum) Emergency caesarean

Did you use any pain relief?

Gas and Air Pethidine Epidural

Alternative methods (e.g. warm bath, hypnosis, homeopathy, TENS)

None

Did you have an episiotomy?

Yes/ No

Please answer the following questions as they relate to you;

1. From your perspective was there any risk of serious injury to you or your baby at any point during labour?

Yes/ No

2. Did you experience feelings of fear, horror or helplessness at any point during labour?

Yes/ No

If you had a romantic partner who was present for any part of labour please answer the following questions;

3. How satisfied were you with the level of practical support you received from your partner during your birth and labour?

Extremely satisfied	Very satisfied	Indifferent
Dissatisfied	Extremely dissatisfied	

4. How satisfied were you with the level of emotional support you received from your partner during your birth and labour?

Extremely satisfied	Very satisfied	Indifferent
Dissatisfied	Extremely dissatisfied	

5. Overall, how satisfied were you with the support you received from your partner during your birth and labour?

Extremely satisfied	Very satisfied	Indifferent
Dissatisfied	Extremely dissatisfied	

Impact of Events Scale (Horowitz, Wilner & Alvarez, 1979)

This questionnaire has not been included for copyright purposes.

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

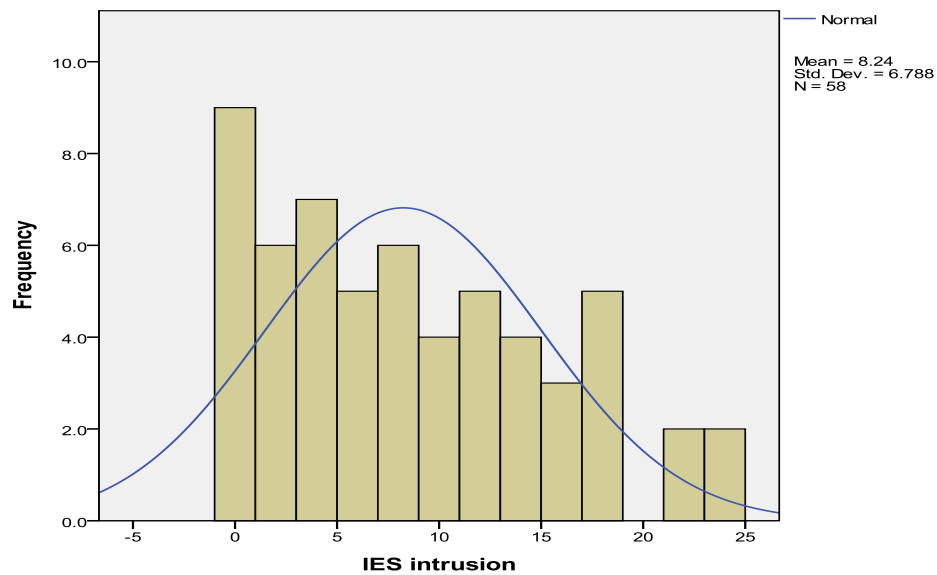
This questionnaire has not been included for copyright purposes.

The Perception of Labour and Delivery Scale (Czarnocka & Slade, 2000)

This questionnaire has not been included for copyright purposes.

Normality distributions of outcome variables

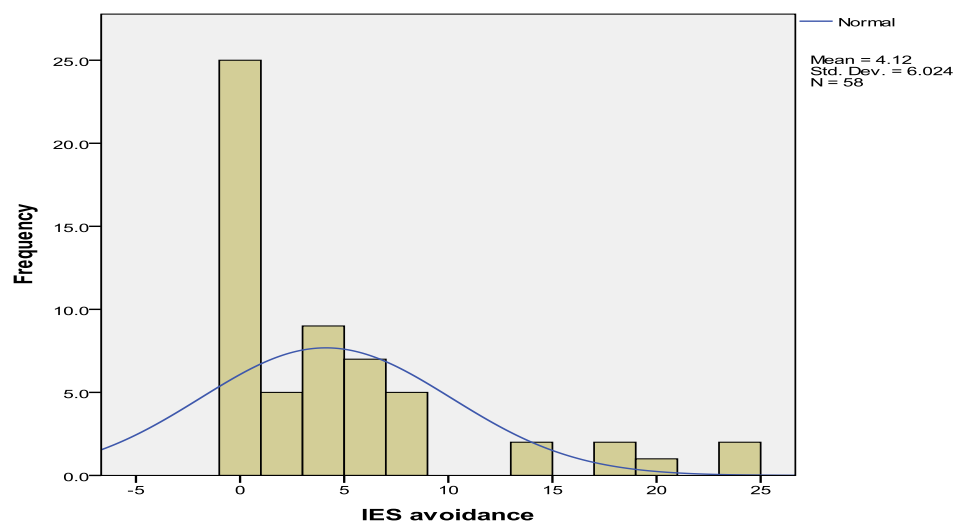
IES intrusion histogram



IES intrusion normality test

Kolmogorov-Smirnov statistic = .11, p = .062

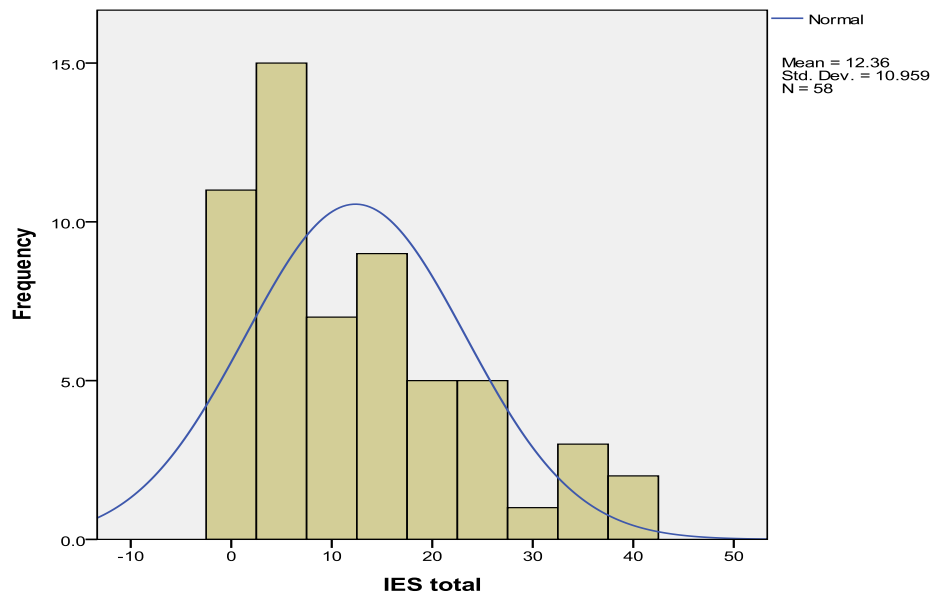
IES avoidance histogram



IES avoidance normality test

Kolmogorov-Smirnov statistic = .25, p = .0001

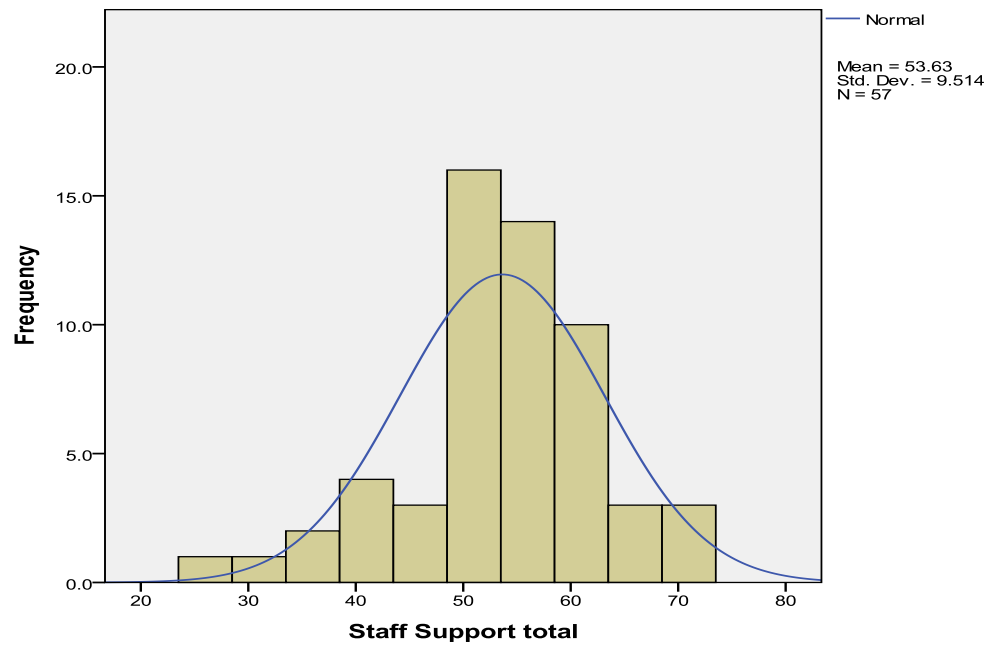
IES total



IES total normality test

Kolmogorov-Smirnov statistic = .14, p = .008

PLDS Staff support

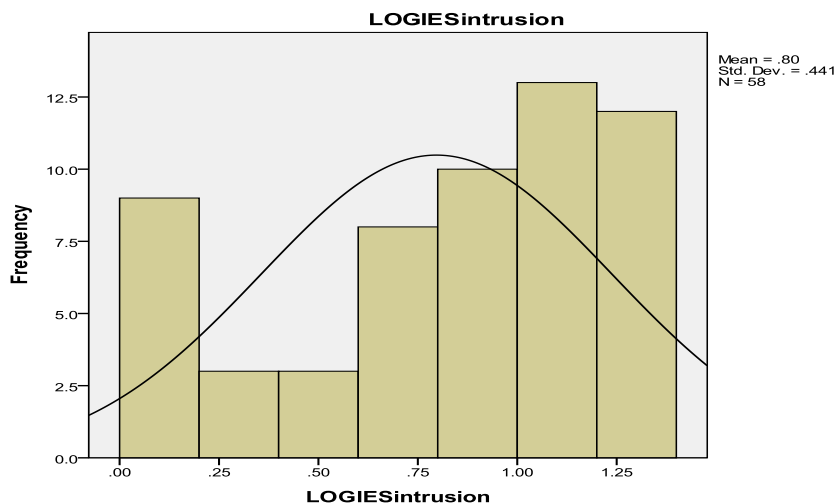


Staff support normality test

Kolmogorov-Smirnov statistic = .12, p = .039

Log transformations

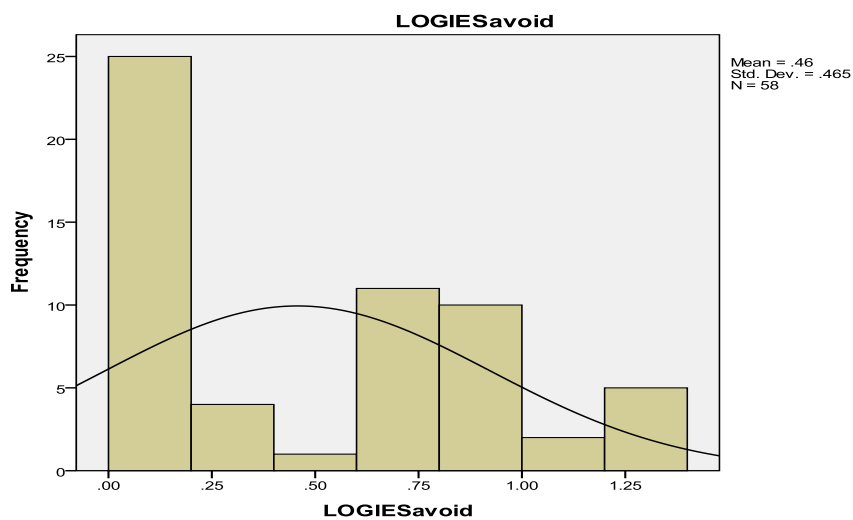
IES intrusion histogram



IES intrusion normality test

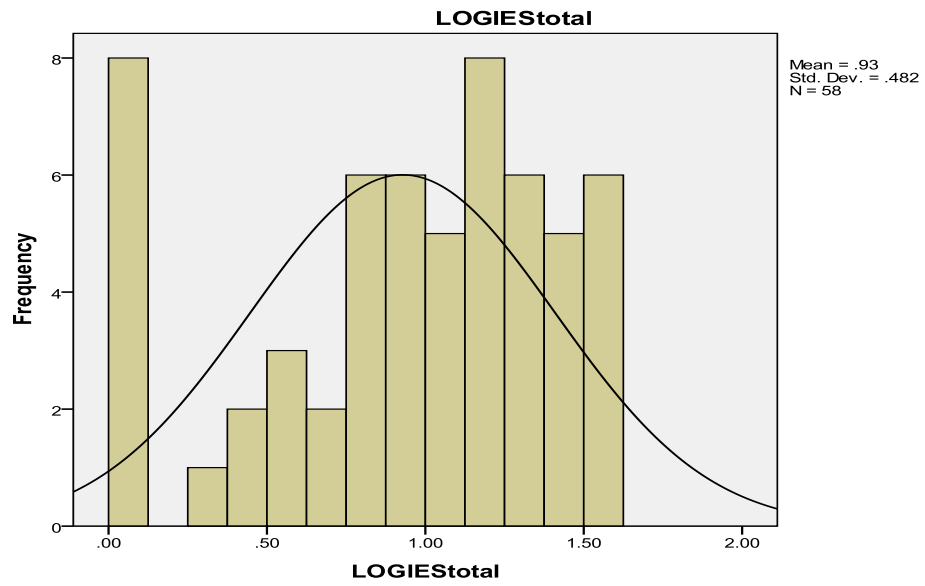
Kolmogorov-Smirnov statistic = .15, $p = .003$

IES avoidance histogram



IES avoidance normality test

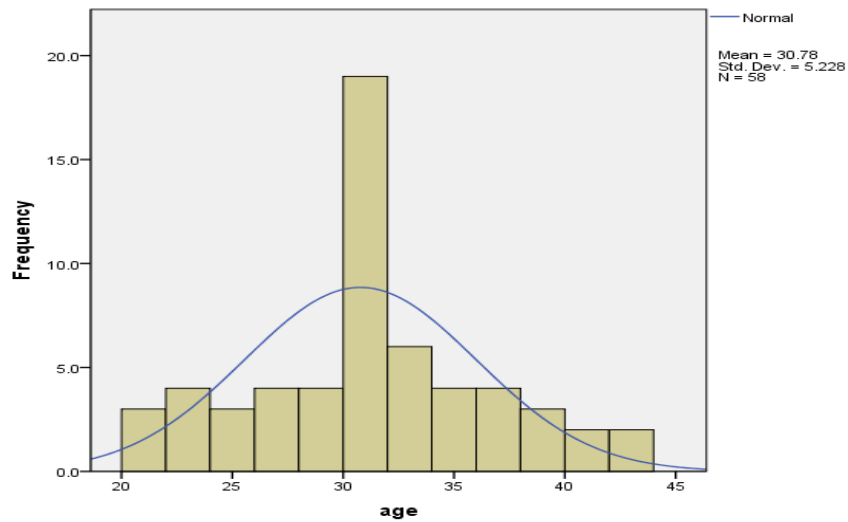
Kolmogorov-Smirnov statistic = .27, $p = .0001$

IES total histogram**IES total normality test**

Kolmogorov-Smirnov statistic = .11, p = .052

Normality distributions of predictor variables

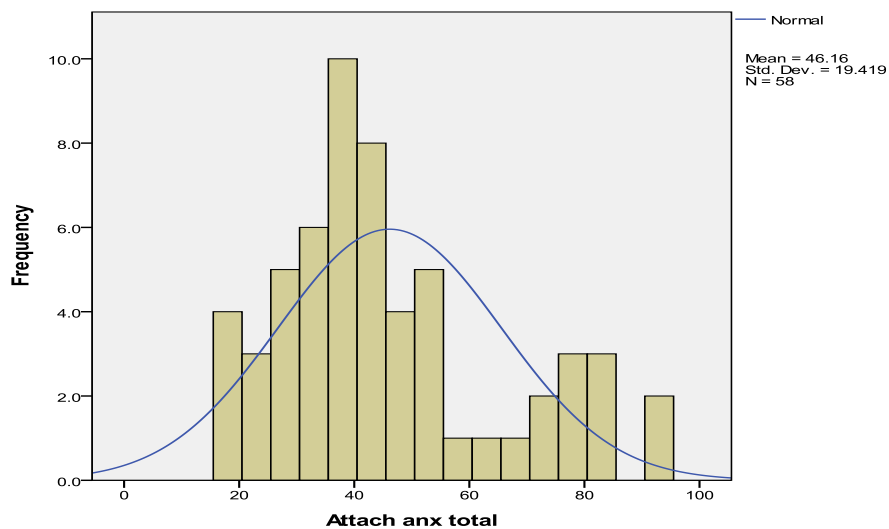
Age



Age normality test

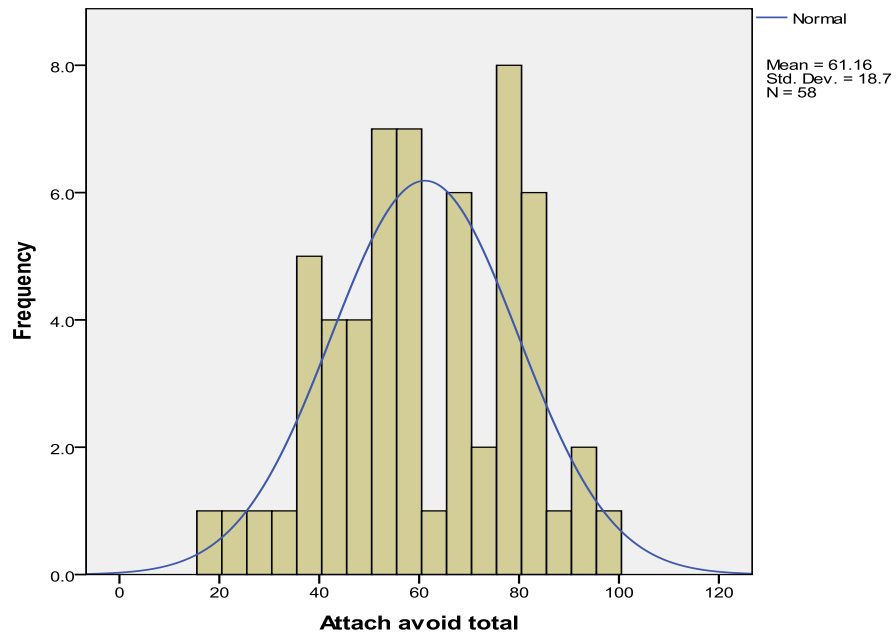
Kolmogorov-Smirnov statistic = .13, $p = .015$

Attachment anxiety



Attachment anxiety normality test

Kolmogorov-Smirnov statistic = .14, $p = .004$

Attachment avoidance**Attachment avoidance normality test**

Kolmogorov-Smirnov statistic = .109, $p = .082$

Comparisons between responders and non responders at time point 2

Variable	Test used	Statistic	Significance
Age	Independent T-test	t = -1.16	p = 0.249
Married status	Fisher's exact test		p = 0.714
Level of Education	Fisher's exact test		p = 0.010
Consultation with GP	Fisher's exact test		p = 0.210
Consultation with Psychiatrist	Fisher's exact test		p = 0.726
Prior experience of traumatic event as measured during pregnancy			
- Q1 Situation experienced	Fisher's exact test		p = 0.440
- Yes to Q1 and Q2 or Q3 (Situation experienced AND presence of 'nightmares, flashbacks or thoughts' OR 'upset by reminders;	Fisher's exact test		p = 0.435
Attachment anxiety	Independent T-test	t = 1.56	p = 0.125
Attachment avoidance	Independent T-test	t = 1.95	p = 0.055

Relationships between demographic characteristics, birth factors and negative emotions experienced during birth

Variable	Negative emotions	Test	Statistic	P=
Age	PLDS- Fear	Pearson's Correlation	r = -0.22	0.104
	PLDS- Pain	Pearson's Correlation	r = -0.16	0.237
	EBS Total negative emotions	Pearson's Correlation	r = -0.06	0.680
Married or Cohabiting	PLDS- Fear	Independent T-test	t = -0.30	0.767
	PLDS- Pain	Independent T-test	t = 1.53	0.137
	EBS Total negative emotions	Independent T-test	t = 0.53	0.601
Below graduate or Graduate and above	PLDS- Fear	Independent T-test	t = -.063	0.529
	PLDS- Pain	Independent T-test	t = 0.86	0.393
	EBS Total negative emotions	Independent T-test	t = -0.05	0.960
Ever consulted GP for mental health problems	PLDS- Fear	Independent T-test	t = 1.46	0.076
	PLDS- Pain	Independent T-test	t = -0.61	0.271
	EBS Total negative emotions	Independent T-test	t = -0.02	0.491
Overall Trauma (yes 2 to 3)	PLDS- Fear	Independent T-test	t = 2.65	0.005
	PLDS- Pain	Independent T-test	t = 0.32	0.377
	EBS Total negative emotions	Independent T-test	t = -0.36	0.362

Hours in labour	PLDS- Fear	Pearson's Correlation	$r = 0.23$	0.043
	PLDS- Pain	Pearson's Correlation	$r = 0.08$	0.278
	EBS Total negative emotions	Pearson's Correlation	$r = 0.06$	0.330
Being Induced	PLDS- Fear	Independent T-test	$t = 0.20$	0.840
	PLDS- Pain	Independent T-test	$t = 0.68$	0.501
	EBS Total negative emotions	Independent T-test	$t = -0.94$	0.362
Mode of delivery (Unassisted vaginal delivery vs other deliveries)	PLDS- Fear	Independent T-test	$t = 2.68$	0.005
	PLDS- Pain	Independent T-test	$t = 1.73$	0.043
	EBS Total negative emotions	Independent T-test	$t = 2.19$	0.017
Episiotomy	PLDS- Fear	Independent T-test	$t = -.13$	0.898
	PLDS- Pain	Independent T-test	$t = 1.51$	0.137
	EBS Total negative emotions	Independent T-test	$t = .50$	0.623
Pain relief (Epidural vs other pain relief)	PLDS- Fear	Independent T-test	$t = 2.49$	0.016
	PLDS- Pain	Independent T-test	$t = 1.64$	0.107
	EBS Total negative emotions	Independent T-test	$t = 1.83$	0.073

Relationships between demographic characteristics, birth factors and perceived partner support experienced during birth

Variable	Test	Statistic	P=
Age	Spearman's Correlation	$r = 0.01$	0.058
Married or Cohabiting	Mann-Whitney	$U = 246.50$	0.235
Below graduate or Graduate and above	Mann-Whitney	$U = 257.00$	0.554
Ever consulted GP for mental health problems	Mann-Whitney	$U = 243.00$	0.285
Overall Trauma (yes 2 to 3)	Mann-Whitney	$U = 189.50$	0.121
Hours in labour	Spearman's Correlation	$r = -0.06$	0.679
Being Induced	Mann-Whitney	$U = 322.50$	0.385
Mode of delivery (Unassisted vaginal delivery vs other deliveries)	Mann-Whitney	$U = 323.50$	0.088
Episiotomy	Mann-Whitney	$U = 276.50$	0.654
Pain relief (Epidural vs other pain relief)	Mann-Whitney	$U = 292.50$	0.027

Relationships between demographic characteristics, birth factors and perceived staff support experienced during birth

Variable	Test	Statistic	P=
Age	Pearson's Correlation	$r = 0.004$	0.488
Married or Cohabiting	T-test	$t = -0.65$	0.522
Below graduate or Graduate and above	T-test	$t = -0.30$	0.766
Ever consulted GP for mental health problems	T-test	$t = 0.89$	0.190
Overall Trauma (yes 2 to 3)	T-test	$t = 0.07$	0.472
Hours in labour	Pearson's Correlation	$r = 0.15$	0.137
Being Induced	T-test	$t = 0.21$	0.838
Mode of delivery (Unassisted vaginal delivery vs other deliveries)	T-test	$t = -0.66$	0.255
Episiotomy	T-test	$t = -0.87$	0.390
Pain relief (Epidural vs other pain relief)	T-test	$t = -0.57$	0.571

Relationships between demographic characteristics, birth factors and acute stress symptoms

Variable	Acute stress symptoms	Test	Statistic	P=
Age	IES intrusion	Pearson's Correlation	r = -0.38	0.002
	IES avoidance	Spearman's Correlation	r = -0.14	0.300
	IES total	Spearman's Correlation	r = -0.35	0.008
Married or Cohabiting	IES intrusion	Independent T-test	t = -1.45	0.153
	IES avoidance	Mann-Whitney	u = 329.50	0.970
	IES total	Mann-Whitney	u = 280.00	0.358
Below graduate or Graduate and above	IES intrusion	Independent T-test	t = -0.15	0.883
	IES avoidance	Mann-Whitney	u = 309.50	0.809
	IES total	Mann-Whitney	u = 299.00	0.676
Ever consulted GP for mental health problems	IES intrusion	Independent T-test	t = 0.04	0.485
	IES avoidance	Mann-Whitney	u = 255.50	0.236
	IES total	Mann-Whitney	u = 267.00	0.317
Overall Trauma (yes 2 to 3)	IES intrusion	Independent T-test	t = 0.61	0.547
	IES avoidance	Mann-Whitney	u = 217.00	0.390
	IES total	Mann-Whitney	u = 258.00	0.992
Hours in labour	IES intrusion	Pearson's Correlation	r = 0.16	0.121
	IES avoidance	Spearman's Correlation	r = -0.06	0.658
	IES total	Spearman's Correlation	r = -0.08	0.571
Being Induced	IES intrusion	Independent T-test	t = -0.11	0.910
	IES avoidance	Mann-Whitney	u = 376.50	0.952
	IES total	Mann-Whitney	u = 375.50	0.941
Mode of delivery (Unassisted vaginal delivery vs other deliveries)	IES intrusion	Independent T-test	t = 0.50	0.309
	IES avoidance	Mann-Whitney	u = 359.50	0.193
	IES total	Mann-Whitney	u = 358.00	0.195

Episiotomy	IES intrusion	Independent T-test	t = -.33	0.742
	IES avoidance	Mann-Whitney	u = 290.00	0.733
	IES total	Mann-Whitney	u = 295.50	0.820
Pain relief (Epidural vs other pain relief)	IES intrusion	Independent T-test	t = -0.28	0.782
	IES avoidance	Mann-Whitney	u = 397.50	0.715
	IES total	Mann-Whitney	u = 389.50	0.634