Precursors and Risk Factors Associated with the Development of Traumatic Stress After Childbirth

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PRECURSORS AND RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF
TRAUMATIC STRESS AFTER CHILDBIRTH

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

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Abstract

PRECURSORS AND RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF TRAUMATIC STRESS AFTER CHILDBIRTH

By Jennifer Jane Runnals, M.S.

A prospective study of pregnant women was undertaken to provide an estimate of rates of Posttraumatic Stress Disorder after childbirth that takes into account pre-existing trauma; to explore risk factors associated with the development of traumatic stress after birth; and to better understand incidence and risk factors associated with fear of childbirth, which is thought to contribute to postpartum Posttraumatic Stress Disorder. Ninety participants in their last trimester of pregnancy completed questionnaires that included depression, trait anxiety, PTSD, anxiety sensitivity, childbearing fear, and self-efficacy for labor. Four weeks after delivery 73 of these women completed questionnaires concerning delivery, posttraumatic stress related to childbirth, and depression.

Levels of childbearing fear were similar to studies of non U.S. women but did not predict traumatic reactions to childbirth. First-time mothers, those with prior miscarriage, and those with childhood sexual assault were not more fearful of childbirth although women reporting past traumatic birth, and repeat sexual victimization that started in childhood were. Women with comorbid Posttraumatic Stress Disorder and depression during pregnancy were
significantly more fearful of childbirth. Higher trait anxiety and anxiety sensitivity, and lower labor self-efficacy predicted greater fear of childbirth. Women who underwent operative deliveries became more fearful of childbirth after delivery whereas women who underwent unassisted vaginal deliveries showed a reduction in fear.

Five percent of women developed new cases of Posttraumatic Stress Disorder attributable to childbirth. An additional five percent who had received a trauma diagnosis during pregnancy met criteria for Posttraumatic Stress Disorder resulting from childbirth. Higher trait anxiety predicted postpartum trauma symptoms and greater self-efficacy for childbirth moderated this relationship. Women assigned a diagnosis of Posttraumatic Stress Disorder or co-morbid PTSD and depression during pregnancy, and women who underwent operative or instrument deliveries (i.e. caesarian section, forceps deliveries, or vacuum extraction), were significantly more likely to receive a diagnosis of PTSD or trauma-related Adjustment Disorder as a consequence of their experience of childbirth. Results suggest that increasing self-efficacy for labor and treating psychopathology present during pregnancy may be fruitful targets for efforts to prevent the development of traumatic reactions to childbirth.
Precursors and Risk Factors Associated with the Development of Traumatic Stress after Childbirth

Posttraumatic Stress Disorder (PTSD) is a form of psychopathology that may occur after a person has been exposed to a traumatic event. Traumatic events are often thought of as extreme experiences such as combat exposure, living through a natural disaster, or being subjected to a sexual assault, however, research has also shown that PTSD can occur as a result of medical events such as undergoing heart surgery or treatment for cancer (Kangas et al., 2002; Tedstone & Tarrier, 2003).

A seemingly ordinary or common event that recent research suggests may elicit PTSD or significant levels of posttraumatic stress is the experience of giving birth (Bailham & Joseph, 2003). While the vast majority of birthing experiences would not be expected to lead to posttraumatic stress, some births may be experienced as traumatic by a small number of women (Moleman et al., 1992). In the few studies that have been conducted, estimates of postpartum PTSD range from 1.7% to 6.0% and estimates of significant levels of posttraumatic symptomology range from 22.6% to 30% (Ayers & Pickering, 2001; Creedy et al., 2000; Czarnocka & Slade, 2000; Skari et al., 2002; Soderquist et al., 2006; Soet et al., 2003; Wijma et al., 1997; Zaers et al., 2008).

Several factors are suggested to play a role in the development of PTSD after birth: childbearing fear, anxiety sensitivity, prior sexual abuse or psychiatric history, prior stillbirth, and operative deliveries. Factors such as childbearing fear and operative deliveries have empirical support from studies conducted in Scandinavia, Australia, and the United Kingdom (Heimstad et al., 2006; Wijma, 2003; Zar et al., 2001; Ryding et al., 1998a; Ryding et al., 1998b; Wijma et al., 1997; Zar et al., 2002; Zar et al., 2001; Wijma, 2003). Similarly,
psychiatric history (Czarnocka & Slade, 2000; Wijma et al., 1997) and history of a stillborn baby (Brisch et al., 2005; Born et al., 2006; Turton et al., 2001) have been suggested to play a role in the development of postpartum PTSD. Other factors such as anxiety sensitivity (Keogh et al., 2002; Keogh et al., 2005; Soet et al., 2003) and labor self-efficacy have received only limited investigation (Lowe, 2000).

Learning about the factors that play a role in the development of postpartum posttraumatic stress and fear of childbearing is important as better understanding may lead to better identification of at-risk or suffering women who can then be directed toward the highly effective treatments that are available for PTSD. In addition, research has shown that higher levels of maternal stress while pregnant are associated with premature birth and low birth weight (Copper et al., 1996; Dunkel-Schetter, 1998; Lou et al., 1994; Wadhwa et al., 1993).

This review will first focus on describing the diagnostic categories of Posttraumatic Stress Disorder and Adjustment Disorder (AD). Both diagnoses have the potential of being assigned when a person has experienced an identifiable stressor that results in trauma symptoms. A clinical picture of PTSD after childbirth will follow, along with a review of incidence studies. The aforementioned factors that are thought to play a role in the development of postpartum PTSD will then be explored. The review will conclude with the physical and mental health risks (to mothers and infants) associated with excessive anxiety and fear, and the hope that learning more about postpartum PTSD would inform detection, diagnosis, and treatment of this phenomenon.

Literature Review

Posttraumatic Stress and Adjustment Disorders. Both Posttraumatic Stress Disorder and Adjustment Disorder are diagnoses that may be assigned when pathological
emotional reactions are present after the occurrence of an identifiable stressor or trauma. The following section provides a review of the diagnostic criteria for Posttraumatic Stress Disorder, including a brief history of changes in the diagnosis of PTSD and prevalence rates of exposure to trauma and PTSD in the United States in men and women. In addition, there is a brief review of the diagnostic criteria for Adjustment Disorder and its relationship to posttraumatic stress symptomology.

**Posttraumatic Stress Disorder.** Posttraumatic Stress Disorder is a form of psychopathology that may manifest after exposure to a traumatic event produces symptoms including re-experiencing of the traumatic event, avoidance of reminders of the traumatic event, and excessive levels of physiological arousal (APA, 1994). According to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000), the traumatic event must have threatened the life or physical integrity of the sufferer or another person (witnessed by the sufferer) in order to meet diagnostic criteria. The DSM-IV also allows that PTSD can result from learning that a family member or close friend suffered an unexpected or violent death (or threat thereof). In addition, the person’s immediate reaction must include intense fear, helplessness, or horror. Typical but not exhaustive examples of events that are associated with the development of PTSD are combat, violent assault, terrorist attacks, torture, natural and manmade disasters, automobile accidents, and being diagnosed with a life-threatening illness (American Psychiatric Association, 2000).

When PTSD was first introduced in the DSM-III as a distinct disorder (American Psychiatric Association, 1980), traumatic events were defined, in part, as those that were *outside the range of usual human experience*. However clinical experience suggested that
traumatic reactions were occurring even when events were \textit{inside the range of usual human experience} (Joseph et al., 1997) and that the individual’s perception of the event has a role in the development of PTSD symptomology. Research supporting this position culminated in the amendment of diagnostic criteria such that the stressor need not be restricted to an objective list of events outside the range of usual experience, but rather, can reasonably include any events that threaten the life or physical integrity of the person (APA, 2000). This definitional shift opened the door to research suggesting that childbirth does indeed meet the litmus test for a traumatic event when the woman perceives the physical integrity or life of herself or infant as threatened and this perception is accompanied by feelings of fear, helplessness, or horror (Bailham & Joseph, 2003).

Estimates of exposure to trauma suggest that more than half of men and women in the United States (U.S.) have experienced a traumatic event though men report greater rates of trauma experience than do women (Breslau et al., 1991; Kessler et al., 1995; Vrana & Lauterbach, 1994). However, the type of trauma differs by gender with women more likely experiencing rape, molestation, or sexual assault and men more likely experiencing physical assault, accidents, or combat (Norris et al., 2002).

Only a portion of those exposed to trauma go on to develop Posttraumatic Stress Disorder. Evidence of traumatic symptomology during or soon after exposure is thought in part to reflect a normal neurobiological stress-response system that when prolonged and associated with alterations in the self (e.g. values about the self and the world) lead to the development of PTSD (Wilson, 2004). Overall prevalence rates of PTSD suggest that approximately 8% of the U.S. population will at some time suffer from this disorder (APA, 1994). When separated by gender the rates show a consistent pattern of women having a
greater susceptibility for developing PTSD than men, despite the fact that men are more likely to experience a traumatic event. Estimates of the rate of PTSD in the U.S. range from 10.4%-12.4% for women and 5-6% for men (Breslau et al., 1991; Kessler et al., 1995; Resnick et al., 1993).

Speculation concerning gender differences in the development of PTSD focuses on the idea that sexual violence (which is more likely to be perpetrated against women) confers a higher conditional risk for the development of PTSD (Norris, Foster & Weisshaar, 2002) and that women have greater levels of physiological reactivity that also increase the risk for development of PTSD (Shalev et al., 1993). Others have suggested that female gender identity consists of cognitions or beliefs (e.g. helplessness or weakness) that are themselves risk factors for the pathological cognitions associated with PTSD (Saxe & Wolfe, 1999; Tolin & Foa, 2002). Some or all of these theories may account for why women also show greater chronicity of PTSD than men (Norris et al., 2002).

Studies of exposure to trauma are typically conducted by using an assessment tool containing a list of possible traumatic experiences (e.g. life-threatening accident, sexual assault, sexual molestation, fire/disaster, combat, and physical assault). No standardized questionnaires used to estimate the prevalence of PTSD in the United States have asked specifically about traumatic birth experiences. Only two standardized measures, the Traumatic Life Events Questionnaire (Kubany et al., 2000) and the Life Stressor Checklist-Revised (Wolfe et al., 1996) have ventured into women’s reproductive territory by asking about traumatizing experiences such as miscarriage and abortion. Thus estimates of exposure to trauma and PTSD prevalence rates in the U.S. do not currently include estimates of traumatic reactions to childbirth.
Conceptualizing traumatic childbirth experiences as a “legitimate” source of PTSD or posttraumatic symptomology is consistent with literature showing a relationship between treatment for medical illnesses and the development of PTSD and its symptomology. In a recent review article (Tedstone & Tarrier, 2003), PTSD prevalence rates were examined across a number of medical conditions. Myocardial Infarction was associated with a PTSD rate of 0-16%; cardiac surgery 10.8-18%; stroke 9.8%; pregnancy loss 7%; elective abortion 1%; gynecological procedures 6%; intensive care treatment 14-59%; diagnosis with Human Immunodeficiency Virus (HIV) 30-35%; and awareness during general anesthesia 6.6%. Rates of PTSD in women diagnosed with breast cancer range from 5-19% (Kangas et al., 2002). While the rates of PTSD attributed to varying medical conditions vary, most are consistent with the overall rate of this disorder in the U.S.

**Adjustment Disorder.** In some cases the most appropriate diagnosis after exposure to a trauma is not PTSD but Adjustment Disorder (AD). AD is considered a, “…residual category used to describe presentations that are a response to an identifiable stressor and that do not meet the criteria for another specific Axis I disorder” (American Psychiatric Association, 1994; pp. 682). According to the DSM-IV, a diagnosis of Adjustment Disorder instead of PTSD is appropriate under either of two conditions: the stressor is not considered severe enough, or in other words was not life-threatening, or when a severe stressor was present but the pattern of posttraumatic stress symptomology does not fully meet the criteria for a diagnosis of Posttraumatic Stress Disorder (American Psychiatric Association, 2000). The primary component of an AD is that in the face of an “identifiable” stressor the person experiences emotional or behavioral problems that are judged clinically significant.
A diagnosis of Adjustment Disorder would be appropriate only if the stressor occurred in the preceding three-month time period and the person experiences distress that is out of proportion with the stressor or has significant impairment of their functioning (e.g. social, occupational, or academic). A diagnosis of AD would be inappropriate in the presence, for example, of bereavement. Examples of less severe stressors given in the DSM-IV are divorce, living in a crime-ridden neighborhood, and becoming a parent (American Psychiatric Association, 2000).

The prevalence rates of AD vary. Samples of the general community suggest the rate ranges from 2-8%, however, rates as high as 50% have been seen in medical populations following specific procedures such as cardiac surgery (American Psychiatric Association, 2000). In the current study a diagnosis of AD would be appropriate in cases where women are experiencing posttraumatic stress symptomology that does not meet the full criteria for diagnosis of PTSD but that is clinically relevant in that women are experiencing emotional distress. This may occur, for example, when childbearing was perceived as extremely stressful but not traumatic and significant stress symptoms are present, or when childbearing meets criterion A (i.e. actual or threatened injury to self or other and intense fear, helplessness, or horror) but the woman experiences sub-clinical levels of symptoms.

**Posttraumatic Stress after Childbirth**

Posttraumatic stress after childbirth or postpartum PTSD (PP-PTSD) is defined as the development of posttraumatic stress disorder as a result of experiencing a traumatic birth (Bailham & Joseph, 2003). The traumatic experience can include incidents such as obstetrical procedures (i.e. cesarean section, vacuum extraction, or forceps instrument) uncontrolled excessive pain, or seeing a limp non-responsive infant (Creedy et al., 2000).
Researchers acknowledge that, “While childbirth is quite a stressful experience for most women, delivery rarely overwhelms existing coping mechanisms to cause long-term psychological changes” (Moleman et al., 1992). Thus diagnosis of PTSD after childbirth is viewed as an exceptional reaction to childbearing that occurs under specific conditions that are consistent with DSM-IV diagnostic criteria. In other words, the experience must have involved actual or threatened death or serious injury to the woman or her child, and the woman must experience extreme fear, helplessness, or horror in response to the situation.

The next three sections include the differentiation of PTSD after childbirth from postpartum depression, a review of studies presenting a clinical or subjective picture of PP-PTSD, and a review of objective studies attempting to determine the rate of PP-PTSD in samples of Swedish, Australian, British, Norwegian, German, Italian, and American women. A summary table of prevalence studies is provided on page 18.

**Postpartum Depression versus Postpartum Posttraumatic Stress Disorder.**

Posttraumatic Stress Disorder and depression are distinct diagnoses; however, in the few studies that exist of postpartum PTSD it has been shown that women with this disorder often present with depression as well (Ballard et al., 1995; Reynolds, 1997; Soderquist et al., 2009; Zaers et al., 2008). Despite the overlap in symptoms and co-existence of PP-PTSD and PP-Depression, researchers have shown that these disorders also present independently (Czarnocka & Slade, 2000; Lyons, 1998; Zaers et al., 2008). In a study of PP-PTSD in 63 deliveries of stillborn fetuses it was found that there was great correspondence between PTSD category and scores on the Edinburgh Postnatal Depression Scale (Turton et al., 2001). Eight women met the criteria for both PTSD and depression; nine met the criteria for depression only; and five met the criteria for PTSD but not depression.
Appropriately identifying PP-PTSD and differentiating it from PP-Depression has important implications for treatment. When a diagnosis of PTSD is “missed” by clinicians, women end up diagnosed with multiple (on average four) disorders that obscure the true nature of their pathology (Cloitre, 1998; Elliot, 1995). This in turn interferes with effective case conceptualization and treatment, or results in treatment on the basis of secondary pathology only, which is unfortunate given that treatments for PTSD are highly effective (Cloitre et al., 2002). One impediment to the diagnosis of PTSD in women may be failure on the clinician’s part to consider gender-specific events (Cloitre et al., 2002) that may have been experienced as traumatic such as miscarriage, abortion (Menage, 1993), or childbirth (Ayers & Pickering, 2001; Creedy et al., 2000; Czarnocka & Slade, 2000; Wijma et al., 1997).

In the case of psychopathology manifesting after childbirth, the assumption may be that the woman is experiencing (only) depression, which would be an understandable conclusion given the co-morbidity of these diagnoses (Ballard et al., 1995; Reynolds, 1997) or at least the overlap in symptomology (American Psychiatric Association, 2000). Unfortunately someone suffering from both PTSD and depression experiences greater role impairment (work, school, home) and greater dysfunction than someone with PTSD alone (Blanchard et al., 1998; Shalev et al., 1993). Thus appropriate differential diagnosis that leads to appropriate treatment is necessary.

**Clinical Presentation of PTSD after Childbirth.** Case studies and phenomenological studies of women with postpartum Posttraumatic Stress Disorder have sought to describe this disorder and have found that the clinical presentation is similar to that of other traumas although stimuli differ. For example, avoidance may take the form of
requesting a tubal ligation (to prevent subsequent conception), not discussing the childbirth or avoiding exposure to childbirthing material (e.g. TV programs or books), abstaining from sexual intercourse (Beck, 2004), using multiple forms of birth control simultaneously (Fones, 1996), terminating subsequent pregnancies (Gold-Beck-Wood, 1996), refusal to breastfeed the infant (Reynolds, 1997), or requesting elective cesarean section for subsequent deliveries (Creedy et al., 2000; Ryding et al., 1997; Waldenstrom et al., 2006).

Re-experiencing includes intrusive recollections of the birth, nightmares of dying during childbirth, reliving the traumatic birth and birth-associated pain during intercourse, and reliving the traumatic birth on anniversary dates (Ballard et al., 1995; Fones, 1996; Beck, 2004). Hyperarousal may take the form of muscle tension, startling easily, and developing panic attacks when faced with reminders of the delivery, including even non-gynecological visits to doctors’ offices or hospitals (Beck, 2004).

In an internet study that recruited 38 women through the website Trauma and Birth Stress (www.tabs.org.nz), mothers were asked to describe their experience of postpartum PTSD in narrative form (Beck, 2004). Women were considered to have PP-PTSD if they self-reported that a healthcare professional had diagnosed them with this disorder. Five themes emerged from these narratives: flashbacks that the mothers’ described as re-looping movies they could not avoid watching; feeling like a shadow of their former selves, which included numbing and emotionally detached sensations; feeling “obsessed” with trying to cognitively work out why or how the traumatic birth came about; frequent if not constant feelings of anger, anxiety, and depression; and feeling isolated from other mothers who were all perceived to have had normal or non-traumatizing births.
Women in this study reported that they often could not tolerate sexual intercourse or spending time with mothers who did not have traumatizing births, and that they spent time “grieving” for children they might have had but would not due to fears of undergoing another birth. Despite this fear almost half of women chose to bear more children. However, women who chose to become pregnant again (42%) reported feeling intense anxiety and fear throughout their subsequent pregnancy (some to the extent of having suicidal thoughts and panic attacks), while a minority of these women sought “more supportive” second births (homebirths with midwives and doulas), which they reported helped to heal the trauma from the prior birth.

In a second phenomenological study (Allen, 1998), 145 women from the U.K. were screened for traumatic delivery, of which 26 reported their delivery was extremely distressing. Eight women were “likely” suffering from PP-PTSD based on scores from the Impact of Events Scale (Horowitz et al., 1979). Of the 26 women, half underwent emergency c-section or instrument delivery (vacuum extraction or forceps instrument). Concerns that were reported by the 26 women were having lost control during labor; feeling intense pain; reliving a prior traumatic delivery; lack of reassurance by the medical staff, which contributed to feelings of distress and isolation; and fearing that they or their child would not survive the delivery. Women whose IES scores suggested a likely PP-PTSD diagnosis reported continued feelings of anger, fearing future childbearing and intention to avoid future pregnancy, intrusive memories of the delivery, feelings of guilt (that they had somehow caused the problematic delivery), loss of physical and emotional intimacy with their partner, and continued feelings of emotional detachment from their infant.
While these phenomenological studies provide a clinical picture of PP-PTSD, a few studies have sought to quantitatively explore the development of PTSD after childbirth in larger samples of women. All but one of the following studies has been conducted outside of the United States. Consequently, little is know about the incidence or risk factors associated with PTSD after childbirth in American women.

**Incidence Studies.** This section provides details regarding rate of Postpartum Posttraumatic Stress Disorder found in countries where this phenomena has been investigated.

**Studies of Women in Sweden.** Wijma, Soderquist, and Wijma (1997) assessed the prevalence of PP-PTSD in 1,640 Swedish women who had recently given birth and found that 28 women (1.7%) met the DSM-III criteria for Posttraumatic Stress Disorder. Women were assessed only after their delivery and thus it is not known whether any suffered from pre-existing PTSD. In the postpartum trauma assessment researchers did ask women to rate their symptomology with regard to the recent childbearing experience only. This was accomplished using the Traumatic Event Scale (unpublished), which the authors developed based upon DSM-IV criteria for diagnosis, and whose sole stressor criterion is the recent childbirth experience. Women who developed PP-PTSD were more likely experiencing their first delivery, however, they caution against assuming that multiple birth experiences decrease the likelihood of PTSD as an equally reasonable conclusion is that women with traumatic birth experiences are less likely to undergo subsequent pregnancy. Women who developed PP-PTSD also reported greater levels of fear of childbearing, however, this fear was not measured prior to labor and delivery and thus it is unknown whether their fear was only a consequence of their current birth experience.
The most recent and comprehensive study of PP-PTSD was conducted by this same group of researchers (Soderquist et al., 2006). Traumatic stress related to childbearing was measured both during pregnancy and post-delivery using the Traumatic Event Scale. PP-PTSD was found in 1.7% of women at four weeks postpartum. The researchers note that women who failed to take part in the postpartum assessment were more likely to have higher trait anxiety and fear of childbirth, which are both associated with greater likelihood of developing PP-PTSD. Thus the rate of PP-PTSD may be underestimated in this sample. Women were also assessed at months four and seven post-delivery and it was found that approximately 1% of the sample met the criteria for chronic PTSD one year after delivery. Again, attrition was more likely to occur among women with higher levels of distress and thus this rate of chronic PTSD may be a conservative estimate.

**Studies of Women in Australia.** In Australia researchers have found incidence rates ranging from 2% (White et al., 2006a) to 5.6% (Creedy et al., 2000). As in the Wijma and colleagues study the Creedy and White groups did not screen women for a history of PTSD or prior traumatic experiences. The Creedy study employed postpartum telephone interviews where women were asked to describe their birth experience and if the description was judged traumatic, which occurred in 335 out of 499 of the cases, the Posttraumatic Stress Symptoms interview (PSS) scale was administered to determine diagnostic status. In addition to the 28 women who were classified as PTSD cases, 113 women (22.6%) were experiencing significant posttraumatic symptomology. The White study was more methodologically rigorous in that all women were screened for PTSD.

**Studies of Women in the United Kingdom.** Two studies of PTSD after childbirth in British women have found comparable rates of trauma (2.6-3%) when assessed four weeks
Ayres and Pickering (2001) conducted a prospective study and sought to rule out pre-existing PTSD in order to determine the rate at which new cases attributable solely to childbearing occur. Importantly, the researchers excluded women choosing elective c-sections and women whose babies died immediately before or after birth although studies have shown that elective c-sections may be chosen by women particularly fearful of labor and delivery, and that perinatal death is associated with posttraumatic symptomology (Ballard et al., 1995; Menage, 1993; Turton et al., 2001; Engelhard et al., 2001). It is unclear how these exclusions may have affected the rate of PTSD in this study (e.g. it is unknown whether ‘even’ elective c-section may be traumatic). As with the Creedy study in Australia, Ayers and Pickering used the PSS to assess childbirth trauma, which the researchers chose due to its reputation for providing conservative estimates of PTSD. However the Minnesota Multiphasic Personality Inventory (MMPI) was used to assess pre-existing PTSD.

Ayers and Pickering conclude that the rate of PTSD in their sample of women in the U.K. is a conservative estimate due to attrition, the use of a conservative measure for postpartum PTSD, and the demographics of the participants (predominately highly educated professionals). The researchers restricted their analysis to the number of likely PTSD cases and did not provide data concerning levels of posttraumatic symptomology not meeting diagnostic criteria for PTSD. Even with the conservative estimate of PP-PTSD, the researchers point out that based on birth rates in the U.K., 10,000 new cases of PTSD after childbirth could develop annually.

Czarnocka and Slade (2000) also carried out a prospective study of PP-PTSD in British women, however, the baseline measures were administered in the first 72 hours after
Diagnosis of postpartum PTSD was accomplished using the Posttraumatic Stress Disorder Questionnaire (PTSD-Q) in which the stressor criterion was specified as the recent labor and delivery. Using the strict guidelines for scoring the PTSD-Q the authors found that 3% of the participants obtained a diagnosis of PTSD six weeks post-delivery and that an additional 24.2% were experiencing significant posttraumatic symptomology. This led the researchers to suggest that out of 700,000 births per year in the U.K., up to 21,000 women per year may suffer from Posttraumatic Stress Disorder or severe symptomology. Approximately 5,250 of these women would be missed by postpartum mental health assessments (conducted on all postpartum women in the U.K.) that rely solely on the Edinburgh Postnatal Depression Scale.

**Studies of Women in Norway.** Researchers in Norway have investigated posttraumatic stress reactions after childbirth in both mothers and fathers (Skari et al., 2002). The incidence of PTSD in women was determined by reviewing the level of avoidance, intrusion, and hyperarousal as measured by the Impact of Events Scale (Horowitz et al., 1979) and it was found that 0.8% of women would be classified as having childbirth related-PTSD at six months postpartum. Although this rate of PTSD is one of the lowest researchers have found, it is important to note that only women who had delivered *healthy* babies were included in the study. Seventeen of 138 women were excluded from the analyses because their infant was admitted to the Neonatal Intensive Care Unit (NICU). This exclusion likely removed from the sample women who may have experienced fear that they or their child would be harmed during the delivery. This in effect removes women who meet part of the criteria for PTSD and calls into question the estimate of rates the researchers provide for
Norwegian women. It is also unknown how many women in this sample may have been experiencing sub-clinical levels of posttraumatic stress symptoms.

*Study of Women in Germany.* Rates of PTSD after childbirth in a sample of 60 German women were 6.0% at six weeks postpartum, and contrary to other longitudinal studies, increased to 14.9% at the six-month assessment (Zaers et al., 2008). PTSD was not assessed during pregnancy, thus it is unknown how many cases might have been pre-existing. In addition, another 28% of women were found, at six-weeks postpartum, to meet criteria for subclinical levels of PTSD on the Posttraumatic Stress Diagnostic Scale (Foa et al., 1997). In addition to finding an increase in PTSD symptoms, the authors report depression scores were stable between the 6-week and 6-month assessments, unlike other measures of symptomatology such as state anxiety, insomnia, and social dysfunction, which lessened during the postpartum time period. The authors also assessed postpartum co-morbidity (depression and PTSD) and found that 12% of women met the criteria for PTSD and depression at 6-weeks and 14.9% at 6-months. Importantly, subclinical levels of PTSD declined in the postpartum whereas women who met full diagnostic criteria for PTSD increased during this time. The investigators found that pre-delivery anxiety levels and negative birth experiences were significant predictors of postpartum diagnostic status.

*Study of Women in Italy.* One investigation into PTSD after childbirth has been conducted in a sample of Italian women (Maggioni et al., 2006). Results showed that 2.4% of women met the full criteria for a diagnosis of PTSD and an additional 32% were positive on at least one of the symptom clusters (i.e. re-experiencing, avoidance, or hyperarousal). Although this was a prospective study, PTSD was not assessed during pregnancy. Importantly women with a psychiatric diagnosis (according to their medical charts) were not
invited to participate in the study however PTSD after delivery was positively correlated with depressive symptomology both during pregnancy and after childbirth. Symptoms of PTSD were not found to be related to desired or perceived social support.

**Study of Women in the United States.** In the sole study investigating PP-PTSD in the United States 1.9% of women met the criteria for a likely diagnosis of PTSD and an additional 30% of the participants were experiencing posttraumatic symptomology four weeks post-delivery (Soet et al., 2003). PTSD status was determined using the Traumatic Event Scale developed by Wijma and colleagues. Pre-existing PTSD was assessed by a question asking women if they had experienced a traumatic event in the past.

Unlike the aforementioned prevalence studies that recruited women directly from hospitals, Soet and colleagues recruited 100 women who were attending childbirth education classes in the Atlanta area. The researchers did not provide information about these classes and it is possible this group of women may represent a specific type of pregnant woman who seeks childbearing information and these women may have been less likely to develop PP-PTSD (e.g. most participants had a bachelors degree or higher level of education, most were Caucasian, and most had incomes of greater than $50,000 per year, which is not reflective of demographics for the Atlanta area; lower levels of education and non-Caucasian race are risk factors for the development of PTSD [Brewin, 2000]). Although all of the participants were engaged in childbirthing classes, those women who went on to develop PP-PTSD or symptomology reported having received inadequate information regarding labor and delivery and these women rated their confidence in their ability to labor as lower than asymptomatic women.
In summary, as Table 1 below shows, the rate of PTSD in the studies reviewed ranged from 0.8% to 6.0%. In a sample of women in the U.S. PTSD was diagnosed in 1.9% of women. Several of the studies showing lower rates of Posttraumatic Stress Disorder had potential flaws such as poor sampling (i.e. samples drawn from non-representative populations or exclusion criteria that removed likely PTSD cases from the study). Given low rate of Posttraumatic Stress Disorder in the sample of women in the U.S. (Soet et al., 2003), and the higher rate of general PTSD in American women, it may be that PTSD was underestimated by this investigation.

Table 1

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Country</th>
<th>N</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayers &amp; Pickering, 2001</td>
<td>U.K.</td>
<td>289</td>
<td>2.8% at 6 wks</td>
</tr>
<tr>
<td>Creedy, Sochet &amp; Horsfall, 2000</td>
<td>Australia</td>
<td>499</td>
<td>5.6% at 6 wks</td>
</tr>
<tr>
<td>Czarnocka &amp; Slade, 2000</td>
<td>U.K.</td>
<td>264</td>
<td>3.0% at 6 wks</td>
</tr>
<tr>
<td>Maggioni et al., 2006</td>
<td>Italy</td>
<td>93</td>
<td>2.4% at 3-6 months</td>
</tr>
<tr>
<td>Skari et al, 2002</td>
<td>Norway</td>
<td>127</td>
<td>0.8% at 6 months</td>
</tr>
<tr>
<td>Soderquist, Wijma &amp; Wijma, 2006</td>
<td>Sweden</td>
<td>1224</td>
<td>1.7% at 4 wks</td>
</tr>
<tr>
<td>Soet, Brack &amp; Diloria, 2003</td>
<td>US</td>
<td>103</td>
<td>1.9% at 8 wks</td>
</tr>
<tr>
<td>White et al., 2006</td>
<td>Australia</td>
<td>270</td>
<td>2.0% at 6 wks</td>
</tr>
<tr>
<td>Wijma et al., 1997</td>
<td>Sweden</td>
<td>1640</td>
<td>1.7% 1-13 months</td>
</tr>
<tr>
<td>Zaers et al., 2008</td>
<td>Germany</td>
<td>47</td>
<td>6.0% at 6 weeks</td>
</tr>
</tbody>
</table>

Four studies reported not only the rate of PTSD “cases” but also the percentage of women experiencing significant posttraumatic symptomology, although how these
percentages were calculated varied among studies. These estimates range from 22.6% in a sample of Australian women to 30% in a sample of U.S. women (Creedy et al., 2000; Czarnocka & Slade, 2000; Soet et al., 2003; Maggioni et al., 2006). These women were experiencing distress that may have been of clinical significance and it is possible these women could meet the criteria for a diagnosis of Adjustment Disorder. It appears the psychological distress associated with birth is not limited to the number of women meeting the criteria for a diagnosis of PTSD after childbirth.

The remaining sections of this literature review detail factors thought to contribute to the development of PTSD related to childbirth and is organized into three domains: historical factors present in the woman’s past include prior traumas such as sexual assault and miscarriage; current situational factors include whether a woman has given birth before and presence of psychopathology; and dispositional factors include variables such as fear of childbirth, anxiety sensitivity, and belief in the ability to cope with labor and delivery. Each of these domains is likely influenced by factors in other domains (e.g. history of sexual assault may contribute to whether there is current psychopathology) and this presentation is intended simply to provide a means for organizing the factors that may be related to the development of PTSD after childbirth.

**Traumatic Stress after Childbirth: Historical Factors.**

**History of Sexual Abuse.** Women who develop PTSD after childbirth are more likely to have a history of sexual trauma and women who have experienced past sexual abuse are 12 times more likely to experience the childbirthing event as traumatic whether or not they go on to develop PTSD (Soet et al., 2003). Those who have experienced sexual abuse or assault report that labor sensations and the process of labor feel similar to the sensations
they experienced during the assault (Rhodes & Hutchinson, 1994). Some of the feelings reported that were common to both events were pain, lack of being in control of the situation, and being exposed. Women even reported that some of the behavior of medical staff such as exhortations to “open your legs”, “cooperate”, or “be a good girl” were the type of phrases used by the assailant. In addition, women with a history of sexual or physical abuse are more likely to have high levels of childbearing fear (Heimstad et al., 2006).

In a study of 26 women who were being treated for extreme fear of childbearing (some to the extent of choosing abortions rather than childbearing and others reporting feeling extreme relief after miscarriage), eight had a history of childhood sexual abuse and rape (Hofberg & Brockington, 2000). Many of the women in this sample would only carry a child to term after their obstetrician agreed to provide an elective c-section (some going so far as to request this surgery even prior to becoming pregnant). Half the women sought sterilization after their only delivery.

**Miscarriage and Stillbirth.** Half of women who experience a stillbirth or miscarriage become pregnant again within one year (Hughes et al., 1999). Researchers have speculated that PTSD as a result of the prior stillbirth could be present during the subsequent pregnancy. In a sample of 56 women in their third trimester of a pregnancy subsequent to stillbirth, investigators found that 13 women (21%) met the criteria for diagnosis of PTSD (Turton et al., 2001). This finding is consistent with case-studies that have shown the presence of traumatic stress and anxiety in women during pregnancies subsequent to stillbirth (Born et al., 2006). Additionally, women who have experienced stillbirth have been shown to experience high and persisting levels of anxiety during subsequent pregnancies (Brisch et al., 2005).
**Traumatic Stress after Childbirth: Situational Factors.**

*Psychopathology.* Women who develop traumatic reactions to childbirth are more likely to have received counseling or other psychiatric services in the past (Wijma et al., 1997) and to self-report a “past mental health difficulty” (Czarnocka & Slade, 2000). Wijma and colleagues speculate that prior counseling may be a marker for psychological vulnerability that places women at risk for developing PTSD after childbirth. This could, in part, explain why some “less” traumatic birth experiences can elicit posttraumatic symptomology in some women. Soderquist and colleagues (2004) found that pregnant women who were more fearful of childbearing and who were experiencing diagnostic levels of traumatic stress were also more likely to report higher levels of trait anxiety and a history of psychological counseling. Unfortunately it is not clear from the research what is specifically meant by mental health or psychiatric history (e.g. self-report of past mental health difficulty could refer to the person’s perception, a formal diagnosis, or something else entirely).

*Mode of Delivery.* In a sample of German women, those who were most dissatisfied with their delivery experience were women who underwent operative deliveries (Neuhaus et al., 1994), with 63% of women who underwent forceps deliveries (versus 20% of women undergoing cesarean section) reporting extreme dissatisfaction. Others have found that highly anxious women are twice as likely to require an assisted delivery (i.e. forceps or vacuum extraction) as less anxious women (Heimstad et al., 2006). In addition, women with higher levels of childbearing fear may be more likely to require emergency c-sections (Ryding et al., 1998c; Saisto et al., 1999) though not all studies have supported this finding (Johnson & Slade, 2002).
Ryding and colleagues (1997) in an investigation of 25 women who underwent emergency c-section found that 19 women met the DSM-IV PTSD criterion A for having experienced a traumatic event (i.e. feared for their own life or the life of the infant and responded with intense negative emotion). Of these nineteen women, thirteen reported posttraumatic symptomology (six of whom the researchers referred for psychological treatment) in the form of re-experiencing the trauma through intrusive thoughts and hyperarousal. In a case study review of four women with PTSD after childbirth, incomplete anesthesia that allowed a participant to experience extreme pain during c-section was indicated as the cause of chronic PTSD (Ballard et al., 1995).

In a similar study 53 women who underwent emergency c-section were interviewed to determine whether the surgery met the stressor criterion for PTSD (Ryding et al., 1998a). General anesthesia was used for fifty of the women. Fear was the dominant feeling immediately preceding the delivery with half of women being very afraid that they would lose the baby or be injured during the delivery. Twenty-six percent feared for their own lives. Over half of women experienced some type of extreme fear that met the stressor criterion for PTSD, leading the investigators to conclude that for many women emergency or unplanned c-section may be a precursor to posttraumatic stress.

In a subsequent study the researchers compared women who had undergone emergency c-section (71 women), elective c-section (70 women), instrument vaginal delivery (89 women), and unassisted vaginal delivery (Ryding et al., 1998b). Women in the first three groups were enrolled until there was a minimum of 70 per group; enrollment of women experiencing unassisted vaginal deliveries was conducted periodically throughout the study.
time-frame. Posttraumatic stress was assessed using the Impact of Events Scale and cognitive appraisal of the delivery was assessed using the Wijma Delivery Experience Scale.

Women who had emergency c-sections appraised their delivery more negatively than women in other groups and showed greater posttraumatic stress than women who underwent elective c-sections or unassisted vaginal deliveries. Five women from the sample (none of whom had unassisted deliveries) had high enough scores on the IES to suggest a diagnosis of PTSD. Both the instrument vaginal delivery and emergency c-section groups viewed their births more negatively and experienced greater posttraumatic stress than women who had elective c-sections or unassisted deliveries; the researchers suggest that women undergoing the former should be screened at postpartum visits for posttraumatic stress.

Wijma and colleagues followed these studies with a prospective investigation of women who underwent emergency c-section to determine what factors may contribute to the development of posttraumatic stress after this surgery (Wijma et al., 2002). Questionnaires were given to 1981 women at 32 weeks of gestation, several days post-delivery, and one-month post-delivery. Both fear of childbirth and general anxiety before delivery predicted traumatic stress after an emergency c-section. Since fear of childbearing has been shown to increase the risk for emergency c-section (Ryding et al., 1998c) researchers point to the need for identifying severely fearful women prior to labor and delivery for interventions that may make c-sections less likely, or that at least will help vulnerable women cope after surgery.

A separate study of Swedish women (N=1550) looked at mode of delivery and development of posttraumatic stress (Soderquist et al., 2002). PTSD symptoms were more likely to occur in women who underwent emergency c-sections or instrument vaginal deliveries compared to elective c-sections or unassisted vaginal deliveries. Women who had
unassisted vaginal deliveries and who nonetheless developed symptoms of posttraumatic stress were more likely to have a history of psychological counseling; however, this was not true of women who underwent operative deliveries and developed posttraumatic stress. This suggests that more “objectively” traumatic deliveries, such as emergency c-section, may need to be present to elicit PTSD in women with no sexual abuse or psychiatric history.

Similarly, Creedy and colleagues (2000) found that in a sample of Australian women, those who underwent emergency c-section, forceps delivery, or vacuum extraction were more likely to develop PTSD symptomology after delivery. The development of trauma symptoms was even more likely if women underwent one of these obstetrical interventions and rated their care by medical staff as poor. Although not considered an operative intervention, Czarnocka and Slade (2000) found that women who developed PTSD or significant symptomology were also more likely to have had an episiotomy.

In looking at distress associated with mode of delivery, forty women in the U.K. were assessed after emergency c-section, induced vaginal delivery, spontaneous vaginal delivery, or instrument vaginal delivery. Women of premature infants and women with a psychiatric history were not included in the study (Maclean et al., 2000). Women in the instrument vaginal delivery group were significantly more distressed by their birth experience than women in the other groups, believed that they were at risk of severe injury during the delivery, and considered their pain control “not at all sufficient”. The finding that women with emergency c-sections were not distressed by their births (or at least not as distressed as women undergoing instrument delivery) is inconsistent with the aforementioned studies; however, this study consisted of a much smaller sample and also excluded mothers of premature infants and those with a history of psychological care; both have been shown in
prior studies to play a role in the development of traumatic stress reactions after operative deliveries. One study of German women has similarly failed to demonstrate an association between postpartum trauma symptoms and mode of delivery although worse appraisal of delivery was associated with increased trauma symptoms (Zaers et al., 2008).

While the role of situational factors such as presence of pre-delivery psychopathology in the development of PTSD after childbirth is unclear or conflicting, there is significant support for the role of mode of delivery (i.e. c-section, instrument, or unassisted vaginal) in the subsequent development of traumatic stress. In the following section, additional factors that may affect the development of traumatic reactions such as anxiety sensitivity, fear of childbirth, and self-efficacy for labor, are reviewed.

**Traumatic Stress after Childbirth: Dispositional Factors.**

*Anxiety Sensitivity.* Anxiety sensitivity (AS) refers to the fear of physiological symptoms of anxiety based on the belief that the symptoms or sensations have harmful consequences (Reiss et al., 1986). A review of the literature (Asmundson et al., 2000) suggests there is consensus that anxiety sensitivity is itself a distinct component of trait anxiety and that AS is associated with diagnoses such as panic attacks and Panic Disorder as well as PTSD, depression, and hypochondriasis. In his review in 2000 Asmundson recaps the expectancy model of fear from which the concept of anxiety sensitivity was founded. The essential components of this model are that there are fundamental fears (fear of anxiety symptoms, fear of illness, injury, or death, and fear of negative evaluation) and common fears (e.g. fear of spiders or flying). The expectancy model of fear postulates that someone with higher levels of fundamental fear is more prone to the development of common fear(s).
Anxiety sensitivity is thought to represent a vulnerability factor or etiological factor that plays a role in the development of common fear.

Anxiety sensitivity is measured by the Anxiety Sensitivity Index (ASI) and was originally a 16-item questionnaire developed by Reiss and colleagues (1986). It has been developed into a longer 36-item version by other researchers (Taylor & Cox, 1998). AS has been linked not only to the psychiatric conditions mentioned above, but also to medical conditions such as gastrointestinal dysfunction, asthma, vestibular dysfunction, and chronic pain (Asmundson et al., 2000). With regard to pain, greater anxiety sensitivity has been show to exacerbate fear of pain in chronic pain patients (Asmundson & Taylor, 1996). In some studies patients with chronic pain and higher levels of AS have been show to use greater amounts of analgesic medications (Asmundson et al., 2000). Asmundson, in summarizing the work on pain, states higher levels of AS essentially exacerbates fear of pain and contributes to the maintenance of pain behaviors, and that anxiety sensitivity may predispose individuals to have more negative responses to painful events.

Given that there is an established relationship between anxiety sensitivity and anxiety disorders, Keogh and colleagues undertook a prospective study of PTSD after childbirth in pregnant women in the U.K. Women completed the ASI, General Health Questionnaire, and the Trauma History Questionnaire at 36 weeks gestation, and two measures of PTSD two weeks post delivery (Keogh et al., 2002). The ASI was highly correlated with and predicted the development of PTSD symptoms, and women who were delivered by elective c-section had significantly higher AS and PTSD scores than did other women. The reasons for elective c-section varied and included self-reported fear of childbirth. The authors conclude that AS may be a risk factor in the development of PTSD after childbearing. In a subsequent study of
women seeking elective c-section, women with negative expectations of delivery who were higher in AS were more fearful during the operation and experienced more pain after their surgery (Keogh et al., 2005).

The reviewed research suggests that those higher in anxiety sensitivity may have lower pain thresholds or at least experience the same level of pain as more distressing than those lower in AS. Saisto and colleagues have investigated pain tolerance prospectively in a sample of 40 pregnant women using the cold pressor test (CPT); half of whom feared childbearing and half of whom did not (Saisto et al., 2001a; Saisto et al., 2004). During pregnancy, fearful women tolerated the CPT for a significantly shorter time period (154 seconds versus 282 seconds) and this was true nine months post-delivery as well. Fearful women also rated the CPT as more painful than non-fearful women both during pregnancy and post-delivery. All women rated the CPT as more painful nine months post-delivery than while pregnant leading the researchers to suggest that pregnancy may increase pain tolerance, however this effect was blunted in fearful women who showed less pain tolerance both before and after childbirth.

*Fear of Childbirth.* Fear of childbirth, also referred to by some as tocophobia, may be experienced by more than 20% of pregnant women (Areskog et al., 1982; Searle, 1996) and reaches severe levels in approximately 6% (Areskog et al., 1982) to 11% of women (Waldenstrom et al., 2006). It is thought more common in first-time than second-time mothers (Alehagen et al., 2001; Wijma, 2003; Zar et al., 2001), however this finding may also suggest that only less fearful women, or women who have less traumatic first deliveries, are more likely to undertake subsequent pregnancies.
It has been proposed that primary tocophobia (prior to first delivery) is more likely to exist in women who have been exposed to stories of traumatic deliveries and/or who have experienced sexual trauma or abuse whereas secondary tocophobia (fear in women with prior birth experience) is a consequence of a traumatic first birth experience (Hofberg & Ward, 2004). In interviews with 26 British women with tocophobia, eight had fear of childbearing that dated back to adolescence; however the etiology of their fear was unknown. Fourteen of the remaining women developed fear of childbearing after a traumatic birth experience; of these fourteen women ten underwent operative deliveries and two sustained extensive perineal tearing (Hofberg & Brockington, 2000).

While some studies of childbearing fear simply ask women open-ended questions about fear of labor and delivery, a number of studies have relied on a standardized scale: the Wijma Delivery Expectancy/Experience Questionnaire (Wijma et al., 1998). The WDEQ has two versions: “A” is used prior to delivery and “B” post-delivery. Positive correlations between the WDEQ and state-trait anxiety scores have been found (Johnson & Slade, 2002; Zar et al., 2001); however, it has been shown that only 25% of the variance in the WDEQ is predicted by the State-Trait Anxiety Inventory (Speilberger et al., 1983) suggesting that the WDEQ measures a unique facet of anxiety or fear. Table 2 on the next page summarizes the results of studies investigating levels of childbearing fear using the WDEQ-A.

Researchers have proposed a cut-off score of $\geq 85$ is indicative of women who are significantly fearful of labor and delivery. This cut-off score has been used in numerous studies of childbearing fear and was first suggested by the Wijma group (Ryding et al., 1998c) after they found that women with fear scores above 85 had a three-fold increased risk of emergency cesarean sections and below this cut-off the risk was not increased.
Table 2

*Investigations of Childbearing Fear using the Wijma Delivery Expectancy Scale*

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Country</th>
<th>Cut-off*</th>
<th>N</th>
<th>M (SD)</th>
<th>Severe Fear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heimstad, 2006</td>
<td>Norway</td>
<td>≥95</td>
<td>126</td>
<td>NP=66(20)</td>
<td>7.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MP=60(24)</td>
<td></td>
</tr>
<tr>
<td>Johnson 2002</td>
<td>U.K.</td>
<td>--</td>
<td>123</td>
<td>NP=65(17)</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MP=58(20)</td>
<td></td>
</tr>
<tr>
<td>Nieminen, 2009</td>
<td>Sweden</td>
<td>≥85</td>
<td>1635</td>
<td>62(23)</td>
<td>15.6%</td>
</tr>
<tr>
<td>Rouhe 2008</td>
<td>Finland</td>
<td>--</td>
<td>1400</td>
<td>68(21)</td>
<td>--</td>
</tr>
<tr>
<td>Ryding, 1998</td>
<td>Sweden</td>
<td>≥85</td>
<td>1948</td>
<td>NP=54(21)</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MP=57(22)</td>
<td></td>
</tr>
<tr>
<td>Soderquist, 2004</td>
<td>Sweden</td>
<td>≥85</td>
<td>951</td>
<td>--</td>
<td>13.5%</td>
</tr>
<tr>
<td>Wijma, 1997</td>
<td>Sweden</td>
<td>--</td>
<td>1640</td>
<td>NP=52(27)</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MP=45(27)</td>
<td></td>
</tr>
<tr>
<td>Zar, 2002</td>
<td>Sweden</td>
<td>≥85</td>
<td>506</td>
<td>57(23)</td>
<td>11%</td>
</tr>
</tbody>
</table>

*Note.* NP=nulliparous women or women with no prior birth experience; MP=multiparous women or women who have given birth before. *All women at or above this score were judged to have severe fear of childbirth.

In a subsequent study (Zar et al., 2002) the Wijma group conducted diagnostic interviews of pregnant women using the Anxiety Disorders Interview Schedule (ADIS) and added a section that assessed for extreme levels of childbearing fear based on diagnostic criteria of phobia and endorsement of pursuing c-section for fear. Women who were found in interviews to suffer from phobic levels of childbearing fear showed mean WDEQ-A scores of 102. Women who were diagnosed with non-childbearing fear anxiety disorders showed mean WDEQ-A scores of 66; none of the latter women were seeking c-sections due to fear. Women who showed neither signs of childbearing fear nor anxiety disorders during the interview had mean WDEQ-A scores of 57. These results suggest that childbearing fear is not just an extension of general anxiety. In a later study (Soderquist, Wijma, & Wijma,
2004), pregnant women were assessed for diagnostic levels of traumatic stress in advance of labor and delivery and were shown to be seven times more likely to receive a diagnosis of “pre” traumatic stress if they scored higher than 85 on the WDEQ-A (i.e. meeting the DSM-IV criteria for PTSD) than women with scores below the cut-off.

**Incidence of childbearing fear.** Rates of childbearing fear have been studied in women from Sweden, Norway, and the U.K.. In a study of 1224 pregnant women in Sweden (Soderquist et al., 2004), level of anxiety, depression, coping, and social support were assessed in the 20th week of gestation and childbearing fear (measured by the WDEQ-A) and current level of “pre-traumatic” stress (measured by the Traumatic Event Scale; TES) were assessed in the 32nd week of gestation. The researchers hypothesized that diagnostic levels of traumatic stress would be present in women even before the “trauma” (i.e. the delivery) occurred. Diagnostic levels of pre-traumatic stress on the TES associated with the upcoming delivery were 1.1% for first-time mothers and 3.2% among women with prior experience of birth, and 13.5% of the women were judged to have severe fear of childbearing. Fear of childbearing was highly correlated with current levels of pre-traumatic stress and women with high levels of both were more likely to report a prior traumatic delivery.

While the researchers conclude that traumatic stress can pre-date the trauma, the high levels of traumatic stress existed mostly among women who had in fact experienced a prior traumatic delivery. This suggests that the women’s anticipatory levels of traumatic stress and fear likely were linked to their actual past experience of traumatic birth. What the researchers appear to have identified is that 1.1% of their sample, having never given birth before, had what would be considered phobic fear of childbearing (Wijma, 2003). An
additional 3.2% of their sample had a ‘diagnosis of pre-traumatic stress’ that in fact is related to a prior traumatic delivery. In addition, another 9.2% of the sample was experiencing severe fear of childbearing without showing concomitant levels of “pre” or posttraumatic stress.

In a prospective study also conducted in Sweden the stability of childbearing fear was assessed in 200 women at 32 weeks gestation, two hours post delivery, and five weeks post-delivery (Zar et al., 2001). Women were categorized as having low, moderate, or high levels of childbearing fear based upon their score on the WDEQ part A at week 32. Less fearful women exhibited less anxiety on the Spielberger State-Trait Anxiety Inventory (STAI) and women’s level of fear prior to delivery was consistent with their level of fear at both post-delivery time points. All women, regardless of baseline level of fear, experienced a reduction in childbearing fear at the five-week post-delivery assessment suggesting that removing the object of fear (labor and delivery) reduced the level of fear women were experiencing.

In a follow up study fear of childbearing and presence of anxiety disorders, eleven percent or 56 out of 506 women exhibited severe fear (Zar et al., 2002). Of these 56 women, eight were diagnosed with an anxiety disorder, five of them with PTSD related to a prior delivery. All eight women were intending to deliver via elective c-section. The investigators speculate that fear of childbearing sets the stage for experiencing labor and delivery as more dangerous than it objectively or usually is, which in turn maintains post-delivery levels of childbearing fear. In cases where emergency intervention is then needed during delivery, women with pre-existing childbearing fear may respond more fearfully than other women and this may contribute to the development of PTSD after childbirth. Unfortunately, this
higher level of fear appears to play a role in the physiological process of labor and delivery (though the mechanism of action is unclear) and greater childbearing fear appears to be a risk factor for the subsequent need for emergency c-section (Ryding et al., 1998c).

A smaller number of women were found to have excessive levels of childbearing fear (≥ 95 on the WDEQ) in a sample of Norwegian women (Heimstad et al., 2006) though the researchers caution that the response rate in this study (54%) may be contributing to a conservative estimate of fear level. In this sample 7.5% of women exhibited high levels of fear and among these women there was significantly greater likelihood of undergoing an instrument delivery (in this case vacuum extraction) and of having a history of sexual and/or physical abuse. Fear was not associated with the need for emergency c-section. Among women who had previously given birth, those who had undergone a prior operative delivery had higher mean scores on the WDEQ.

Researchers in the U.K. did not find that operative deliveries were associated with greater levels of fear on the WDEQ (Johnson & Slade, 2002) even though the mean level of childbearing fear was significantly higher than that found in the Swedish sample (Ryding et al., 1998c). Unfortunately the percentage of women exhibiting significant childbearing fear (≥ 85 on the WDEQ) was not reported so it is unclear how the rate of severe childbearing fear compares to that found in other countries. As the rate of c-section in the U.K. is twice that of Sweden, the researchers suggest that cultural difference in childbearing may be affecting the relationship between childbearing fear and operative delivery in the two countries.

One study has looked at fear of childbearing during labor and delivery (Alehagen et al., 2001). Thirty-five first-time mothers women and 39 women who had prior birth
experience were administered the Delivery Fear Scale (DFS). The DFS was developed by the investigators who report that unpublished data shows the 10-item DFS has a strong positive correlation with the WDEQ. First-time mothers had higher scores on the DFS (mean of 42.8 versus 29.5), had longer labors, and received more pain relief than women with prior birth experience. Fear did not predict the type of delivery (operative, instrument, etc.) however the investigators caution that this may have been due to the small sample size and that only six women had operative deliveries. The investigators conclude that higher levels of fear among first-time mothers may be “normal” due to their insecurities about what to expect of the process of labor and delivery. A subsequent investigation showed that fear of childbearing as measured by the WDEQ before and after labor and the DFS during labor shows stability across the three time-points and that women who are more fearful use greater amounts of pain medication during labor (Alehagen et al., 2006).

**Characteristics and Experiences of Fearful Women.** The Saisto and colleagues group in Finland have sought to determine what factors are associated with greater fear of childbearing. In the first study 100 women identified as fearing childbirth due to their request for elective c-sections were compared to 200 matched controls (Saisto et al., 1999). The fearful women had a greater number of prior miscarriages, were more likely to have used epidural analgesia in their prior delivery, were more likely to have been delivered by emergency c-section (45% versus 5%) or vacuum extraction (24% versus 14%), had longer stage one and stage two labors, and were more likely to have suffered a perineal laceration (9.1% versus 3.7%) than non-fearful women. Forty-four of the 100 fearful women could not isolate a cause for their childbearing fear and reported the whole experience was frightening; other women were able to isolate their fear to that of tearing, pain, or concern for the baby’s
welfare. There were no significant differences between fearful and non-fearful women in terms of demographic variables although other studies have found that advancing maternal age is associated with increased fear (Nieminan et al., 2009). However, advancing maternal age is also associated with increased use of fertility treatments, and difficulty attaining a pregnancy may increase a woman’s apprehension regarding labor and delivery.

The investigators in this research group also sought to determine which psychosocial characteristics may be associated with fearing childbearing (Saisto et al., 2001c). Two-hundred and seventy-eight unselected women and their partners took part in this study. The Pregnancy Anxiety Scale (Levin, 1991) and Fear of Childbirth Questionnaire (Areskog et al., 1982) were used to determine level of childbearing fear. Among women, higher fear scores were associated with more general anxiety, neuroticism, depression, lower self-esteem, and dissatisfaction with their partner. It is unknown whether the fearful women were more likely to have experienced a traumatic birth in the past. Thus it is unclear whether this fear is based on experience or expectation. Similar results have been found by other Swedish and U.K. researchers, who have also implicated personality traits and long-standing difficulties in relationships (Ryding et al., 2007) as well as trait anxiety (Ayers & Pickering, 2005) in excessive childbearing fear.

*Fear as a precursor to PTSD after childbirth.* In a study comparing Swedish women with and without PP-PTSD (Wijma et al., 1997), women with prior deliveries and current PP-PTSD were found to have higher levels of pre-delivery childbearing fear on the Wijma Delivery Experience Scale (part A) than women with no prior deliveries and current PTSD. Conversely, among the women without PTSD, those with prior deliveries had lower levels of childbearing fear than women with no prior deliveries. It could be hypothesized that the
women with both prior deliveries and PTSD had experienced more than one traumatic birth however this is speculative as women in this study were not screened for PTSD that may be related to an earlier birth experience.

British women whose childbearing fears were explored after delivery showed that those who developed PP-PTSD and/or significant posttraumatic symptomology also reported greater fear for themselves and their babies during the delivery (Czarnocka & Slade, 2000). These women also reported the birthing experience was worse than expected and that prior to delivery they had lacked confidence about their ability to cope during labor. Women who are severely fearful before delivery are likely to remain severely fearful during and after delivery regardless of whether their delivery would be judged by others as traumatic (Wijma, 2003). This suggests that women’s expectations regarding childbearing play a role in how they experience and appraise their delivery, and affects whether they may go on to develop PP-PTSD. Researchers have therefore speculated that psychological and physiological processes interact during labor and delivery, perhaps through stress hormones secreted by the neuroendocrine system (Wijma, 2003).

The view that psychological and physiological processes are interconnected is consistent with theories showing that anxiety and fear exist in three interrelated response systems (Foa & Kozak, 1986; Foa & Kozak, 1998; Lang, 1979; Lang, 1983). These response systems (behavioral, physiological, and cognitive) are each involved in anxiety-provoking situations and have reciprocal effects on one another. For example, Zar and colleagues (2001) suggest that women with excessive childbearing fear are hypervigilant (physiological) and scanning for signals of danger (behavioral) during labor and delivery and that due to their fearful frame of mind (cognitive) they interpret neutral stimuli as dangerous. This in turn
confirms their suspicion that labor and delivery are in fact presently dangerous to them, thus providing support for their fearful cognitions and increasing fear further. Pregnant women with severe fear of childbirth have no option but to face their fear and it is thought that this may in part account for the dramatic growth in elective c-sections as they provide a means for either avoiding part of the feared event (vaginal delivery) or at least provide a means for controlling the event (i.e. being able to predict when it will occur).

Childbearing Fear and Elective Caesarean Section. Fear of labor is the reason given for elective surgery in approximately 8-22% of c-sections (Ryding, 1991; Saisto et al., 1999). In a survey of 3,061 pregnant Swedish women, 8.2% expressed a preference for an elective c-section (Hildingsson et al., 2002). Demographic factors that were associated with a preference for c-section were greater than 35 years old, lower level of education, and prior elective or emergency c-section. Psychological factors associated with this preference were more worry about the birth and their ability to care for the newborn, concern about internal exams during labor, and fear that something was wrong with the baby or the fetus would be miscarried. Fear of childbearing and/or having a prior negative childbearing experience were predictive of women who preferred elective c-section.

While elective c-sections are one method for coping with severe childbearing fear there are drawbacks to this approach. In one survey only half of physicians in the Netherlands agreed to provide an elective c-section for childbearing fear with no other medical indication (Kwee et al., 2004). A more extensive study of obstetricians throughout Europe showed that the willingness to perform this procedure for childbearing fear varied greatly depending upon the country: Italy (46%), Spain (10%), France (14%), Germany (85%), Netherlands (30%), Luxembourg (50%), United Kingdom (76%) and Sweden (79%).
Of concern to some in the medical community is that maternal mortality is higher after c-section and the risk of complication in future pregnancies (e.g. uterine rupture, placenta previa and/or accreta) is greater than in vaginal delivery (Schuitemaker et al., 1997; Hemminki & Merilainen, 1996). In addition, persistent pulmonary hypertension, asthma, and respiratory distress syndrome are more likely to occur in infants delivered via c-section (McFarlin, 2004). From an economic perspective, c-sections cost approximately twice what a vaginal delivery does (Petrou & Glazener, 2002).

Thus, while elective c-section is one option for women who fear childbearing, it is not without risks and may not be an option provided by all obstetricians. Understanding and treating the anxiety behind the request (McFarlin, 2004) and providing continuous labor support (Hodnett et al., 2004) may be a preferable approach to helping women cope with childbearing fear. Unfortunately formal screening and/or treatment for childbearing fear is non-existent in most countries with the exception of Sweden (Ryding et al., 2003) and Finland (Saisto et al., 2006).

**Self-Efficacy for Labor and Delivery.** Lowe (2000) found an inverse relationship between fear of labor and delivery and self-efficacy for childbirth in a sample of women from the Midwest. In general the researcher found that self-efficacy for childbirth was low and speculated that the medicalization of childbirth, which places the responsibility for labor and delivery not in the hands of the woman but in the “hands” of technology, may negatively affect childbirth self-efficacy. Lowe speculates that while technological birth is reassuring to many women it may also take away their feelings of personal control over the process and render childbearing more uncertain. This is unfortunate as Lowe has shown that confidence
in coping with labor is associated with reduced levels of pain during childbirth (Lowe, 1987; Lowe, 1989).

Only one study has looked at the role of labor self-efficacy in the development of traumatic reactions to childbirth and this was conducted in a sample of American women (Soet et al., 2003). Women lower in self-efficacy for childbirth were subsequently more likely to report their birth experience was traumatic although they did not report greater trauma symptomology after childbirth. However it is unclear whether labor self-efficacy truly adds to the understanding of factors that are related to the development of PTSD after childbirth. For example if labor self-efficacy is simply the inverse (Lowe, 2000) of childbirth fear it adds little to the understanding of risk factors for postpartum PTSD. On the other hand, lack of confidence in the ability to cope with labor may not be synonymous with fearfulness regarding childbirth. If these are generally distinct (albeit possibly overlapping) constructs, and childbirth self-efficacy affects development of PTSD, it may present a possible target for intervention as childbearing fear has (in Sweden).

In summary, a number of factors are known or suspected precursors to the development of PTSD after childbirth. Historical factors are those from the woman’s personal history and include circumstances such as having experienced sexual assault or a stillborn or miscarried fetus. Situational factors include circumstances such as history of psychopathology, whether this is her first childbirth experience and the mode by which a woman delivers her infant. Dispositional factors include measures of anxiety sensitivity, fear of childbirth, and childbirth self-efficacy.

Of the factors thought to contribute to PTSD after childbirth, fear of childbearing and mode of delivery have some empirical support, though this research has been conducted
primarily with Scandinavian or British women and has received no attention in American women. Few studies have looked at the relationship of sexual abuse history or psychopathology during pregnancy to the development of PTSD after childbirth. Anxiety Sensitivity as a precursor to PTSD has been investigated in only two pilot studies of women in the U.K. and the role of labor self-efficacy has similarly received little attention.

**Why Investigating Childbearing Fear and PTSD after Childbirth is Important.**

Highly effective treatments are available for PTSD but to be useful this disorder must first be detected by mental and medical healthcare professionals. One of the overarching goals of this project is to better understand who is at risk for traumatic reactions to childbirth and how best to identify women who may struggle with postpartum posttraumatic stress. In order to better inform professionals who care for these women, a greater understanding of the factors that contribute to PP-PTSD is needed. While depression has become a well-documented postpartum complication, little is known about posttraumatic stress, in particular in American women. Not only does missing this diagnosis leave women untreated, but improper diagnosis (e.g. presuming depression instead of PTSD or comorbidity), suggests ineffective treatments may be used and psychological distress may become chronic.

In addition to the reduction of psychological distress and its concomitant effects on women’s social, occupational, and family life, reducing traumatic stress or anxiety associated with being fearful of childbearing may have effects on infants as well. Research has shown that higher levels of life event stress are associated with premature birth and low birth weight (Copper et al., 1996; Dunkel-Schetter, 1998; Lou et al., 1994; Wadhwa et al., 1993). Maternal trait anxiety (highly correlated with childbearing fear) is also associated with
reduced heart rate variability in newborn infants (Ponirakis et al., 1998), which suggests diminished ability to self-regulate through appropriate autonomic reactivity (Porges, 1995).

Evidence for the long-term effect of maternal anxiety on infants and children can be seen in the Avon Longitudinal Study of Parents and Children, which is a prospective study of mothers and children in which baseline measures of anxiety and other indices of maternal emotional functioning were collected during pregnancy (Glover et al., 2004; O'Connor et al., 2005; O'Connor et al., 2003). Measures of behavioral and emotional functioning of these children at 47 and 81 months old have shown that higher levels of prenatal maternal anxiety predict increased behavioral and emotional problems in the children (O'Connor et al., 2003). Furthermore, prenatal maternal anxiety predicted higher levels of awakening cortisol in the children at age ten, which the researchers suggest shows the lasting effects of maternal anxiety on HPA axis functioning in the child (O'Connor et al., 2005).

Gutteling and colleagues found similar results in a longitudinal study that showed higher levels of prenatal anxiety are associated with higher levels of behavioral problems in two-year-old children (Gutteling et al., 2005). Fear of bearing a handicapped child (a four-item measure) and fear of giving birth (a three-item measure) were assessed during pregnancy. Those mothers who showed greater fear of bearing a handicapped child were significantly more likely to have children with restless and disruptive temperaments (as measured by the Infant Characteristics Questionnaire) and children with attention regulation problems.

Thus increasing our understanding of traumatic reactions to childbirth and pre-delivery factors such as childbearing fear may benefit not only mothers who could receive appropriate pre and postpartum care, but also infants whose earliest intrauterine development
and early childhood development may be negatively affected by the psychological difficulties their mothers are experiencing.

**Statement of the Problem, Exploratory Goals, and Hypotheses.** Few studies have addressed the incidence of PTSD in childbearing women, and only one of these has been conducted in the U.S. Of the two prospective studies of postpartum PTSD neither demonstrated whether levels of PTSD after childbirth are an aggravation of pre-existing psychopathology or the development of new psychopathology. Several factors thought to contribute to the development of postpartum PTSD were reviewed. These include fear of childbearing, anxiety sensitivity, history of sexual abuse, psychiatric history, a prior stillborn or miscarried fetus, operative deliveries, and self-confidence for labor and delivery. While some factors, such as operative deliveries, have received some research support, other factors such as childbirth fear, anxiety sensitivity, and labor self-efficacy have limited support. The current study was intended to provide a comprehensive investigation into the development of postpartum posttraumatic stress disorder and postpartum stress symptomology as well as fear of childbirth in a sample of American women. The purpose was to supply answers to the following questions:

I. What is the incidence of Posttraumatic Stress Disorder and trauma-related Adjustment Disorder after childbirth and what factors are associated with the development of postpartum trauma diagnosis and symptoms in American women?

Most studies of childbirth-related PTSD have taken place in European countries or Australia and have show rates ranging from 1.7 to 6.0% (Creedy et al., 2000; Soderquist et al., 2006; Zaers et al., 2008). One study of American women showed that 1.9% of participants sampled met the criteria for a diagnosis of PTSD (Soet et al., 2003). Given that
the rate of obstetrical intervention (i.e. c-section and instrument delivery) is greater in the U.S. and that these interventions are associated with the development of PTSD after childbirth, it may be that this study yielded a conservative estimate of PTSD. In addition, studies have reported that up to 30% (Soet et al., 2003) of postpartum women experience significant levels of posttraumatic stress that do not meet the threshold for a diagnosis of PTSD. Thus this study will seek to clarify the rates of PTSD after childbirth and also to determine the rates of postpartum posttraumatic stress that would likely meet the threshold for a diagnosis of Adjustment Disorder.

Regarding factors associated with postpartum trauma, it is hypothesized that:

A. Childbearing fear and Anxiety Sensitivity will show a moderate correlation with one another, however, each will contribute to the prediction of trauma symptoms after childbirth.

B. Women who undergo operative or instrument deliveries will experience significantly greater levels of postpartum posttraumatic stress symptomology than women who undergo unassisted vaginal deliveries.

C. Higher levels of labor self-efficacy will predict lower levels of postpartum posttraumatic stress symptomology and will moderate the relationship between trait anxiety and postpartum trauma symptoms.

II. What is the incidence of childbearing fear in American women and what factors are associated with greater levels of fear?

To date no thorough explorations of childbearing fear have been conducted in American women. Some have suggested that childbearing fear may be greater in the U.S. given that the rate of elective c-section (a potential reflection of fear) has doubled in the last
decade. However, elective c-sections may also be requested for convenience or simple preference. Therefore a goal of the investigation is to determine the rate of severe childbearing fear ($\geq 85$ on the Wijma Delivery Expectancy/Experience Questionnaire) and to explore factors than may be associated with fear of childbirth. It is hypothesized that:

A. Women with a diagnosis of Posttraumatic Stress Disorder during pregnancy will show greater fear of childbearing than women without PTSD.

B. Anxiety sensitivity and labor self-efficacy will predict childbearing fear after controlling for trait anxiety. In particular, higher labor self-efficacy is suggested to moderate the effect of higher trait anxiety on childbearing fear.

**Methods**

**Design**

This was an observational study using a single-group cohort design (a prospective longitudinal study). Assessment occurred pre-delivery (between 25 weeks gestation and delivery of the infant) and post-delivery (between 4 and 8 weeks postpartum). Assessment consisted of packets of questionnaires (detailed in the materials section) that participants completed at their convenience and returned, via postage pre-paid envelopes, to the study coordinator.

**Participants.** Data were collected primarily at three sites: Virginia Commonwealth University’s (VCU) Department of Obstetrics and Gynecology in Richmond, Virginia ($n=36$ or 40%); two obstetrical practices delivering at DePaul Hospital in Norfolk, Virginia [WomanCare Center ($n=7$ or 7.8%) and The Midwifery Center ($n=20$ or 22.2%)]; and the Woman’s Center at St. Francis Medical Center in Midlothian, Virginia ($n=6$ or 6.7%). In addition, 21 participants (23%) were enrolled through birthing classes in the Richmond,
Virginia area. One hundred and four women were enrolled in the study and 90 completed the pre-delivery assessment; of these 90 women 73 completed the post-delivery assessments; the remaining 17 women were classified as non-completers sixteen weeks post-delivery. Figure 3 in appendix F shows the flow of participants in the study. Table 3 on page 57 displays characteristics for the entire sample, and separately for women who did (completers) and did not (non-completers) complete the entire study by providing both pre and post-delivery data. Women who did not complete the study were younger, lower in income, lower in social support, and more likely African-American and single.

Women were primarily recruited in-person and given the pre-delivery measures to return in postage pre-paid envelopes. Participants who contacted the study coordinator via phone (e.g. after seeing a study brochure) were mailed pre-delivery packets with a postage pre-paid return envelop. Approximately four weeks after their estimated due date a second set of questionnaires was sent to participants along with a phone call reminding them of the study and asking them to complete the second set of questionnaires between four and eight weeks after delivery. Participants who failed to return post-delivery packets by nine weeks post-partum were contacted via phone and letter and again encouraged to complete the study packets; second copies of post-partum assessment measures were mailed as needed. At 16 weeks post-partum, women who had not returned the post-delivery surveys (n=17) were classified as study non-completers and attempts to obtain post-delivery data were discontinued. Women who completed both pre and post-delivery measures were eligible to win one of two $100.00 gift certificates.

**Inclusion and Exclusion Criteria.** Only pregnant women 25 weeks or more in gestation, and aged 18 and older, were invited to participate in the study.
Recruitment Strategies. A variety of recruitment strategies were used to obtain participants for this study. Flyer and brochure are in Appendix G.

I. Flyers and brochures and were placed in the lobbies of all participating OB/Gyn clinics and posted in areas frequented by pregnant women (e.g. community boards at prenatal yoga classes).

II. At VCU and the WomanCare and Midwifery Centers at DePaul Hospital the study brochure was included in all new-patient packets given to pregnant women on their first prenatal visit, between September of 2007 and May of 2008. In addition, providers at DePaul Hospital gave brochures to patients who were ≥30 weeks gestation and encouraged them to contact the study coordinator if they were interested in learning more about participating in the research project.

III. The study coordinator conducted in-person recruitment at the two VCU Medical Center OB/Gyn clinics between September of 2007 and June of 2008 for approximately 16-24 hours weekly. This was accomplished by explaining the study to pregnant women who were awaiting prenatal appointments.

IV. The study coordinator attended Centering Pregnancy (group prenatal appointments at VCU Medical Center), and birth education and prenatal yoga classes in the Richmond area to briefly explain the study and to enroll interested participants.

Materials

Only the Edinburgh Postnatal Depression Scale (EPDS) and the Posttraumatic Stress Diagnostic Scale (PDS) were given at both time measurements. For the Wijma Delivery Scale, the Expectancy scale, commonly referred to as childbearing fear, was administered at
the pre-delivery assessment (WDEQ-A), and the Experience scale was administered at the post-delivery assessment (WDEQ-B). The pre and post-delivery questionnaires are included in Appendix A. Other questionnaires have been omitted as they are copyrighted.

**Pre-delivery Questionnaire.** This measure was used to obtain demographic information including age, race, income/employment status, marital status, number of children, and obstetrical variables such as: current week of gestation, mode of prenatal care (individual versus group; obstetrician versus midwife), anticipated delivery site, prior deliveries and type (emergency c-section, planned c-section, vaginal delivery, and vaginal delivery with forceps or vacuum extraction), history of miscarriage, and history of stillbirth.

**Post-Delivery Questionnaire.** This measure was used to obtain information regarding the recent labor and delivery such as: type of delivery (emergency c-section, planned c-section, unassisted vaginal delivery, and vaginal delivery with forceps or vacuum extraction); whether the infant was stillborn, premature ($\leq 36$ weeks gestation), or full-term ($\geq 37$ weeks gestation); and whether the infant required care in the NICU. Women were asked to self-report obstetrical information.

**Posttraumatic Diagnostic Scale.** The PDS (Foa et al., 1997) is a fifty-item self-report measure that assesses presence of PTSD symptoms during the previous month and provides symptom criteria that corresponds to the diagnostic criteria for PTSD in the DSM-IV (i.e. criterion A1 (traumatic event); A2 (responding with fear, helplessness, or horror); B (re-experiencing symptoms); C (avoidance symptoms); D (hyperarousal symptoms); E (duration of more than 1 month), and F (clinically significant distress or impairment of functioning). The PDS is based upon its precursor, the Posttraumatic Stress Disorder
Symptom Scale (Foa et al., 1993), which has been used in several of the aforementioned studies of postpartum PTSD (Ayers & Pickering, 2001; Creedy et al., 2000).

In the PDS seventeen trauma symptoms are assessed on a 4-point Likert scale of frequency during the last 30 days. Symptom totals ranging from 1-10 are considered mild; 11-20 moderate; 21-35 moderate/severe; and ≥36 severe. The PDS takes approximately ten to fifteen minutes to complete and is written at an eighth-grade reading level (Shear et al., 2000). In a validation study of 248 men and women, internal consistency for the overall scale was .92 and for the symptoms clusters ranged from .78-.84. Test-retest reliability for the symptom clusters ranged from .77-.85 while convergent validity with the Beck Depression Inventory (BDI) and Impact of Events Scale (IES-R) was .79 and .78 respectively. Compared with assignment of PTSD or no PTSD according to the SCID, the sensitivity of the PTSD was .89 and specificity was .75. In addition, the PDS yields both a dichotomous and continuous score allowing the investigator to assign PTSD diagnostic status and/or to assess amount of trauma symptomology.

In a recent multidisciplinary meeting of postpartum PTSD researchers (Ayers et al., 2008) the consensus was that future studies should determine diagnostic status with questionnaires whose psychometric properties are established and that assess all PTSD criteria. One recommendation was Foa’s Postraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997) given that its precursor the PSS has been used in several of the aforementioned studies of PTSD, that it assesses all criteria associated with the diagnosis, and that its sensitivity (.89) and specificity (.75) rates in comparisons with the SCID suggest the PDS provides reasonable estimates of PTSD. One study of postpartum trauma that has used the
PDS (Zaers et al., 2008) has yielded one of the highest published rates of childbirth-related PTSD (6.0%).

In the current study the internal consistency for the overall scale administered prior to delivery was .85 and for the overall scale administered post-delivery was .93. Cronbach’s alpha for pre-delivery symptoms clusters were: \( r = .85 \) for re-experiencing (five items), \( r = .80 \) for avoidance (7 items), and \( r = .85 \) for hyperarousal (5 items). Cronbach’s alpha for post-delivery symptoms clusters were: \( r = .79 \) for re-experiencing (five items), \( r = .85 \) for avoidance (7 items), and \( r = .83 \) for hyperarousal (5 items). Scores from the full scale assessing all criteria were used to assign pre and postpartum trauma diagnoses (Posttraumatic Stress Disorder, Adjustment Disorder, and No Diagnosis). In addition, in some analyses scores from individual symptom clusters (re-experiencing, avoidance, and hyperarousal), or the total of these symptom clusters, were used. Finally, data from the portion of the scale that details Criterion A events (e.g. different types of assault, combat, natural disasters) was used to explore the relationship between variables of interest and types of traumatic events.

Women were assigned a PTSD diagnosis (both pre and postpartum) if they endorsed a criterion A event for which they indicated believing their life or well-being (or that of another) was threatened and to which they responded with feelings of hopelessness, fear, or horror; as well as reporting diagnostic levels of symptomology across the three symptom clusters (re-experiencing, avoidance, and hyperarousal); duration of more than one month, and clinically significant distress.

A number of studies of PTSD after childbirth have reported incidence rates for women endorsing ‘sub-clinical’ PTSD however the DSM-IV-TR does not include such a diagnostic category. It is suggested that a diagnosis of Adjustment Disorder is appropriate
for situations in which “(a) the response to an extreme stressor does not meet the criteria for Posttraumatic Stress Disorder (or another specific mental disorder) and for (b) situations in which the symptom pattern of Posttraumatic Stress disorders occurs in response to a stressor that is not extreme” (APA, 2000, pp. 467).

Thus, in keeping with the DSM-IV recommendations, women were assigned an Adjustment Disorder diagnosis if they endorsed a criterion A event in which they believed their life or well-being (or that of another) was threatened and they either (a) responded with feelings of hopelessness, fear, or horror but did not fully meet criteria for diagnostic levels of symptomology across the symptom clusters or (b) did not respond with feelings of hopelessness, fear, or horror but did meet criteria for diagnostic levels of symptomology across the symptom clusters. As with the diagnosis of PTSD, these symptoms need to be present for at least one month and to cause significant distress or impairment in an important area of functioning.

In the pre-delivery administration of the PDS, women were provided with a list of criterion A events and were to complete the measure only if they endorsed at least one event, which 71% of the sample did. In the post-delivery administration of the PDS, women were instructed to answer all questions on the PDS based on their most recent experience of labor and delivery. Thus the traumatic event varied for pre-delivery diagnostic status, but was held constant (all women were assessed for post-partum PTSD or AD) for the post-delivery assessment.

**Wijma Delivery Expectancy/Experience Questionnaire** (Wijma et al., 1998). The Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) is a two-part questionnaire designed to measure cognitive appraisal of childbearing, in particular, fear of childbirth for
the approaching and then recent delivery. Part A (the expectancy version) is administered prior to labor and delivery and Part B (the experience version) is administered postpartum. Each measure has 33 items with a six-point rating scale ranging from “not at all” or zero to “extremely” or five. The scores on this measure can range from 0 to 165; each question in Part A has a counterpart in Part B. The original validation studies are based upon the Swedish-language version of the measure; the English-language translation was provided by the authors as part of a publication in an English-language journal. In a validation study of 200 Swedish women (Wijma et al., 1998), internal consistency (Cronbach’s α) on Part A was .93 and on Part B was .93. Split-half reliability estimates were 1.00 on Part A and .95 on Part B. Convergent validity of the W-DEQ Part A was .26 with the Beck Depression Inventory (BDI) and .54 with the State-Trait Anxiety Inventory (STAI). Two English-language studies have included the WDEQ, finding an internal consistency of .86 in an American sample (Soet et al., 2003) and .91 in a sample of women in the U.K. (Johnson and Slade, 2001).

Researchers have suggested a cut-off of ≥85 as an indicator of severe fear of childbirth (Ryding et al., 1998; Soderquiest et al., 2004; Zar et al., 2002) based upon findings that women are at a significantly increased risk for emergency c-section, of meeting diagnostic criteria for phobia of childbearing, and to request elective c-section for fear, if they score ≥85 on this measure.

In the current study, internal consistency (Cronbach’s α) on Part A was .93 and on Part B was .90. Similar to the findings in the sample of Swedish women, there was evidence of convergent validity with a measure of depression (Edinburgh Postnatal Depression Scale) \( r=0.502, n=90, p=0.001 \), and trait anxiety (STAI), \( r=0.591, n=90, p=0.001 \). For the analyses, total scores for part A (childbearing fear) and part B (experience of labor) were calculated.
Edinburgh Postnatal Depression Scale (Cox et al., 1987). The Edinburgh Postnatal Depression Scale (EPDS) is a ten-item self-report measure that was developed for early screening of postnatal depressive symptomology in community samples (Cox & Holden, 2003). One of the purposes of developing the EPDS was to create a screening measure that does not rely on somatic items that if endorsed by pregnant women could simply reflect the normal physiological changes associated with childbearing rather than depressive symptoms (e.g. the Beck Depression Inventory [BDI], a widely used tool for screening depressive symptomology, includes a number of somatic items). In addition, in validation studies comparing the BDI to the EPDS the EPDS was better able to correctly identify depressed from non-depressed women (Harris et al, 1989). The scale takes approximately ten minutes or less to complete (Yonkers & Samson, 2000).

Psychometric analysis of the EPDS showed a sensitivity rate of 86% and specificity rate of 78% when a cut-off score of 12 was used (Cox et al., 1987). Most studies support the use of a score of 12/13 indicating a cut-off for likely depression (Murray & Cox, 1990; Cox et al., 1987; Lyons, 1998; Murray & Cox, 1990). The authors suggest a cut-off score of 9/10 may be chosen in order to capture nearly all truly depressed women being screened. Internal consistency showed a reliability estimate of .87 and concurrent validity studies with the BDI showed high correlations of .67 and .79 (Yonkers & Samson, 2000). In validation and reliability studies the split-half reliability estimate was .88. This scale has been used extensively in obstetric populations (Czarnocka & Slade, 2000; Lyons, 1998; Turton et al., 2001) and in studies of childbirth-related PTSD (Czarnocka & Slade, 2000). In addition, it is appropriate to use this scale with pregnant women (Murray & Cox, 1990; Wickberg et al., 2005).
In the current study, Cronbach’s alpha was .87 on the pre-delivery measure and .86 on the post-delivery measure. The test re-test correlation was .457, \( n=73, p=.01 \). Scores were totaled for each administration for use in analyses and a provisional diagnosis of depression was assigned if women scored \( \geq 12 \) on the measures.

**Interpersonal Support Evaluation List-General Population** (Cohen et al., 1985; Cohen & Hoberman, 1983). A measure of social support was included in the study in order to explore its potential to reduce or mitigate the effects of dispositional factors on level of childbearing fear prior to labor and delivery. The Interpersonal Support Evaluation List (ISEL) is a 40-item measure of perceived availability of social support that assesses four social support domains: The "tangible" subscale measures perceived availability of material aid; the "appraisal" subscale assesses the perceived availability of someone to talk to about problems; the "self-esteem" subscale measures the perceived positive comparison of self to others; and the "belonging" subscale assesses the perceived availability of people one can engage in activities with. The measure contains forty items; half of which are worded positively and half negatively. The four subscales are combined in order to obtain an overall measure of perceived social support. The correlations among subscales range from .30 to .50, suggesting a fair amount of independence between the scales (Cohen et al., 1985). The advantage of assessing these four domains is that the effect of specific types of social support on outcome variables can be investigated.

In a study of the intercorrelations of several measures of social support the ISEL showed a strong positive correlation with both the Perceived Social Support Scale (PSS; Procidano & Heller, 1983) and the Social Support Questionnaire (Sarason et al., 1987) suggesting that each of these measures was likely assessing the same general domain. The
ISEL has the advantage of containing a Likert scale rather than a yes-no format, which limits ceiling effects in participants high in social support (Sarason et al., 1987). Studies of internal reliability range from .88 to .90 (Cohen et al., 1985); test-retest reliability was .87 with a two-day interval and .70 with a six-week interval. A test-retest study resulted in a reliability estimate of .74, suggesting that the measure has long-term stability (Cohen et al., 1985).

In the current study, internal consistency (Cronbach’s α) was .89. Correlations among the subscales ranged from .38 to .76, N=90, p=.01. Subscale and total scores were calculated for use in analysis. Given that subscale and overall scores had quite similar correlations with dependent variables, the total score was used in the analyses.

**Childbirth Self-Efficacy Inventory** (Lowe, 1993; Lowe, 2000). The Childbirth Self-Efficacy Inventory (CBSEI) was developed to measure both strength of belief that certain behaviors are useful coping strategies during labor and delivery (outcome expectancy) as well as confidence in ability to use particular behaviors to cope during labor and delivery (self-efficacy expectancy). Item development was based on self-efficacy theory and interviews with women with recent childbirth experience, and focus on specific behavior that can be used to cope with labor and delivery. The inventory is arranged in four sub-scales as each type of expectancy is measured separately for active versus second-stage labor. The four subscales yield two expectancy totals: one for outcome and one for self-efficacy.

In 382 women internal consistency of the four sub-scales ranged from .86-.95. Test-retest reliability estimates ranged from .46-.76 (higher scores for self-efficacy than outcome expectancy) and it was suggested they were lower than expected due to women’s engagement in childbirth education classes between the test and re-test interval. There were small positive correlations between the self-efficacy subscale and General Self-Efficacy
Scale \( (r=0.30, \ p<.002) \), Self-Esteem Scale \( (r=0.21, \ p<.002) \), Multidimensional Health Locus Control Scale (internal; \( r=0.25, \ p<.002 \)), and a small negative correlation with the Learned Helplessness Scale \( (r=-0.17, \ p<.002) \).

In a validation study in 100 Australian women (Drummond & Rickwood, 1997), the authors sought to investigate construct validity by exploring the relationship of childbirth self-efficacy to knowledge of labor and delivery, social support, previous birth experience (i.e. positive or negative birth experiences), and anxiety. Correlations between knowledge of birth and self-efficacy for birth was small to moderate \( (r=.32, \ p<.01) \). Prior birth experience was also correlated with self-efficacy for birth \( (r=.26, \ p<.05) \). Correlations among subscales were high \( (r=.72 \text{ to } 0.87) \). Based on principal components analysis the authors suggest collapsing the four-factors suggested by Lowe (1993) into two factors that combine active and second stage labor, yielding two subscale scores (outcome expectation and self-efficacy) and supported one total score for labor self-efficacy as found in the validation study.

In a study of 280 first-time mothers, Lowe (2000) found that internal consistency for the four subscales was as follows: active labor outcome expectancy .88; second stage outcome expectancy .91; active labor self-efficacy .93; and second stage self-efficacy .94. In the current study, internal consistency (Cronbach’s \( \alpha \)) was .88 for active labor outcome expectancy; .92 for second stage outcome expectancy; .93 for active labor self-efficacy; and .95 for second stage labor. Correlations among the subscales ranged from .63 to .85, \( N=90, \ p=.01 \). Total scores were calculated for outcome expectancy, self-efficacy, and an overall total (referred to as labor self-efficacy) for use in analysis. Means and standard deviations were: outcome expectancy \( (M=7.89, \ SD=1.37) \); self-efficacy \( (M=6.95, \ SD=1.65) \); and total labor self-efficacy \( (M=7.42, \ SD=1.43) \).
State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The State-Trait Anxiety Inventory (STAI) was developed to measure state (20 items) and trait anxiety (20 items) in both research and clinical settings. State anxiety is defined as feelings of tension, apprehension, and worry that include nervous system arousal whereas trait anxiety reflects “relatively stable individual differences in anxiety proneness”.

Test-retest reliability estimates for the Trait portion of the STAI are high ranging from .73-.86, whereas test-retest reliability estimates for the State portion of .33 are relatively low, which is appropriate given that the State portion of the STAI should fluctuate based on changes in stress status (Spielberger et al., 2004). Concurrent validity studies showed high correlations with both the Manifest Anxiety Scale and Anxiety Scale Questionnaire (.73 to .85). Construct validity studies of the State anxiety scale were conducted by assessing participants after stressful and relaxing time frames. These studies showed that scores were higher during stressful than non-stressful activities (Spielberger et al., 2004). In the current study, internal consistency (Cronbach’s $\alpha$) was .94 for state anxiety and .93 for trait anxiety. For the purpose of analysis, total scores for both state and trait anxiety were calculated.

Anxiety Sensitivity Index-Revised (Taylor & Cox, 1998). The Anxiety Sensitivity Index-Revised (ASI-R) is a 36-item questionnaire that measures the fear of anxiety-related sensations. Two studies in which the ASI-R was factor analyzed showed four factors were present: fear of respiratory symptoms, fear of publicly observable anxiety reactions, fear of cardiovascular symptoms and fear of cognitive dyscontrol (Deacon et al., 2003; Taylor & Cox, 1998). In a non-clinical sample the mean ASI-R score for women was 27 with a standard deviation of 19. Internal consistency was quite high (Deacon et al., 2003) showing that all items correlated well with the overall ASI-R total scale. Assessment of construct
validity showed moderate correlations with other measures of anxiety (.36-.56) and a moderate correlation with one depression measure (.40). In the current study, internal consistency was .94. There were strong positive correlations, suggestive of convergent validity, between the ASI-R and the EPDS ($r=.573$, $N=90$, $p=.001$), as well as the ASI-R and trait anxiety ($r=.581$, $N=90$, $p=.001$). Total scores were used for analysis.

Results

Demographics

The demographic characteristics for the 90 women who completed the pre-delivery measures are summarized in Table 3 on the following page. Table 3 also displays differences in characteristics of women who did and did not complete the postpartum measures. Due to the large number of comparisons that were made between study completers and non-completers the alpha level was set at .01 rather than .05. All 90 women are included in analyses looking at factors related to childbearing fear, with the exception of outcome data for childbearing fear such as fear and mode of delivery or fear and epidural use (results from the latter are in Appendix D).

Similar to prior studies, only the completers ($n=73$) are included in sections of data analysis looking at postpartum Posttraumatic Stress Disorder symptoms and diagnosis (see Appendix B for details). There are significant differences between women who did and did not complete the study, with completers more likely to be married, Caucasian, slightly older, higher in income, and reporting greater levels of social support as well as more likely to have a current or past psychiatric diagnosis. Completers and non-completers did not differ
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Completers (n=73)</th>
<th>non-Completers (n=17)</th>
<th>Test Statistic (df)</th>
<th>p</th>
<th>Total Pre-Delivery Participants (n=90)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (in years)</strong></td>
<td>30.97 (4.42)</td>
<td>28.29 (4.78)</td>
<td>t(88)=-2.21</td>
<td>.03</td>
<td>30.47 (4.58)</td>
</tr>
<tr>
<td><strong>Education (in years)</strong></td>
<td>15.94 (2.13)</td>
<td>14.82 (2.83)</td>
<td>t(88)=-1.53</td>
<td>.14</td>
<td>15.73 (2.30)</td>
</tr>
<tr>
<td><strong>Income Level</strong></td>
<td>48,917 (12,370)</td>
<td>36,529 (19,713)</td>
<td>t(88)=-2.48</td>
<td>.02</td>
<td>46,577 (14,475)</td>
</tr>
<tr>
<td><strong>% African-American</strong></td>
<td>2.7%</td>
<td>41.2%</td>
<td>χ²(1)=18.56</td>
<td>.00</td>
<td>10%</td>
</tr>
<tr>
<td><strong>% married</strong></td>
<td>93.2%</td>
<td>52.9%</td>
<td>χ²(1)=14.93</td>
<td>.00</td>
<td>85.6%</td>
</tr>
<tr>
<td><strong>Plan to Breastfeed</strong></td>
<td>93.2%</td>
<td>76.5%</td>
<td>χ²(1)=4.78</td>
<td>.09</td>
<td>90%</td>
</tr>
<tr>
<td><strong>Employed F/PT</strong></td>
<td>57.5%</td>
<td>82.4%</td>
<td>χ²(1)=2.63</td>
<td>.10</td>
<td>62.2%</td>
</tr>
<tr>
<td><strong>Hx of Psychiatric DX</strong></td>
<td>69.9%</td>
<td>35.3%</td>
<td>χ²(1)=5.68</td>
<td>.01</td>
<td>63.3%</td>
</tr>
<tr>
<td><strong>Any Sexual Trauma</strong></td>
<td>30.1%</td>
<td>17.6%</td>
<td>χ²(1)=.54</td>
<td>.46</td>
<td>27.8%</td>
</tr>
<tr>
<td><strong>Early Sexual Trauma</strong></td>
<td>11.0%</td>
<td>5.9%</td>
<td>χ²(1)=.032</td>
<td>.89</td>
<td>10%</td>
</tr>
<tr>
<td><strong>OB Provider</strong></td>
<td>46.6%</td>
<td>52.9%</td>
<td>χ²(1)=.041</td>
<td>.89</td>
<td>47.8%</td>
</tr>
<tr>
<td><strong>Midwife Provider</strong></td>
<td>53.4%</td>
<td>47.1%</td>
<td>χ²(1)=.041</td>
<td>.89</td>
<td>52.2%</td>
</tr>
<tr>
<td><strong>Prior Birth Experience</strong></td>
<td>43.8%</td>
<td>41.2%</td>
<td>χ²(1)=.40</td>
<td>.84</td>
<td>43.3%</td>
</tr>
<tr>
<td><strong>PTSD Diagnostic Scale</strong></td>
<td>4.52 (7.01)</td>
<td>2.65 (6.30)</td>
<td>t(88)=-1.01</td>
<td>.31</td>
<td>4.17 (6.89)</td>
</tr>
<tr>
<td><strong>Depression Sx on EPDS</strong></td>
<td>7.94 (5.06)</td>
<td>8.29 (4.64)</td>
<td>t(88)=.274</td>
<td>.78</td>
<td>8.01 (4.96)</td>
</tr>
<tr>
<td><strong>Fear of L&amp;D on WDEQ-A</strong></td>
<td>52.82 (22.27)</td>
<td>59.71 (15.10)</td>
<td>t(88)=1.54</td>
<td>.13</td>
<td>54.12 (21.20)</td>
</tr>
<tr>
<td><strong>Anxiety Sensitivity Index Revised</strong></td>
<td>59.00 (19.77)</td>
<td>56.00 (12.85)</td>
<td>t(88)=.730</td>
<td>.47</td>
<td>58.98 (18.64)</td>
</tr>
<tr>
<td><strong>State Anxiety Inventory (STAI)</strong></td>
<td>33.13 (10.89)</td>
<td>38.35 (11.30)</td>
<td>t(88)=1.76</td>
<td>.08</td>
<td>34.13 (11.09)</td>
</tr>
<tr>
<td><strong>Trait Anxiety Inventory (STAI)</strong></td>
<td>36.30 (11.25)</td>
<td>39.23 (10.66)</td>
<td>t(88)=.974</td>
<td>.33</td>
<td>36.86 (11.14)</td>
</tr>
<tr>
<td><strong>Social Support on the ISEL</strong></td>
<td>139.00 (14.84)</td>
<td>131 (22.57)</td>
<td>t(88)=-1.93</td>
<td>.05</td>
<td>137.98 (16.79)</td>
</tr>
<tr>
<td><strong>Childbirth Efficacy Scale (CBSEI)</strong></td>
<td>7.42 (1.36)</td>
<td>7.42 (1.74)</td>
<td>t(88)=-.003</td>
<td>.99</td>
<td>7.42 (1.42)</td>
</tr>
</tbody>
</table>

*Note.* EPDS=Edinburgh Postnatal Depression Scale; WDEQ-A=Wijma Delivery Expectancy Scale; ISEL=Interpersonal Support Evaluation List; CBSEI=Childbirth Self-Efficacy Inventory.
significantly on many variables of interest such as depression, pre-delivery levels of trauma symptomology, anxiety sensitivity, trait anxiety, labor self-efficacy, and history of sexual assault. There were trends toward significant differences in childbearing fear and state anxiety with non-completers higher in both.

Of the total sample (N=90), 71% of participants endorsed experiencing at least one traumatic event, which is greater than the prevalence rate of 51% seen in a national sample of women (Kessler et al., 1995) but less than the 84% seen in college students (Vrana & Lauterbach, 1994) and 90% prevalence rate seen in Breslau’s study of women (1998). This 71% rate is also higher than seen in prior studies of childbirth trauma (rate=58% Leeds et al., 2008; rate=66%, White et al., 2006). When looking at study completers only 12% reported no traumatic events; 45% reported one; 25% reported two; and 17% reported three or more traumatic events.

Twenty-eight percent of participants endorsed having experienced a sexual assault, which is higher than estimates of lifetime prevalence of 13-25% seen in prior studies (Warsaw, 2001) and also higher than the 12.7% that has been reported in a prior study of PTSD after childbirth (Leeds & Hargreaves, 2008). Other investigators have estimated that one in four American women have experienced sexual abuse during childhood (Horan et al., 2000). Eight percent of the study participants reported sexual assault as a minor as well as an additional incident of later sexual assault.

Of the 90 participants, four or 4.4% were assigned a pre-delivery diagnosis of PTSD, a lower than expected rate based on population estimates of 10-12% (Breslau et al., 1991; Kessler et al., 1995; Resnick et al., 1993). Thirteen women were assigned a pre-delivery diagnosis of Adjustment Disorder (14%); and 73 were assigned no diagnosis (81%).
Data Analysis Section One: Posttraumatic Stress after Childbirth

The overarching goal was to determine the rate of Posttraumatic Stress Disorder and Adjustment Disorder after childbirth in a sample of American women and to explore predictors of PTSD and AD symptomology. The analyses in this section are based on the 73 women who completed the study out of the 90 who completed the pre-delivery assessment.

Variables essentially fell into three domains: historical factors included having a prior miscarriage, difficult birth, and sexual assault; situational factors included mode of delivery and pre-delivery psychopathology (PTSD and depression); and dispositional factors included trait anxiety, anxiety sensitivity, labor self-efficacy, and childbearing fear.

PTSD rates are based on women who met criteria for a likely diagnosis of PTSD based on positive endorsement (via self-report) of items on the Posttraumatic Stress Diagnostic Scale (PDS) that reflect DSM-IV diagnosis of PTSD. Similarly, likely diagnosis of Adjustment Disorder was based on information collected in the PDS (see the PDS information starting on page 46 of the Methods section). These PTSD and Adjustment Disorder assignments were also used in the analysis of predictors of diagnostic status (located in Appendix D). Analyses based on symptoms of PTSD (i.e., the sections detailing historical, situational, and dispositional factors) reflect total scores on the PDS that measure re-experiencing, avoidance, and hyperarousal symptoms (clusters B, C, and D).

Incidence of Postpartum Posttraumatic Stress and Adjustment Disorders. One of the primary aims of this investigation was to examine the rate at which postpartum PTSD and Adjustment Disorder occur in a non-selected sample of American women. Of the 73 women who completed the study, 8 were assigned a postpartum diagnosis of PTSD (10.9%; 90% CI [4.22%, 15.78%]) and 14 a post-partum diagnosis of Adjustment Disorder (19.2%;
90% CI [11.45%, 26.55%]). Of these 22 women with postpartum trauma diagnoses, 11 were new cases meaning that they did not carry a pre-delivery diagnosis of either Posttraumatic Stress Disorder or trauma-related Adjustment Disorder.

Table 4 below details the type and number of PTSD, Adjustment Disorder, and no diagnosis cases, pre and post-delivery, among these 73 participants. Pre-delivery diagnostic status (AD, PTSD, and No Diagnosis) included any type of criterion A event endorsed on the PDS whereas post-delivery diagnostic status was determined based on the recent experience of childbirth as the sole criterion A event assessed. Thus it is possible for women who received a diagnosis during pregnancy to carry no postpartum diagnosis and vice versa.

Table 4

Pre and Post-Delivery Assignment of Trauma Diagnoses

<table>
<thead>
<tr>
<th>Pre-Delivery Diagnosis</th>
<th>AD</th>
<th>Post-Delivery Diagnostic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AD</td>
<td>PTSD</td>
</tr>
<tr>
<td>AD</td>
<td>n=4 (5.4%)</td>
<td>n=2 (2.7%)</td>
<td>n=4 (5.4%)</td>
</tr>
<tr>
<td>PTSD</td>
<td>n=3 (4.1%)</td>
<td>n=2 (2.7%)</td>
<td>n=0</td>
</tr>
<tr>
<td>No Diagnosis</td>
<td>n=7 (9.6%)</td>
<td>n=4 (5.5%)</td>
<td>n=47 (64.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>19.2%</td>
<td>10.9%</td>
<td>69.9%</td>
</tr>
</tbody>
</table>

PTSD=Posttraumatic Stress Disorder. AD=trauma-related Adjustment Disorder.

Of primary importance in Table 4 is the finding that eleven women without a trauma diagnosis during pregnancy developed posttraumatic stress as a result of childbirth as it has been unclear from prior studies whether new cases of PTSD occur after childbirth. Additionally, it is clear from this table and subsequent analysis of predictors of postpartum PTSD and Adjustment Disorder that women with pre-existing trauma diagnoses are highly likely (three-in-four chance) to develop an anxiety disorder related to childbirth; women not evidencing a trauma-related diagnosis during pregnancy stand a one-in-five risk.
Of the 11 newly diagnosed women, all endorsed prior trauma exposure on the pre-delivery administration of the PDS (two endorsed a prior difficult childbirth). Eight of these eleven newly diagnosed women also reported a current or past diagnosis of depression and or anxiety on the pre-delivery questionnaire. Thus while these newly diagnosed women did not meet criteria for PTSD or depression during pregnancy, there was evidence that the majority had dealt with mental health difficulties in the past.

Table 5 on the next page displays means and standard deviations among post-delivery diagnostic categories for demographic variables and variables of interest. In addition, number of cases present within categories of interest (e.g. mode of delivery) based on post-delivery diagnostic status are provided. The table shows, for example, that women who were newly diagnosed with PTSD based upon their recent experience of childbirth evidenced similar levels of childbirth fear, anxiety sensitivity, state, and trait anxiety during pregnancy as women who received a trauma diagnosis both before and after childbirth. This suggests that women who evidenced no trauma diagnosis during pregnancy but were diagnosed with postpartum PTSD were particularly vulnerable to trauma resulting from childbirth.

**Historical Factors Related to PTSD after Childbirth: Miscarriage, Prior Difficult Birth, and Sexual Assault.** Stillbirth (Soderquist et al., 2004), prior difficult birth, or history of sexual assault (Heimsted et al., 2006; Soet et al., 2004) may be associated with trauma after childbirth. It was not clear whether miscarriage would be related to increased trauma symptoms. History of miscarriage, prior difficult birth, and sexual assault were compared in separate independent-samples t-tests with symptoms of postpartum PTSD (total score on the PDS) as the dependent variable. Table 6, on page 65 shows the means, standard deviations, t-scores, significance levels, and effect sizes of these comparisons.
Table 5

Characteristics based on Post-Delivery Trauma Diagnosis

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No Diagnosis</th>
<th>Pre-trauma DX Only</th>
<th>Pre/Post Trauma DX</th>
<th>New AD</th>
<th>New PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$ (SD) n=47</td>
<td>$M$ (SD) n=4</td>
<td>$M$ (SD) n=11</td>
<td>$M$ (SD) n=7</td>
<td>$M$ (SD) n=4</td>
</tr>
<tr>
<td>Age (in years)</td>
<td>31 (4)</td>
<td>31 (5)</td>
<td>30 (5)</td>
<td>30 (5)</td>
<td>34 (2)</td>
</tr>
<tr>
<td>Education (in years)</td>
<td>16 (2)</td>
<td>15 (2.5)</td>
<td>14 (2.7)</td>
<td>16 (2)</td>
<td>16.5 (1.9)</td>
</tr>
<tr>
<td>Pre-Delivery PDS</td>
<td>1.87 (3.85)</td>
<td>8.75 (4.85)</td>
<td>14.45 (9.26)</td>
<td>2.00 (2.28)</td>
<td>9.25 (9.60)</td>
</tr>
<tr>
<td>Postpartum PDS</td>
<td>2.57 (3.10)</td>
<td>3.75 (3.30)</td>
<td>16.18 (8.06)</td>
<td>10.50 (5.95)</td>
<td>15.50 (12.04)</td>
</tr>
<tr>
<td>Pre-Delivery EPDS</td>
<td>6.95 (4.60)</td>
<td>9.25 (4.99)</td>
<td>12.27 (4.90)</td>
<td>6.33 (5.78)</td>
<td>9.00 (5.88)</td>
</tr>
<tr>
<td>Postpartum EPDS</td>
<td>6.56 (5.04)</td>
<td>4.25 (3.86)</td>
<td>10.81 (3.71)</td>
<td>8.66 (3.77)</td>
<td>10.25 (3.40)</td>
</tr>
<tr>
<td>WDEQ-A (expectancy)</td>
<td>48.79 (22.72)</td>
<td>50.50 (12.50)</td>
<td>67.90 (20.20)</td>
<td>51.33 (20.22)</td>
<td>64.25 (18.33)</td>
</tr>
<tr>
<td>WDEQ-B (experience)</td>
<td>41.58 (17.95)</td>
<td>38.50 (7.18)</td>
<td>60.18 (15.70)</td>
<td>71.83 (23.72)</td>
<td>61.25 (25.74)</td>
</tr>
<tr>
<td>ASI-R</td>
<td>55.54 (14.10)</td>
<td>44.00 (8.16)</td>
<td>79.90 (28.97)</td>
<td>53.33 (12.72)</td>
<td>80.25 (18.28)</td>
</tr>
<tr>
<td>State Anxiety Inventory</td>
<td>31.04 (10.10)</td>
<td>38.25 (6.84)</td>
<td>42.36 (13.46)</td>
<td>32.83 (8.18)</td>
<td>40.75 (7.45)</td>
</tr>
<tr>
<td>Trait Anxiety Inventory</td>
<td>34.50 (11.02)</td>
<td>33.00 (3.55)</td>
<td>45.54 (13.01)</td>
<td>32.83 (8.18)</td>
<td>40.75 (7.45)</td>
</tr>
<tr>
<td>Social Support on ISEL</td>
<td>143.00 (12.74)</td>
<td>131.50 (12.34)</td>
<td>129.00 (20.57)</td>
<td>143.50 (6.71)</td>
<td>137.25 (17.68)</td>
</tr>
<tr>
<td>Labor efficacy on CBSEI</td>
<td>7.70 (1.22)</td>
<td>7.59 (1.08)</td>
<td>6.57 (1.86)</td>
<td>7.27 (0.97)</td>
<td>6.80 (1.08)</td>
</tr>
</tbody>
</table>

Number of Cases within Diagnostic Category

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sexual Trauma (yes)</td>
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<td>2</td>
<td>0</td>
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<tr>
<td>Repeat Sex Assault (yes)</td>
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<td>1</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>OB Provider</td>
<td>22</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Midwife Provider</td>
<td>25</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Instrument Delivery (yes)</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Operative Delivery (yes)</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. PDS=Posttraumatic Stress Disorder Diagnostic Scale; EPDS=Edinburgh Postnatal Depression Scale; WDEQ=Wijma Delivery Expectancy/Experience Scale; ASI-R=Anxiety Sensitivity Scale-Revised; ISEL=Interpersonal Support Evaluation List; CBSEI=Childbirth Self-Efficacy Inventory; AD=Adjustment Disorder; PTSD=Posttraumatic Stress Disorder; DX=diagnosis.


**Miscarriage.** Women who endorsed having experienced miscarriage prior to the current pregnancy did not show higher levels of postpartum trauma symptoms after labor and delivery than women with no history of miscarriage. Miscarriage was assessed as a dichotomous variable (yes or no) and thus it was not possible to assess whether women with a greater number of prior miscarriages, or more recent miscarriage, might evidence more symptoms of PTSD after subsequent birth.

**Prior Difficult Birth.** Prior difficult birth refers to birth experiences women reported during the pre-delivery assessment of variables during pregnancy. The following criterion A event was included on the Posttraumatic Stress Diagnostic Scale (PDS): difficult or upsetting childbirth (for example, an emergency c-section or forceps delivery, stillborn child, extremely painful labor, or a lot of tearing during delivery). Women with a history of prior difficult birth were significantly higher in symptoms of postpartum PTSD after the childbirth experience investigated in the current study.

Table 6 on page 65 shows differences in postpartum PTSD symptoms for women who, before this current childbirth experience, had reported a prior difficult birth compared to women with no history of difficult birth. In contrast to significant differences in trauma symptoms after the recent birth, PTSD symptoms assessed during pregnancy did not differ significantly between second-time mothers who did and did not report prior difficult birth. This suggests that for women with a difficult prior birth, subsequent experience of birth either reactivates prior trauma symptomology or acts as a vulnerability to the development of ‘new’ trauma symptomology.

Among the eleven women reporting prior difficult birth, in the current delivery nine fell in the unassisted vaginal delivery category for mode of delivery (one woman delivered
via repeat c-section and one with instrument assistance). Half of these women had undergone unassisted vaginal delivery during their prior birth. This suggests increases in trauma symptoms after the recent birth experience are not accounted for (only) by undergoing recent obstetrical intervention.

**Sexual Assault.** Women who experience sexual contact or assault during childhood and subsequently experience sexual assault during adulthood are particularly susceptible to co-morbid psychological disorders and higher suicide rates (Cloitre et al., 2002; Kimerling et al., 2007; Messman-Moore et al., 2000; Najdowski & Ullman, 2009; Norris et al., 2002), and gynecological difficulties such as difficulty conceiving, recurrent vaginal infections, sexually transmitted diseases, painful intercourse, and abortions (Golding, 1996; West et al., 2000).

To explore whether trauma symptoms are greater among revictimized women a composite variable was created from two criterion A events on the PDS in an attempt to identify women endorsing both early and subsequent sexual victimization. The two criterion A events were: (a) sexual contact when younger than 18 with someone who was 5 or more years older (endorsed by 17 women) and (b) sexual assault by a family member or someone known to you (endorsed by 15 women). Nine women indicated they had both experienced early sexual contact with someone five or more years older and that they had been sexually assaulted by a family member or someone known to them.

The current study found that women who reported repeated sexual victimization\(^1\) with the first instance occurring in childhood were higher in symptoms of PTSD after childbirth;

\(^1\) Due to the wording of these criterion A events it is possible that some women endorsed two categories of sexual assault in reference to one incident (e.g. identifying whether the assault was by a stranger or someone known to them and also identifying that it occurred before age 18 by someone five or more years older). While this cannot be ruled out, 8 women endorsed early sexual contact without also using a second criterion A event to identify whether this person was a stranger or known to them. Thus it is more likely, though not definitive, that women viewed the criterion A events as mutually exclusive as they are intended and endorsed multiple items to indicate separate incidents of sexual assault.
however the difference did not reach statistical significance and the effect size was small.

Table 6 below shows means, standard deviations, t-score, and effect size for the comparison between women with and without repeat sexual assault.

Table 6

**Independent T-tests Comparing Symptoms of PTSD after Childbirth Between Women with and without a History of Miscarriage, Difficult Birth, and Repeated Sexual Assault**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=yes</th>
<th>M(SD)</th>
<th>n=no</th>
<th>M(SD)</th>
<th>t-score</th>
<th>p</th>
<th>effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscarriage</td>
<td>19</td>
<td>6.00 (8.58)</td>
<td>54</td>
<td>6.15 (6.99)</td>
<td>t(71)=.075</td>
<td>.94</td>
<td>.000</td>
</tr>
<tr>
<td>Difficult Birth</td>
<td>11</td>
<td>10.00 (8.57)</td>
<td>62</td>
<td>5.42 (6.99)</td>
<td>t(71)=-1.93</td>
<td>.05</td>
<td>.049</td>
</tr>
<tr>
<td>RSA</td>
<td>8</td>
<td>8.13 (6.92)</td>
<td>65</td>
<td>5.86 (7.44)</td>
<td>t(71)=-.817</td>
<td>.42</td>
<td>.009</td>
</tr>
</tbody>
</table>

*Note.* RSA refers to repeated sexual assault.

Not all women who experience sexual assault (whether in childhood or adulthood) develop Posttraumatic Stress Disorder (Wijma et al., 2002; Wilson, 2004) suggesting some women are more vulnerable to the development of psychopathology after sexual trauma whereas other are more resilient [this is also likely related to severity of sexual assault as severity of trauma is a known risk factor for the development of PTSD (Brewin et al., 2003)]. It would seem reasonable then that women with a history of repeat assault who are coping with ongoing PTSD and depression would be more susceptible to experiencing trauma symptoms after childbirth than women who were assaulted but do not struggle with ongoing psychopathology. An additional analysis was conducted to investigate whether women who evidenced PTSD and depression during pregnancy and who have a history of repeated sexual assault (as opposed to history of repeat sexual assault and no depression or PTSD during pregnancy) show greater trauma symptoms after childbirth.

Trauma symptoms after childbirth in women with a history of repeat sexual assault (RSA) and with or without comorbid PTSD and depression during pregnancy were compared in an independent t-test. There was a significant difference between the groups, $t(6)=-5.146$,.
Mean level of postpartum trauma symptoms among women with RSA and a PTSD/depression diagnosis during pregnancy ($n=3$) was 15.67 ($SD=1.52$). Mean level of postpartum trauma symptoms among women with RSA but without diagnosis of PTSD and depression during pregnancy ($n=5$) was 3.60 ($SD=3.78$). These results are considered preliminary given the small sample size. Future investigations with larger sample sizes would be needed to confirm (or disconfirm) the finding that among women with repeated sexual assault, only those with current PTSD and depression show significantly higher symptoms of trauma as a result of childbirth.

**Situational Factors Related to PTSD after Childbirth: Mode of Delivery and Pre-Delivery Psychopathology.** Factors thought to be associated with PTSD symptomology or to suggest greater trauma symptomology after childbirth include mode of delivery and psychopathology during pregnancy.

**Mode of Delivery.** One important aspect of trauma is how ‘objectively’ traumatic or severe the trauma is; a dose-response model of posttraumatic stress suggests the more severe the stressor the more stress symptoms it will produce. Deliveries that require intervention have been shown to produce more trauma symptomology though results have been mixed.

In the overall sample deliveries were categorized, based on self-report of the participants ($n=73$), as operative delivery (OD; i.e. c-section), instrument delivery (ID; i.e. vacuum extraction or forceps) or unassisted vaginal delivery (VD). Fifty-four women (74%) fell in the vaginal delivery group, 12 in the operative delivery group (16.4%), and 7 in the instrument delivery group (9.6%). Operative deliveries included 1 planned and 11 unplanned (2 acute emergency, and 9 after some period of labor). The c-section groups were combined for the analysis due to the small sample size. Compared to the national rates, there were
more vaginal deliveries (national rate=62.3%), fewer operative deliveries (national rate=30.1%), and comparable instrument deliveries (national rate=6.6%). These percentages are similar to other investigations of PTSD after childbirth (e.g. Maggioni, Margola, and Filippi, 2006).

Compared with other industrialized countries, the U.S. has the third-highest rate of c-section (MacDorman, Menacker, Declerq, 2008), and this rate is substantially higher than that seen in other countries where investigations of childbearing fear have been conducted: 9% (60% of those were emergency) in a study of Swedish women (Ryding et al., 1997); 12.2% in a Norwegian sample with 8.1% considered emergency surgeries (Heimstad et al., 2006); and 22% in the U.K. (Johnson & Slade, 2002).

In the current study, level of trauma symptomology was explored in a one-way between-groups analysis of variance with mode of delivery as the independent variable (i.e. unassisted vaginal delivery, instrument delivery, and operative delivery). The overall analysis was significant, $F(2,70)=6.67, p=.002$, eta squared=.16, however, the only significant group comparison (Tukey HSD) was between the women in the unassisted vaginal delivery group (VD) and women in the instrument assisted delivery (ID) group. Mean PTSD symptoms in the VD group were mild at 4.44 ($n=54, SD=4.69$) and in the ID group were moderate at 13.00 ($n=7, SD=14.28$). Women in the operative delivery group (OD; $n=12, M=9.58, SD=9.03$) did not differ significantly from those in the VD or ID groups, although their trauma symptoms border on moderate.

**Pre-delivery Psychopathology: Depression and PTSD during Pregnancy.** Trauma symptoms were compared in women with a pre-delivery diagnostic status of no diagnosis, PTSD/trauma-related Adjustment Disorder, depression alone, or comorbid PTSD/AD and
depression in a one-way analysis of variance with postpartum PTSD symptoms as the dependent variable. Only women with depression (either alone or comorbid with PTSD) showed significantly more trauma symptoms after childbirth compared to women without either diagnosis: $F(3,69)=6.25$, $p<.01$. Table 7 below shows the number, means, standard deviations, and significant differences between diagnostic groups. Women who met criteria for PTSD and trauma-related Adjustment Disorder during pregnancy had elevated levels of postpartum trauma symptoms compared to women with no diagnosis during pregnancy; however, their elevated levels of trauma fell in the mild range and did not differ significantly from women carrying no diagnosis.

Table 7

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Symptom Severity</th>
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</thead>
<tbody>
<tr>
<td>No Diagnosis*†</td>
<td>49</td>
<td>3.49</td>
<td>4.28</td>
<td>mild</td>
</tr>
<tr>
<td>PTSD/AD Only</td>
<td>6</td>
<td>7.33</td>
<td>5.89</td>
<td>mild</td>
</tr>
<tr>
<td>Depression Only*</td>
<td>9</td>
<td>11.00</td>
<td>9.62</td>
<td>moderate</td>
</tr>
<tr>
<td>PTSD/AD and Depression†</td>
<td>9</td>
<td>15.67</td>
<td>10.11</td>
<td>moderate</td>
</tr>
</tbody>
</table>

Note. * and † indicate significant differences between groups, $p=.05$. Diagnostic categories are based on measures administered during pregnancy. PTSD symptoms are based on administration of the PDS after childbirth.

### Dispositional Factors Related to PTSD after Childbirth: Trait Anxiety, Labor

#### Self-Efficacy, Anxiety Sensitivity, and Childbearing Fear.
Several dispositional factors were hypothesized to show a relationship with trauma symptoms after childbirth. Trait anxiety, anxiety sensitivity, and childbearing fear have separately shown to predict postpartum trauma symptoms, although their relationship to one another was unknown. Similarly, the relationship between these variables and labor self-efficacy and their relative contribution to the prediction of trauma symptoms after childbirth had not yet been explored.

Given the relatively small sample size ($N=73$), the number of predictors entered into the model was limited to protect against losing power to detect significant contributors to
postpartum trauma symptoms (Tabachnick & Fidell, 1996). Although anxiety sensitivity and childbearing fear showed only small correlations with postpartum trauma symptoms and thus might be candidates for exclusion from the analysis, they were included since a small number of prior studies have shown a relationship between these variables and trauma symptoms after childbirth (Fairbrother & Woody, 2007; Keogh et al., 2002; Soderquist et al., 2009).

Anxiety sensitivity (ASI-R) and pre-delivery childbearing fear (WDEQ-A) showed a significant moderate correlation with one another, and each showed significant but small positive correlations with postpartum trauma symptomology (Postpartum PDS; see Table 9 on page 72 for correlations). Labor self-efficacy (CBSEI) showed a significant moderate negative correlation with postpartum trauma symptoms, and trait anxiety (STAI-T) a significant small-moderate positive correlation with postpartum trauma symptoms. After centering, each of these variables were entered into a hierarchical multiple regression to determine their ability to predict trauma symptoms after childbirth. Given the low correlation of trauma symptoms to anxiety sensitivity and childbearing fear, these two variables were not entered until the final step to explore whether they added to the model. This final R-square change was the only step that did not reach statistical significance and these two predictors were dropped from the model.

In the final model, trait anxiety was entered in step one and accounted for 9.3% of the variance in trauma symptoms. Labor self-efficacy was entered in step two and accounted for an additional 15.4% of the variance in postpartum trauma symptoms. Their interaction was entered in step three to explore whether labor self-efficacy moderated the relationship between trait anxiety and trauma symptoms. This interaction accounted for an additional 7.2% of variance in trauma symptoms. The model as a whole, and each step, was significant,
$F(3,67)=10.46, p<.01$. Table 8 on page 71 details the beta, significance levels, confidence levels, and R-squared change for the coefficients. Figure 1 below displays the interaction between trait anxiety and labor self-efficacy and demonstrates that self-efficacy for labor moderates the effect of higher levels of trait anxiety on trauma symptoms.

Figure 2. Displays the interaction between trait anxiety and labor self-efficacy and shows that greater levels of self-efficacy for labor and delivery moderate the relationship between trait anxiety and trauma symptoms.
### Table 8

**Hierarchical Multiple Regression Analysis Predicting Trauma Symptoms after Childbirth**

<table>
<thead>
<tr>
<th>Full Model</th>
<th>Unstandardized Coefficient and Standard Error</th>
<th>Standardized Coefficient</th>
<th>95% Confidence Interval for $B$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$ (Std. Error)</td>
<td>$Beta$</td>
<td>$T$</td>
<td>Sig.</td>
</tr>
<tr>
<td>STAI-Trait</td>
<td>.159 ( .071)</td>
<td>.242</td>
<td>2.26</td>
<td>.027</td>
</tr>
<tr>
<td>Labor Self-Efficacy (CBESI)</td>
<td>-.0287 (.010)</td>
<td>-.305</td>
<td>-2.72</td>
<td>.008</td>
</tr>
<tr>
<td>CBSEI x STAI</td>
<td>-.002  (.001)</td>
<td>-.287</td>
<td>-2.66</td>
<td>.010</td>
</tr>
</tbody>
</table>

$\Delta R^2 = .319*$

*Note.* $p \leq .01$. CBESI=Childbirth Self-Efficacy Inventory; STAI-Trait=trait component of State-Trait Anxiety Inventory.
Table 9

Correlation Table

<table>
<thead>
<tr>
<th>Measure</th>
<th>pre-PDS</th>
<th>pre-EPDS</th>
<th>ASI-R</th>
<th>STAI(s)</th>
<th>STAI(t)</th>
<th>WDEQ-A</th>
<th>ISEL</th>
<th>CBSEI</th>
<th>Post-PDS</th>
<th>Post-EPDS</th>
<th>WDEQ-B</th>
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</thead>
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<tr>
<td>Pre-delivery PDS</td>
<td>1</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Pre-Delivery EPDS</td>
<td>.51**</td>
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<td>ASI-R</td>
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<td>.57**</td>
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<tr>
<td>STAI(s)</td>
<td>.41**</td>
<td>.70**</td>
<td>.50**</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>STAI(t)</td>
<td>.51**</td>
<td>.82**</td>
<td>.58**</td>
<td>.81**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WDEQ-A</td>
<td>.32**</td>
<td>.50**</td>
<td>.45**</td>
<td>.49**</td>
<td>.53**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISEL</td>
<td>-.32**</td>
<td>-.47**</td>
<td>-.25*</td>
<td>-.35**</td>
<td>-.58**</td>
<td>-.31**</td>
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<td></td>
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</tr>
<tr>
<td>CBSEI</td>
<td>-.10</td>
<td>-.24*</td>
<td>-.24*</td>
<td>-.23*</td>
<td>-.35*</td>
<td>.26*</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postpartum PDS</td>
<td>.45**</td>
<td>.32**</td>
<td>.27*</td>
<td>.23*</td>
<td>.31**</td>
<td>.26**</td>
<td>-.23</td>
<td>-.46**</td>
<td>1</td>
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</tr>
<tr>
<td>Postpartum EPDS</td>
<td>.20</td>
<td>.46**</td>
<td>.30**</td>
<td>.46**</td>
<td>.48**</td>
<td>.40**</td>
<td>-.26*</td>
<td>-.32**</td>
<td>.56**</td>
<td>1</td>
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</tr>
<tr>
<td>WDEQ-B</td>
<td>.17</td>
<td>.08</td>
<td>.15</td>
<td>.12</td>
<td>.20</td>
<td>.41**</td>
<td>-.15</td>
<td>.31**</td>
<td>.47**</td>
<td>.37**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Correlation is significant at the .01 level. *Correlation is significant at the .05 level. ASI=Anxiety Sensitivity Index-Revised, CBSEI=Childbirth Self-Efficacy Inventory, ISEL=Interpersonal Support Evaluation List, EPDS=Edinburgh Postnatal Depression Inventory, PDS=Posttraumatic Stress Disorders Scale, STAI=State-Trait Anxiety Inventory, WDEQ=Wijma Delivery Expectancy (A) and Experience (B) Scales.**
Data Analysis Section Two: Childbearing Fear

The purpose of this section of analyses was to determine the rate of excessive childbearing fear in a sample of American women, and to explore variables thought to contribute to greater levels of fear before and after childbirth. Several of these variables have empirical support from studies that have explored their relationship to fear in women from Scandinavia, Australia, and the U.K. Variables fall in three domains: historical (e.g. miscarriage, prior difficult birth, and sexual assault), situational (e.g. whether the woman has given birth before and current psychiatric diagnosis), and dispositional (e.g. trait anxiety, anxiety sensitivity, and self-efficacy for childbirth). For most subsections of the childbearing fear analyses, data obtained from the 90 women completing the pre-delivery assessment are included. In the final subsection of childbearing fear (i.e. childbearing fear and mode of delivery) the effect on post-delivery fear scores of varying modes of delivery (instrument, operative, and unassisted vaginal delivery) are explored; for these analyses only the data from the 73 women who completed the study are included.

Incidence of Childbearing Fear. The second overarching goal of this investigation was to determine the rate, expressed as percentage of the total sample, at which women endorsed severe childbearing fear ($\geq 85$ on the Wijma Delivery Expectancy Questionnaire (WDEQ-A)) in order to determine whether excessive fear in American women is commensurate with or exceeds levels experienced by women in other countries. The mean score on the WDEQ-A among the ninety participants was $54.12$ ($SD=21.20$). Seven women ($7.7\%; 90\% CI [3.08\%, 12.32\%]$) obtained scores of $\geq 85$. As seen in Table 2 on page 29, this rate of fear is lower than that seen in samples of women from other countries, and mean levels of fear are comparable or slightly lower than those seen in non-U.S. women.
However, 52% of this sample (n=47) reported a midwife as their medical provider, which is significantly greater than the 7-8% (Declerq, 2001; Ventura et al., 1999) typically seen in the United States. Women who chose a midwife for their care provider were significantly lower in childbearing fear ($M=47.00, SD=18.89$) than women who reported an obstetrician as their provider ($M=61.91, SD=21.04$). When looking at rate of severe fear within category of medical provider, childbearing fear was 4% (90% CI [0.6%, 7.4%]) among those in midwifery care and 11.6% (90% CI [5.57%, 16.43%]) among those in the care of an obstetrician. The latter rate is quite similar to the rate of childbearing fear seen in non-U.S. women. Comparisons between obstetrical and midwifery patients have not occurred in other countries that have investigated childbearing fear as the provision of obstetrical services is quite different. For example, in Sweden midwives are the first line of care for a woman without high-risk pregnancy and 34% of women give birth at home (McKay, 1993). This contrasts with the 1% of women who birth at home in the U.S.

Researchers have shown that excessive childbearing fear is associated with preference for delivery by c-section, and possibly leads to unplanned interventions such as operative deliveries (Ryding et al., 1998c). In this sample, when asked to rate the likelihood, if given a choice, of choosing an elective c-section over vaginal delivery on a scale of 1-6, there was a moderate correlation between preference for c-section and childbearing fear, $r=.390, N=90, p<.001$. On a yes/no question of whether the participant had already asked their provider for an elective c-section for fear, four women indicated having done so and they showed significantly more childbearing fear ($M=78.50, SD=16.46$) compared to women not requesting surgical delivery ($n=86, M=52.99, SD=20.78$), $t(88)=-2.42, p=018$, eta squared=.062.
Of these four women, three endorsed prior miscarriage (but not stillbirth), two sexual trauma, one prior traumatic birth, and all four reported two or more criterion A events. All four women completed the study; one delivery was instrument, one operative but not planned ahead, and two unassisted vaginal deliveries.

Historical Factors Related to Childbirth Fear: Miscarriage, Prior Difficult Birth, and Sexual Assault. Researchers have suggested that excessive childbearing fear may be a consequence of incidents in the woman’s personal history such as having experienced a miscarriage, prior difficult birth (Saisto et al., 1999), or history of childhood sexual abuse (Heimsted et al., 2006). To explore whether these factors contribute to greater childbearing fear in American women, separate independent samples t-tests were conducted comparing fear between women with and without these experiences.

Miscarriage and Prior Difficult Birth. Level of childbearing fear was compared separately in women who indicated a history of miscarriage and in women who indicated a prior difficult birth. Nulliparous women (those with no history of giving birth) were excluded from the latter analysis. Table 10 below shows the means, standard deviations, t-scores, significance levels, and effect sizes of these comparisons.

Table 10

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=yes</th>
<th>M(SD)</th>
<th>n=no</th>
<th>M(SD)</th>
<th>t-score</th>
<th>p</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscarriage</td>
<td>23</td>
<td>54.52 (24.19)</td>
<td>67</td>
<td>53.98 (20.27)</td>
<td>t(88)=-.104</td>
<td>.92</td>
<td>.0001</td>
</tr>
<tr>
<td>Difficult Birth</td>
<td>12</td>
<td>57.08 (21.74)</td>
<td>27</td>
<td>51.26 (21.22)</td>
<td>t(37)=-.747</td>
<td>.46</td>
<td>.0148</td>
</tr>
<tr>
<td>Childhood Sexual Assault</td>
<td>17</td>
<td>58.77 (27.32)</td>
<td>73</td>
<td>53.04 (19.59)</td>
<td>t(88)=-1.00</td>
<td>.32</td>
<td>.0112</td>
</tr>
<tr>
<td>Repeat Sexual Assault</td>
<td>9</td>
<td>68.33 (24.82)</td>
<td>81</td>
<td>52.54 (20.32)</td>
<td>t(88)=-2.16</td>
<td>.03</td>
<td>.0504</td>
</tr>
</tbody>
</table>
There was no significant difference in childbearing fear between women who did and did not report a history of miscarriage. Mean fear scores were higher for women with prior difficult birth however this difference was not statistically significant.

**Sexual Assault.** Heimstad and colleagues (2006) demonstrated that women who report a history of childhood sexual abuse show greater childbearing fear. Seventeen women (18.8%) in the current study reported sexual assault when they were under age 18 by someone five or more years older. As shown in Table 10 although mean childbearing fear was higher among women reporting sexual assault during childhood compared to women without this experience, this difference did not reach statistical significance. The nine women who endorsed repeat sexual assault [(RSA), n=9] showed greater mean level of childbearing fear (M=68.33, SD=24.82) compared to women not reporting repeated sexual assault (non-RSA n=81, M=52.54, SD=20.32), t(88)=-2.16, p=.03, eta squared=.05.

**Situational Factors Related to Childbirth Fear: Birth experience and Pre-Delivery Psychopathology.** Several circumstances surrounding the upcoming birth are thought to influence the level of childbearing fear, such as whether the woman has given birth before and whether she currently suffers from a psychiatric disorder.

**Birth Experience.** Women were first compared using an independent-samples-t-test to determine whether level of fear differed between first-time mothers and women with prior birth experience, the presumption being that women undergoing their second or more childbirth experience would experience less fear than first-time mothers. These results were non-significant t(88)=.417, p=.678, eta squared=.0019 (first-time mothers n=51, M=54.94, SD=20.47 and experienced mothers n=39, M=53.05, SD=22.35).
Given that other researchers have found differences in fear levels between first-time mothers and women with prior birth experience, fear levels were again compared after excluding women who endorsed prior traumatic birth \( (n=12) \) on the pre-delivery PDS. The results were again non-significant \( t(76)=.727, p=.470, \eta^2=.007 \), although mean level of fear in second-time mothers was slightly reduced \( (n=27, M=51.26, SD=22.79) \) after excluding women with prior difficult deliveries.

**Pre-Delivery Psychopathology.** Current psychopathology may represent vulnerability for increased childbearing fear. Depression has been suggested as a risk factor for greater fear (Saisto et al., 2001c) of vaginal delivery and women with a history of counseling have greater levels of fear (Soderquist et al., 2006). In the current study there was a small significant positive correlation between trauma symptoms (pre-PDS) and childbearing fear (WDEQ-A), and a moderate significant correlation between symptoms of depression (pre-EPDS) and childbearing fear (see Table 9 on page 80 for correlations).

Fear levels were explored among women who would likely meet criteria for a current diagnosis of PTSD or depression. As noted in the Methods section, a provisional diagnosis of depression was made if a woman met or exceeded a score of 12 on the EPDS. Based on this cut-off, 22 women in the pre-delivery sample (24%) met the threshold suggestive of a depressive disorder, which is on the higher end of the range of depression rates (14-23%) typically seen during pregnancy. Seventeen women met criteria on the PDS for a diagnosis of PTSD, or Adjustment Disorder related to trauma. Nine of these cases were co-morbid depression and PTSD/Adjustment Disorder.

Level of childbearing fear was compared among women with no diagnosis, PTSD/AD only, depression only, and comorbid PTSD/AD and depression. This one-way
analysis of variance was significant, \( F(3,86)=6.86, p<.01 \), eta squared=.24. Table 11 below shows the number of women, means, standard deviations, and significant differences between the groups. Post hoc analysis using Tukey’s HSD showed that both women with depression and women with co-morbid PTSD/AD and depression were significantly more fearful of childbearing than women without a diagnosis; whereas women with a diagnosis of PTSD/AD alone did not differ significantly in fear from those with no diagnosis. None of the diagnostic groups differed significantly from one another.

Table 11

<table>
<thead>
<tr>
<th>Group</th>
<th>( n )</th>
<th>( M )</th>
<th>( SD )</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Diagnosis</td>
<td>59</td>
<td>48.32*†</td>
<td>20.06</td>
</tr>
<tr>
<td>PTSD/AD Only</td>
<td>8</td>
<td>53.88</td>
<td>16.13</td>
</tr>
<tr>
<td>Depression Only</td>
<td>13</td>
<td>68.08*</td>
<td>19.23</td>
</tr>
<tr>
<td>PTSD/AD and Depression</td>
<td>9</td>
<td>72.89†</td>
<td>16.93</td>
</tr>
</tbody>
</table>

*Note.* * and † indicate significant differences between groups, \( p=.05 \).

In addition, among the women who endorsed severe fear of childbirth, five of the seven were diagnosed with depression or co-morbid PTSD and depression, and so not unexpectedly the level of depression symptoms among these seven women was significantly higher (\( M=12.00; SD=3.21 \)) than among women without severe fear of childbirth (\( M=7.67; SD=4.95 \)); \( t(87)=-2.27, p=.03 \), eta squared=.06.

Since the association between repeat sexual abuse (RSA) and diagnostic status (i.e. none, PTSD/AD, depression, and co-morbid PTSD/AD-depression) was marginally significant in a chi-square test for independence \( [\chi^2(3, N=90)=6.32, p=.09, \phi=.27] \), both were entered into a regression analysis to determine whether diagnostic status would better account for the variance in childbearing fear than repeat sexual assault and whether RSA is a predictor of childbearing fear only at higher levels of depression. Repeat sexual assault (\( n \)
for women endorsing was 9; n for women not endorsing was 81) was entered in step one and accounted for 5.3% of the variance in childbearing fear. Depression symptoms were entered in step two explaining an additional 22.7% of the variance in childbearing fear. The interaction of depression and repeat sexual assault was entered in step three and while the full model was significant, $F(3,85)=11.26, p<.01$, accounting for 28.4% of the variance in childbearing fear, the only significant predictor in the final step was depression. This suggests that the relationship between repeated sexual assault and fear of childbirth is mediated by depression.

**Dispositional Factors Related to Childbirth Fear: Trait Anxiety, Anxiety Sensitivity, Labor Self-Efficacy, and the Effect of Social Support.** Of interest was how well dispositional factors predict childbearing fear, specifically, whether anxiety sensitivity, labor self-efficacy, and social support would contribute to the prediction of childbearing fear in addition to the variance that prior studies have shown is associated with trait anxiety. Anxiety sensitivity was hypothesized to predict greater childbearing fear as anxiety sensitivity is a construct thought to underlie many discrete fears and has been shown to predict traumatic reactions after childbirth (Asmundson et al., 2000).

Greater labor self-efficacy was hypothesized to predict lower levels of childbearing fear as having doubt or belief in one’s ability to cope with labor has been shown in one study to have a small negative relationship with childbearing fear (Lowe, 2000). Given the known relationship between trait anxiety and childbearing fear, and the suggested potential for self-efficacy to act as buffer between anxiety proneness and fear, it was hypothesized that a greater belief in the ability to cope during labor and delivery would moderate the relationship between trait anxiety and childbearing fear.
Support for the predictive validity of social support for childbearing fear is limited with general support not predicting fear although satisfaction with partner does (Saisto et al., 2001c). However social support has been shown by numerous prior studies to buffer stress and thus was entered into the analysis primarily to explore its moderating effects. Specifically, social support was tested as an interaction with trait anxiety and labor self-efficacy to determine whether social support might moderate the known relationship between trait anxiety and childbearing fear or the known relationship between self-efficacy and childbearing fear. Given the exploratory nature of these interactions and the need to limit the number of predictors in the regression due to the small sample size, no other interactions were included. Table 9 on page 72 shows the correlations of childbearing fear (WDEQ-A) with anxiety sensitivity (ASI-R), trait anxiety STAI(t), labor self-efficacy (CBSEI), and social support (ISEL).

Trait anxiety was entered in step one of the hierarchical regression explaining 27.9% of the variance in fear of childbirth. In step two anxiety sensitivity, labor self-efficacy, and social support were entered simultaneously and these variables explained an additional 7.8% of the variance in childbearing fear. In the final step, the interaction between trait anxiety and labor self-efficacy, trait anxiety and social support, and labor self-efficacy and social support were entered. This interaction added 7.7% to the total variance accounted for by the model. As seen in Table 12 on page 82 the overall model was significant, $F(7,80)=8.79$, $p<.01$, and accounted for 43.5% of the variance in childbearing fear. The R-squared change at each step was significant at $p\leq.02$. The interaction of labor self-efficacy and social support recorded the highest beta value, followed by trait anxiety, labor self-efficacy, and finally anxiety sensitivity. Social support alone and the interaction between social support and trait
anxiety, and labor self-efficacy and trait anxiety, were not significant predictors of childbearing fear. Greater levels of trait anxiety and anxiety sensitivity predicted higher levels of fear of childbearing. Lower levels of labor self-efficacy predicted greater childbearing fear, but as Figure 2 below shows, this relationship is stronger at higher levels of social support.

![Regression of Childbearing Fear on Labor Self-Efficacy at Differing Values of Social Support](image)

**Figure 3.** Displays the interaction between labor self-efficacy and social support in predicting levels of childbearing fear. SS=social support.

**Childbearing Fear and Mode of Delivery in Study Completers.** Prior studies have shown that childbearing fear decreases slightly after childbirth although women who are categorized as high, moderate, or low prior to childbirth maintain the same level of fear after childbirth (Zar et al., 2001). Wijma and colleagues found that fear increases after emergency c-section (Wijma et al., 2002). Others have found that women who underwent operative or
Table 12

*Final Step of Hierarchical Multiple Regression Analyses Predicting Pre-Delivery Childbearing Fear from Trait Anxiety, Anxiety Sensitivity, Labor Self-Efficacy, and Social Support Prior to Delivery*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Full Model</th>
<th>Unstandardized Coefficient and Standard Error</th>
<th>Standardized Coefficient</th>
<th>95% Confidence Interval for B</th>
<th>( \Delta R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( B ) (Std. Error)</td>
<td>( Beta )</td>
<td>( t )</td>
<td>Sig.</td>
</tr>
<tr>
<td>Trait Anxiety (STAI)</td>
<td></td>
<td>.663 (.244)</td>
<td>.348</td>
<td>2.72</td>
<td>.008</td>
</tr>
<tr>
<td>Anxiety Sensitivity (ASI-R)</td>
<td></td>
<td>.236 (.121)</td>
<td>.207</td>
<td>1.96</td>
<td>.053</td>
</tr>
<tr>
<td>Social Support (ISEL)</td>
<td></td>
<td>-.042 (.164)</td>
<td>-.033</td>
<td>-.254</td>
<td>.800</td>
</tr>
<tr>
<td>Labor Self-Efficacy (CBESI)</td>
<td></td>
<td>-.083 (.024)</td>
<td>-.346</td>
<td>-3.53</td>
<td>.001</td>
</tr>
<tr>
<td>CBESI x ISEL</td>
<td></td>
<td>-.003 (.001)</td>
<td>-.387</td>
<td>-2.96</td>
<td>.004</td>
</tr>
<tr>
<td>CBESI x STAI</td>
<td></td>
<td>-.002 (.003)</td>
<td>-.098</td>
<td>-.786</td>
<td>.434</td>
</tr>
<tr>
<td>STAI x ISEL</td>
<td></td>
<td>-.004 (.001)</td>
<td>-.044</td>
<td>-.381</td>
<td>.704</td>
</tr>
</tbody>
</table>

Note. *\( \Delta R^2 \) = p ≤ .01. ASI-R=Anxiety Sensitivity Index-Revised; CBESI=Childbirth Self-Efficacy Inventory; ISEL=Interpersonal Support Evaluation List; STAI=State-Trait Anxiety Inventory (trait component was used for analysis).
instrument deliveries are more fearful in subsequent pregnancies (Heimstad et al., 2006; Nieminen et al., 2009; Rouhe et al., 2008). Fear of labor and delivery before and after childbirth was investigated to determine how childbirth may influence changes in fear levels. Only data from the 73 women who completed the study are used in this section of analyses.

To explore the consistency of fear across the perinatal period, and to determine whether fear of childbirth differs depending upon mode of delivery, a mixed between-within subjects analysis of variance was conducted. Mode of delivery was the between-subjects independent variable (instrument, operative, or unassisted vaginal delivery) and time of fear measurement (during pregnancy or 4-8 weeks postpartum) was the within-subjects independent variable. Childbearing fear was the dependent variable (WDEQ-A and B).

The interaction between fear scores and mode of delivery was significant, Wilks Lambda=.91, $F(2, 70)=3.62, p=.03$, partial eta squared=.09, suggesting that there is a change in fear scores from pre to post-delivery that depends upon the mode of delivery. Table 13 on page 84 details the mean and standard deviations for childbearing fear among the three modes of delivery. Paired-samples t-tests were conducted to look at differences in pre and post-delivery fear scores within each mode of delivery. As can be seen in Table 13 on the following page, the stability between pre and post-partum childbearing fear was unchanged in the instrument delivery group. Women in the vaginal delivery group evidenced a significant reduction in childbearing fear $t(53)=3.33, p<.01$, eta squared=.17. The increase in fear for women in the operative delivery group did not reach statistical significance, $t(11)=-1.12, p=.29$, eta squared=.10, however the effect size was moderate to large.

Given the apparent influence of mode of delivery on appraisal of fear after delivery, and the ability of dispositional factors to predict pre-delivery fear of childbirth, a regression
Table 13

Pre and Post-Delivery Fear of Childbirth Among Women Based on Mode of Delivery

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>WDEQ-A Pre-Delivery Fear/Expectation</th>
<th>WDEQ-B Post-Delivery Fear/Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>VD</td>
<td>54</td>
<td>52*</td>
</tr>
<tr>
<td>ID</td>
<td>7</td>
<td>61</td>
</tr>
<tr>
<td>OD</td>
<td>12</td>
<td>52</td>
</tr>
<tr>
<td>Group</td>
<td>73</td>
<td>52</td>
</tr>
</tbody>
</table>

VD=vaginal delivery; ID=instrument delivery (forceps or vacuum extraction); OD=operative delivery (c-section). *=significant difference p=<.01.

analysis was conducted to assess the relative influence of dispositional factors and mode of delivery on childbearing fear after childbirth. Due to concerns regarding power and the exploratory nature of this analysis the regression was limited to five predictors. These included trait anxiety, labor self-efficacy, anxiety sensitivity, instrument delivery, and operative delivery.

Trait anxiety, labor self-efficacy, and anxiety sensitivity were entered in step 1 and accounted for 11.3% of the variance in post-delivery fear. Operative and instrument delivery were entered in step 2 and accounted for an additional 13.5% of the variance in post-delivery fear. The overall model was significant, $F(5,65)=4.29$, $p=.002$. In the full model, the significant predictors of post-delivery fear were operative delivery followed by labor self-efficacy and lastly instrument delivery.

Unlike the prior regression on pre-delivery fear of childbirth, anxiety sensitivity and trait anxiety were not significant predictors of post-delivery fear of childbirth in either step of the analysis. Table 14 on the following page shows details for the final step of the model. These results show that lower self-efficacy regarding the ability to cope during childbirth, and undergoing an operative or instrumental delivery, predict greater level of post-delivery fear of childbirth and that trait anxiety and anxiety sensitivity do not contribute to the ability to predict this post-delivery fear of childbirth.
Table 14

*Final Step of Regression Analyses Predicting Post-Delivery Childbearing Fear from Trait Anxiety, Anxiety Sensitivity, Labor Self-Efficacy, and Mode of Delivery*

<table>
<thead>
<tr>
<th>Full Model</th>
<th>Unstandardized Coefficient and Standard Error</th>
<th>Standardized Coefficient</th>
<th>95% Confidence Interval for B</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (Std. Error)</td>
<td>Beta</td>
<td>t</td>
<td>Sig.</td>
</tr>
<tr>
<td>State Anxiety (STAI)</td>
<td>.345 (.253)</td>
<td>.193</td>
<td>1.36</td>
<td>.178</td>
</tr>
<tr>
<td>Anxiety Sensitivity (ASI)</td>
<td>-.014 (.143)</td>
<td>-.014</td>
<td>-.100</td>
<td>.920</td>
</tr>
<tr>
<td>Labor Self-Efficacy (CBSEI)</td>
<td>-.059 (.028)</td>
<td>-.243</td>
<td>-2.07</td>
<td>.042</td>
</tr>
<tr>
<td>Instrument Delivery</td>
<td>14.91 (7.64)</td>
<td>.221</td>
<td>1.95</td>
<td>.055</td>
</tr>
<tr>
<td>Operative Delivery</td>
<td>18.65 (6.16)</td>
<td>.336</td>
<td>3.03</td>
<td>.004</td>
</tr>
</tbody>
</table>

Total \( R^2 = .248^{**} \)

Note. *= p ≤ .05; **= p ≤ .0
Discussion Section I: Posttraumatic Stress after Childbirth

Studying childbirth related trauma presents a unique opportunity for examining predictors of posttraumatic stress as pregnancy is a common event with a conclusion that can be generally forecast. In addition most (though certainly not all) women have some contact with medical providers during pregnancy, which affords several opportunities for assessment prior to birth. A small number of researchers have directed their attention to the development of trauma symptoms after childbirth. The principal goal of these studies has been to verify the existence of Posttraumatic Stress Disorder resulting from childbirth and some of these studies have begun to elucidate variables that predict postpartum PTSD. Similar to prior studies of postpartum trauma emphasis in this study was placed on determining the incidence of Posttraumatic Stress Disorder, assessing subclinical traumatic responses to childbirth, and evaluating levels of traumatic symptomology. In addition this investigation explored predictors of postpartum PTSD and the relative importance of pre-existing psychopathology and mode of delivery on trauma symptoms.

Some factors that have in prior studies been related to greater trauma symptomology, such as a prior difficult birth, sexual assault, instrument and operative deliveries, and pre-delivery psychopathology were supported in the current investigation; however history of miscarriage was not associated with higher levels of trauma symptomology after childbirth. Similar to prior studies, trait anxiety and self-efficacy for labor contributed to the prediction of trauma symptoms after childbirth; in addition labor efficacy was found to moderate the relationship between trait anxiety and trauma symptoms. Contrary to prior work, anxiety sensitivity and childbearing fear did not contribute to the prediction of trauma symptomology.

The following section reviews in greater detail the results of the investigation into traumatic stress after childbirth, beginning with incidence rates of PTSD and Adjustment...
Disorder and then discussing the role of historical, situational, and dispositional factors in posttraumatic symptoms after childbirth.

**Incidence of Posttraumatic Stress and Adjustment Disorders.**

**Rate of Posttraumatic Stress Disorder.** Support for the experience of childbirth as a possible traumatic event has been building in the last decade. Most of this work has been conducted overseas in the U.K. (Ayers & Pickering, 2001; Czarnocka & Slade, 2000), Australia (Creedy et al., 2000; White et al., 2006), Norway (Skari et al., 2002), Sweden (Soderquist et al., 2006; Wijma et al., 1997), Germany (Zaers et al., 2008), and Italy (Maggioni et al., 2006), as well as one study in the U.S. (Soet et al., 2003). In the present study 5.4% of women ($n=4$) developed new cases of Posttraumatic Stress Disorder after childbirth. These women did not meet criteria for PTSD or Adjustment Disorder during pregnancy though each indicated previous treatment for psychological problems. An additional 5.4% of women ($n=4$) met the criteria for postpartum PTSD though these women had been assigned a trauma diagnosis during pregnancy. Thus the total percentage of women assigned a diagnosis of PTSD after childbirth was 10.9%. An additional 19.2% of the sample ($n=14$) met the criteria for a diagnosis of postpartum Adjustment Disorder; half of these women had a trauma-related diagnosis prior to childbirth.

The rate of 10.9% of participants meeting the criteria for PTSD after childbirth is greater than but still consistent with prior studies of postpartum trauma. Several explanations for the higher rate of PTSD in this sample are possible; likely explanations include differences in how diagnosis is established and a sample of women more vulnerable to the development of PTSD.

**Measurement and Rate of PTSD.** Some variability in rates of postpartum PTSD and the higher rate in the current investigation can likely be attributed to how this diagnosis is established. Investigations that have relied on the Traumatic Events Scale (TES; i.e. Soderquist
et al., 2006; Soet et al., 2003; Wijma et al., 1997) have yielded the lowest estimates of postpartum PTSD (1.7-1.9%). The TES measures PTSD symptoms on a 0 to 3 scale and investigators consider symptom scores of 2 or higher to contribute to a diagnosis of PTSD. If scores of 1 or higher are used, the rate of PTSD in one of these studies increases to from 1.7% to 4.8% (Wijma et al., 1997). Alternatively, studies that have relied on measures developed by Foa and colleagues (Foa et al., 1993; Foa et al., 1997) such as the PSS or PDS (the latter used in the current study) yield rates of PTSD from 5.6-6.9%. In the PSS and PDS trauma symptoms are rated on a 0 to 3 scale with symptom scores of 1 or more contributing to a diagnosis of PTSD, which lowers the threshold for diagnosis of PTSD.

**Differing Levels of Pre-Delivery Psychopathology.** Pre-existing psychopathology and trauma exposure are known risk factors for development of PTSD after subsequent trauma (Brewin et al., 2000). The percentage of women in this study meeting criteria for depression during pregnancy (24%) was higher than usually seen. Using the same assessment procedure researchers (de Tychey et al., 2005) found 19% of French women were depressed during pregnancy and they cite several studies with rates ranging from 13.5% to 19.8%. One of the lowest rates of depression during pregnancy (11%) was reported in a sample of Swedish women (Andersson et al., 2004). Depression was also higher than seen in two other prospective childbirth trauma studies; Maggioni and colleagues (2006) reported 12% of Italian women were depressed and their rate of PTSD after childbirth was 2.4%. Soderquist and colleagues (2009) reported even lower rates of depression during pregnancy (4.7%) in Swedish women and their rate of PTSD after childbirth was 1.3%. The rate of previous trauma exposure is also much higher than prior studies of childbirth-related trauma (current study rate=88%; rate=58% Leeds et al., 2008; rate=66%, White et al., 2006). The higher rate of depression is explained by cross-
cultural epidemiological studies of psychopathology where the U.S. has shown greater
prevalence (lifetime, 12 month, and 30 day) of Major Depressive Disorder as well as anxiety and
substance abuse disorders compared to Brazil, Canada, Chile, the Czech Republic, Germany,
Japan, Mexico, Netherlands, and Turkey (Andrade et al., 2003; WHO International Consortium
in Psychiatric Epidemiology, 2000).

**Rate of Adjustment Disorder.** Unlike the higher rate of Posttraumatic Stress Disorder
in this sample, the 19.2% rate of Adjustment Disorder or subclinical traumatic reactions to
childbirth was lower than seen in all but one prior study (White et al., 2006b). Many of these
studies (e.g. Czarnocka & Slade, 2001; Maggioni et al., 2006; Soet et al., 2003; Zaers et al.,
2008) identified subclinical trauma symptoms based on fulfilling the PTSD criteria within at
least one symptom cluster (i.e. 1 re-experiencing symptom, 3 avoidance symptoms, or 2
hyperarousal symptoms). Of concern is that often the hyperarousal symptoms show the greatest
elevations. It has been suggested (Slade, 2006) that some elevation of hyperarousal symptoms
may be ‘normal’ in postpartum women given the physiological changes associated with
recovery, disruption related to parenting a newborn, and possible biological mechanisms that
encourage protection of a newborn.

Basing diagnosis upon criteria for Adjustment Disorder yields a more accurate
subclinical picture of PTSD in that symptoms are spread across several of the categories required
for diagnosis of PTSD and this estimate that 19.2% of women meet the threshold for a diagnosis
of Adjustment Disorder after childbirth provides an important contribution to the literature. This
more conservative method of determining subclinical postpartum stress minimizes the over-
pathologizing of childbirth and narrows but likely more accurately focuses the scope of birth
outcomes considered psychologically disruptive. This affords better differentiation of normal from pathological reactions to childbirth.

**Historical Factors Related to PTSD after Childbirth.**

**Miscarriage.** Investigators have suggested that miscarriage\(^2\) sensitizes women to the medical risks during future pregnancies. Women with prior miscarriage have greater anxiety and depression after the event and are at risk for developing PTSD as a result of the miscarriage (Engelhard et al., 2001; Geller et al., 2004). Researchers have also shown that women who have miscarried have more anxiety and pregnancy-related fear in subsequent pregnancies (Cote-Arsenault, 2003; Fertl et al., 2009) in particular if another pregnancy occurs within one year (Hughes et al., 1999).

In the current study 26% of study completers reported a history of miscarriage, similar to the 23% rate seen in Maggioni’s study. Though one prior study has suggested that previous miscarriage is a risk factor for the development of postpartum PTSD (Maggioni et al., 2006), women in the current investigation with and without history of miscarriage showed similar levels of trauma symptoms after childbirth. However Maggioni et al. included miscarriage in a block of medical variables (along with hyperemesis, preterm contractions, changes in biological rhythms, and hospitalization during pregnancy) and it is unclear what unique contribution miscarriage made to the prediction of posttraumatic stress.

Women who experience repeat miscarriage show greater levels of anxiety and pregnancy related fear during a subsequent pregnancy than women with only one prior miscarriage or no prior miscarriages (Fertl et al., 2009). In the current study miscarriage was collected as a

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\(^2\) Miscarriage is referred to in the medical literature as Spontaneous Abortion occurring in or before the 20th week of gestation however researchers often include spontaneous abortion occurring up to the 28th week (Geller et al., 2004). In the current study women were asked if they ever experienced a miscarriage, without determining the gestational week in which the miscarriage occurred.
dichotomous variable and it is unknown how many miscarriages a participant had experienced or how recently the miscarriage occurred. Thus, while the current study shows women with a history of miscarriage do not report more trauma symptoms after subsequent childbirth, the findings do not rule out the possibility that women with very recent or multiple miscarriages may react to childbirth with higher levels of trauma symptoms.

**Prior Difficult Birth.** The effect of prior difficult birth on the level of posttraumatic stress symptoms after a subsequent delivery is limited and contradictory. Women in the present study with prior difficult birth showed greater trauma symptomology after childbirth than mothers without prior difficult birth. However, these eleven women with difficult birth histories did not show greater symptoms of posttraumatic stress during pregnancy and only two subsequently underwent an operative or instrument delivery for the current childbirth. This suggests greater trauma symptomology after the latest birth is not simply accounted for by recent obstetrical interventions.

The finding that women with prior difficult deliveries show greater trauma symptomology after a subsequent birth suggests that symptoms of trauma may be reactivated in a subsequent birth or prior difficult birth may act as a vulnerability factor for the development of postpartum PTSD after a subsequent birth (Slade, 2006). Studies have shown that the interval between births is longer for women who rate their prior birth as distressing and that symptoms of PTSD decrease in the first six months postpartum (Ayers & Pickering, 2001). It may be that the timing of subsequent pregnancies in women whose prior birth was distressing coincides with some reduction in trauma symptoms that are easily reactivated or act as a diathesis for the development of postpartum PTSD in their subsequent experience of childbirth. A prospective
study of women who experience difficult births and subsequently bear additional children would confirm (or disconfirm) these speculations.

**Sexual Assault.** Repeated sexual victimization when the first assault occurs in childhood or adolescence confers a greater risk for depression, anxiety disorders, and PTSD (Cloitre et al., 2002; Kimerling et al., 2007; Messman-Moore et al., 2000; Najdowski 2009; Norris et al., 2002) and is associated with numerous gynecological difficulties such as vaginal infections, sexually transmitted diseases, and painful intercourse (Golding 1996; West et al., 2000). In a qualitative study of women, participants indicated that labor and delivery produced sensations similar to those occurring during sexual assault and that some behaviors of medical personnel were evocative of the assault (Rhodes & Hutchinson, 1994).

It was expected that women who endorsed repeat sexual victimization with the first event occurring during childhood would exhibit greater PTSD symptomology after childbirth than women not reporting these experiences. Similar to the prior study of childbirth trauma in American women (Soet et al., 2003) participants who reported repeat sexual assault showed higher mean levels of trauma symptoms after childbirth; however, this difference was not statistically significant and the effect size was quite small. Similarly Ryding and colleagues (1997) found that among women with emergency c-section, history of sexual assault was not associated with greater trauma symptomology after childbirth.

The limited support for greater trauma symptomology after childbirth in women with a history of repeated sexual assault may be explained by one or both of the following. Firstly, the wording of the item on the PDS related to underage sexual contact (i.e., sexual contact when younger than 18 with someone who was 5 or more years older) may be overly inclusive in that it
could be endorsed by women whose assault ranged in severity, which confers different risk for the development of trauma-related psychopathology (Hobbins, 2004; West et al., 2000).

Secondly, even among women with similar abuse histories level of psychopathology may differ (Wilson, 2004). Wijma and colleagues found that only 17% of Swedish women reporting past abuse currently met the criteria for a diagnosis of PTSD (Wijma et al., 2000). It would seem reasonable to assume that women with a history of repeated sexual assault and greater PTSD symptoms during pregnancy are more susceptible to experiencing birth as traumatic than women with fewer PTSD symptoms in pregnancy. In fact, in the current study mean postpartum trauma symptoms for victims of repeat sexual assault were mild for women with no PTSD or depression during pregnancy (n=3) whereas they were significantly greater and fell in the upper level of moderate for women who were suffering from both disorders during pregnancy (n=5). These results extend prior findings and indicate that current PTSD/depression mediates the relationship between history of sexual assault and experiencing birth as more traumatic.

Larger studies with more comprehensive measures of childhood sexual assault, adult sexual assault, revictimization, and psychopathology during pregnancy are needed. It is important to better understand the relationship among types of sexual assault, psychopathology, and childbirth as PTSD and childhood sexual abuse have been linked to preterm labor (Horan et al., 2000) and other adverse outcomes for mother and baby (for a review see Seng, 2002).

**Situational Factors Related to PTSD after Childbirth.**

**Mode of Delivery.** Based on earlier work (Ryding et al., 1997; Ryding et al., 1998b; Soderquist et al., 2002; Soderquist et al., 2009) it was expected that women who underwent operative or instrument deliveries would experience more trauma symptoms than women undergoing unassisted vaginal deliveries. This hypothesis was essentially supported. Women
who underwent instrument delivery (i.e. by vacuum extraction or forceps) showed the greatest level of trauma symptoms, differing significantly from women undergoing unassisted vaginal deliveries. Women who underwent operative deliveries also showed greater mean levels of trauma symptoms when compared to unassisted deliveries although this difference did not reach statistical significance.

**Pre-delivery psychopathology.** Confirming results from one study (Soderquist et al., 2009), trauma symptoms after childbirth were significantly higher in women with depression during pregnancy. Extending these results, it was also found that symptom severity was even greater among women with a pre-delivery diagnosis of comorbid depression and PTSD. Previous studies of trauma have shown that women who are diagnosed with PTSD after childbirth are more likely to have a history of psychological intervention (medication or counseling) than women not diagnosed with postpartum PTSD (Czarnocka & Slade, 2000; Soderquist et al., 2009; Wijma et al., 1997).

Prior work has shown that depression during pregnancy predicts both post-partum depression and negative birth experience (Saisto et al., 2001b) and that depressive symptoms were stable before and after delivery (Heron et al., 2004; Zaers et al., 2008). Only one other study has looked at the relationship of depression prior to labor and delivery and the development of PTSD after childbirth. Soderquist and colleagues (2009) found that depression during pregnancy predicted the subsequent development of PTSD after childbirth. One concern is that depression and Posttraumatic Stress Disorder not only affect women directly, there are also short and long-term effects on infant development and attachment (O'Connor et al., 2003; O'Connor et al., 2005).
In the current study 60% of women showed no diagnosis of depression post-delivery and 10% showed a likely diagnosis of postnatal depression on the EPDS based upon a cut-off score of 12 or higher. Twenty percent of women met criteria for a post-delivery diagnosis of trauma alone and 11% met criteria on post-delivery measures for both PTSD and depression. It is important to differentiate post-partum psychological disorders as misdiagnosis obscures the true nature of the psychopathology, which in turn interferes with appropriate case conceptualization and thus application of appropriate treatment. If providers were to miss the diagnosis of PTSD in this sample, the 11% of women who showed co-morbid PTSD and depression would be misdiagnosed and the 20% with trauma alone would be entirely missed (e.g. in postpartum assessments limited to postpartum depression).

**Dispositional Factors Related to PTSD after Childbirth.**

Several prospective studies have shown that characteristics such as trait anxiety (Czarnocka & Slade, 2000; Wijma et al., 2002; Zaers et al., 2008) and anxiety sensitivity (Fairbrother & Woody, 2007; Keogh et al., 2002) are related to the later development of Posttraumatic Stress Disorder after childbirth. Similarly, greater fear of childbirth (Soderquist et al., 2009; Wijma et al., 1997) and labor self-efficacy (Soet et al., 2003) have been implicated as contributing to traumatic reactions to childbirth. As hypothesized, trait anxiety, labor self-efficacy, and their interaction predicted trauma symptoms related to childbirth. Contrary to expectations, in the context of trait anxiety and labor self-efficacy, anxiety sensitivity and childbearing fear did not add to the prediction of childbirth trauma. The results confirmed the hypothesis that labor self-efficacy buffers the relationship between higher levels of trait anxiety and the development of trauma symptomology.
**Anxiety Sensitivity.** In both studies that have found anxiety sensitivity predicts postpartum PTSD symptoms, neither included trait anxiety in their analysis (Fairbrother & Woody, 2007; Keogh et al., 2002). Naragon-Gainey (2010) reports that very few studies of anxiety sensitivity control for trait anxiety; while anxiety sensitivity and trait anxiety are distinct they also show significant overlap. In the current study, when trait anxiety is *not* controlled for anxiety sensitivity is a significant predictor of trauma symptoms however, when trait anxiety is included in the model anxiety sensitivity is no longer a significant predictor. This is explained by the conceptualization of trait anxiety as a broader ‘anxiety proneness’ or tendency to respond to stressors with behavioral patterns indicative of anxiety whereas anxiety sensitivity is a focal aspect of anxiety that specifies fearfulness of physiological symptoms associated with anxiety.

**Childbearing Fear.** Prior studies found fear of childbirth is related to postpartum trauma in Swedish women (Soderquist et al., 2009; Wijma et al., 1997); however the current investigation found pre-delivery childbearing fear did not predict postpartum trauma symptoms. The discrepancy with past results is likely due to prior studies using retrospective measures of fear (Wijma et al., 1997) and Soderquist and colleagues’ (2009) use of dichotomous variables (severe fear v. other; PTSD v. no PTSD) to assess the relationship between fear and PTSD. Severe fear may have a unique relationship with diagnosis of postpartum Posttraumatic Stress Disorder. In the subsequent discussion section on childbearing fear it is shown that for most women fear reduces after childbirth suggesting fear is normative; likely only particularly high levels of childbirth fear present risk for later development of postpartum PTSD, the occurrence of which may be explained by other vulnerabilities such as pre-existing psychopathology.

**Trait Anxiety.** As expected, trait anxiety was a significant predictor of postpartum trauma symptoms, which replicates results from four prior studies and confirms this relationship
in a sample of American women (Czarnocka & Slade, 2000; Maggioni et al., 2006; Wijma et al., 2002; Zaers et al., 2008). Women who are anxiety-prone prior to childbirth are at risk for experiencing birth as more stressful and responding with higher levels of trauma symptomology.

**Labor Self-Efficacy.** The results show that labor self-efficacy is a significant predictor of postpartum trauma symptomology, which extends prior findings showing that women with postpartum PTSD are lower in labor self-efficacy (measured before birth) than women without postpartum PTSD (Soet et al., 2003). One possibility is that women who believed in the efficacy of coping strategies and their ability to use them may actually *have used* these strategies during childbirth, which may influence how distressing childbirth is perceived. This speculation is consistent with prior work showing labor was less frightening to women who used breathing and relaxation strategies during childbirth (Slade et al., 2000). It may also be that labor self-efficacy is reflective of general coping abilities that are protective of the development of trauma symptomology after childbirth. Labor self-efficacy also moderated the relationship between trait anxiety and trauma symptomology indicating women who are anxiety-prone mitigate the effect of trait anxiety if they also believe themselves capable of coping with childbirth. The implication is that if interventions could increase a woman’s belief in her ability to cope during childbirth this may be protective against developing trauma symptoms after birth.

**Discussion Section II: Childbearing Fear**

In this first comprehensive study of childbearing fear in American women the rate of severe fear was 7.7%. This is likely a conservative estimate due to the overrepresentation of women in midwifery care as they were lower in fear than women in the care of an obstetrician. The rate of severe fear for those cared for by an obstetrician was 11%, which is commensurate
with levels of severe fear found in women from Norway, Sweden, Finland, and the U.K. Similar to prior work greater fear of childbirth was associated with preference for elective c-section.

Some historical and situational factors that prior studies have shown relate to fear, such as history of miscarriage, were not supported in the current study. However, early and repeated sexual victimization and higher levels of depression contributed to greater fear. Dispositional factors such as anxiety proneness, fear of physiological sensations, and lower belief in the ability to cope during labor predicted higher levels of pre-delivery fear. While there was no direct predictive relationship between social support and childbearing fear, it was found that among women with greater self-efficacy for labor, higher levels of social support are associated with lower levels of childbearing fear. Compared with levels of fear of childbirth during pregnancy, women who subsequently underwent c-section became more fearful of labor and delivery and women who subsequently underwent unassisted vaginal delivery became less so.

The following section reviews childbearing fear results in greater detail beginning with incidence rates and the relationship of fear to elective c-section, then discussing historical, situational, and dispositional factors that influence women’s fear of labor and delivery, and concluding with changes in levels of fear that occur after differing modes of delivery.

**Incidence of Fear.**

The incidence of severe childbearing fear was 7.7%, which is lower than rates seen in studies of women in Sweden, which has seen rates that have ranged from 10% to 15.6% (Nieminen et al., 2009; Ryding et al., 1998c; Soderquist et al., 2004; Wijma et al., 1997; Zar et al., 2002). While this rate of severe fear might suggest American women are lower in fear, half of the participants in this study chose midwifery for their prenatal care, which was associated with lower fear levels, mean fear ($M=47$) versus obstetrical care ($M=61$). In the U.S. midwifery
care is typically chosen by women who tend toward natural childbirth and have low-risk pregnancies and it is unlikely women making this choice reflect the childbirth attitudes of the general population of childbearing women in the United States.

However, not all severely fearful women were in the care of an obstetrician. Of the seven women endorsing severe fear, two were in midwifery care. The corresponding rate of severe fear is 4% among those in midwifery care and 11.6% among those in obstetrical care. This latter rate is comparable to prior studies and may be a more accurate reflection of childbearing fear levels in American women given that 93% of women in the U.S. chose an obstetrician for prenatal care.

It was expected that American women would evidence greater mean levels of childbearing fear and higher rates of severe fear based on speculation that they have reduced efficacy for labor due to greater emphasis on medical management of childbirth in the U.S. (Lowe, 2000) and the doubling over the last fifteen years of elective c-sections in this country (MacDorman, 2008). Results show this sample of primarily working and college-educated, married American women have similar levels of childbirth fear as non U.S. women. An important implication of this consistency with prior work is the suggestion that there is some universality of ‘normal’ levels of fear of childbirth regardless of any differing cultural norms for childbirth.

Four percent of women in this study indicated having requested a c-section for fear, which is lower than seen in samples of non U.S. women. When applied to the 4 million women delivering annually in the U.S. (MacDorman et al., 2008) this would suggest that at least 160,000 women are distressed enough to prefer elective surgery. In addition to the distress these women endure, birth by c-section doubles the associated medical expenses for these women or their
insurers (Petrou & Glazener, 2002). While providing an elective c-section despite increased costs may appear a compassionate strategy there is limited evidence that elective c-section prevents a negative birth experience (Waldenstrom et al., 2004; Wiklund et al., 2008). However there is support for counseling leading to similar appraisal of childbirth after delivery among women who were and were not fearful during pregnancy (Waldenstrom et al., 2006). These interventions have not been tested in American women. Elective c-section is further complicated by ethical concerns (Wax et al., 2004), variability in access, concerns regarding increased mortality and risk of complications (Hemminki & Merilainen, 1996; Schuitemaker et al., 1997), and concerns regarding the immediate and long-term effects on infants (McFarlin, 2004).

Not all women who requested an elective c-section fell in the severe fear range although all four showed fear levels above the sample mean, replicating what Nieminen (2009) and Wiklund (2008) found in their investigations of Swedish women. Similarly, this study and the prior investigations showed not all severely fearful women are seeking surgical delivery, suggesting factors other than fear affect whether a woman pursues surgical delivery. Four of the six women who were severely fearful and who did not report asking for an elective c-section, met the criteria for a likely diagnosis of depression. It may be that sequelae or factors associated with depression (e.g. learned helplessness or avoidance) affect whether a woman approaches her provider with a request for an “unnecessary” surgery.

**Historical Factors Related to Childbearing Fear.**

**Miscarriage.** Contrary to a prior finding (Saisto et al., 1999), having experienced a miscarriage was not associated with greater fear of childbirth. In the Saisto study women were recruited based upon being fearful enough of childbirth to request elective c-section whereas the current study consisted of a non-selected community sample. Among the highly fearful women
in the Saisto study, there were a greater number of prior miscarriages and women were more likely to have miscarried both prior to their first delivery and between two successful pregnancies. It may be that highly fearful women have increased difficulty coping with miscarriage, or their fear resulted from having undergone multiple miscarriages. A later investigation by Saisto and colleagues (2001) did show that miscarriage measured as a dichotomous variable was not associated with greater fear of vaginal delivery, similar to results from a more recent investigation (Rouhe et al., 2008). The results from these studies (Rouhe et al., 2008; Saisto et al., 2001) and the present investigation suggest that women who have experienced a miscarriage are not higher in fear but that repeated miscarriage may lead to greater childbearing fear.

**Prior Difficult Birth.** Women who reported a prior difficult birth were higher in fear of childbirth than other women with prior birth experience; however, this result did not reach statistical significance. Of the twelve women reporting a prior difficult childbirth, eight had chosen midwifery care for their current delivery. These eight women were significantly higher in labor self-efficacy, lower in depression, lower in trait anxiety, lower in anxiety sensitivity, and lower in childbearing fear than the four women endorsing prior difficult birth who were in obstetrical care (see Appendix B for details of these tests). As will be reviewed in subsequent sections, higher labor self-efficacy, lower depression, lower trait anxiety, and lower anxiety sensitivity predicted less childbirth fear in the overall sample. That these findings are present in this subset of women with prior difficult birth suggests that they may be protective or are possibly involved in reducing or resolving fear after a difficult or traumatic delivery. Given the small number of women who reported prior difficult birth these comparisons of women in midwifery versus obstetrical care are considered exploratory and speculative. Additional
variables such as high-risk pregnancy may also affect comparisons. In addition, imprecise measurement of prior difficult birth (a subjective determination made by the participant) may have influenced the results.

Sexual Assault. Heimstad et al. (2006) showed women with childhood sexual abuse were significantly higher in childbearing fear; however, adult sexual assault was not associated with greater fear. In the present study difference in childbearing fear between women endorsing or not endorsing sexual contact during childhood was not significant although mean levels of fear were slightly higher. Women who reported repeated sexual assault were significantly more fearful of childbirth. It may be that these sexually revictimized women are in fact similar to those in the Heimstad and colleagues study (2006). Heimstad’s assessment was based on asking if women had been “forced to perform sexual acts” (pp. 436) in childhood. This differs from how early sexual contact is assessed in the current study and other investigations of childhood sexual assault (e.g. West et al., 2000) where wording is broad and could include a range of events from inappropriate touching to rape. Heimstad’s assessment likely yielded women exposed to a greater severity of abuse. Since use of force during childhood sexual assault is predictive of later sexual revictimization (West et al., 2000) Heimstad’s phrasing of the childhood sexual abuse question likely captured women who experienced repeat sexual victimization.

Situational Factors Related to Childbearing Fear.

Birth experience. Fear levels were similar between first-time mothers and women with birth experience even when those who reported prior difficult births were excluded from the analysis. Johnson and Slade (2002) and Rouhe et al. (2008) found first-time mothers were significantly more fearful of childbirth than experienced mothers, whereas fear levels in Swedish
women did not differ based on prior birth experience (Nieminen et al., 2009; Ryding et al., 1998c). In calculating an effect size based on information provided in one prior study (Wijma et al., 1997) it was found that the magnitude of the difference between first and second-time mothers was small (.015) suggesting it may not be as relevant as thought.

Pre-Delivery Psychopathology. Women with pre-delivery PTSD showed non-significant elevations in childbirth fear; if they also carried a co-morbid diagnosis of depression fear levels were significantly higher than women with no diagnosis. Women with depression but no PTSD also showed significantly higher fear than women with no diagnosis. Thus, the hypothesis that women with PTSD during pregnancy would be more fearful of labor and delivery was partially supported. The seven women with severe fear of childbirth in this study were significantly more depressed than less fearful women, and five of the seven received a diagnosis of depression. This extends prior results showing a small to moderate correlation (r=.35) between depression and fear in Swedish women (Saisto et al., 2001c) and that women undergoing counseling for fear of childbirth showed more symptoms of depression than women not in counseling (Waldenstrom et al., 2006). Negative expectations and fear regarding childbirth may be rooted in belief systems associated with depression, and treatment for fear that focuses primarily on the event of childbirth may be less efficacious than treatment that addresses both childbirth fear and depression.

Dispositional Factors Related to Childbearing Fear.

Of interest, was how well dispositional factors such as anxiety proneness predict levels of childbearing fear in American woman and what contributions might be made by anxiety sensitivity and labor self-efficacy. Trait anxiety accounted for a significant amount of variance in childbearing fear, replicating prior studies of non U.S. women (Heimstad et al., 2006; Johnson
Greater anxiety sensitivity also predicted higher levels of childbearing fear, which further supports the contention that anxiety sensitivity is a factor that underlies various fears. While the relationship of anxiety sensitivity to childbirth fear was unexplored prior to this study, two studies of women in the U.K. showed a relationship between request for elective c-section (some due to fear) and higher anxiety sensitivity, as well as greater pain and fear during elective c-section for women higher in anxiety sensitivity (Keogh et al., 2002; 2005).

One prior study has investigated the association of childbearing fear and labor self-efficacy in American women (Lowe, 2000), finding there were small negative correlations between the labor efficacy subscales and fear of childbirth (Lowe, 2000). The current investigation shows that higher labor self-efficacy predicts lower childbirth fear; however, there was no support for labor self-efficacy having a mediating effect between trait anxiety and fear of childbirth. The strong predictive relationship in the current study of labor self-efficacy to childbirth fear lends support to Lowe’s suggestion that increasing efficacy for labor might lessen fear of childbirth (or reducing fear could increase labor self-efficacy) although how to go about doing so would be a question for future studies.

Prior studies of the relationship between social support and childbearing fear have shown limited evidence for its ability to predict fear (Saisto et al., 2001c). Social support did not demonstrate a direct predictive relationship to childbearing fear; however, it demonstrated an important effect of further lowering fear among women higher in labor self-efficacy.

**Childbearing Fear and Mode of Delivery in Study Completers.**

The current investigation found that the pre-to-postpartum change in fear of childbirth is related to mode of delivery. The results are consistent with what Heimstad et al. (2006), Nieminen et al. (2009), and Rouhe et al. (2008) found when examining pre-delivery fear in
women with prior deliveries. Prior studies that did not look at the role of mode of delivery found no change or slight reduction in fear from before to after childbirth (Wijma et al., 2006; Zar et al., 2001).

Unlike pre-delivery fear of childbirth, trait anxiety and anxiety sensitivity were not significant predictors of women’s post-delivery fear of childbirth whereas an objectively difficult or traumatic birth was. Higher labor self-efficacy continued to predict lower fear of childbirth after labor and delivery suggesting reduction of fear in the postpartum may be facilitated by pre-delivery belief in the ability to cope during childbirth. It is unknown whether this effect may be mediated by actual use of coping strategies during childbirth.

**Strengths and Limitations of the Study**

This study was an advance of previous work in that PTSD diagnosis was clearly assessed based on timing as well as inclusion of each of the criteria associated with diagnostic status. It has been argued that prior studies have in fact measured negative appraisal of labor and delivery, an acute stress response (Ayers, 2003), or general trauma-related phenomenon (Olde et al., 2006), rather than PTSD. In addition, this is the first prospective study of postpartum PTSD clearly assessing posttraumatic stress disorder pre and post-delivery. One prior study (Ayers and Pickering, 2001) attempted to measure pre-existing PTSD, however changes in assessment tools pre and post-delivery produced confusion regarding rate of PTSD before and after childbirth. This had led to concerns regarding whether postpartum PTSD might occur only in women who already have PTSD during pregnancy (Ayers 2008).

This sample of childbearing women has a unique composition in that half of the study participants chose midwifery for their obstetrical care. This allowed comparison of childbearing fear between obstetrical and midwifery patients. In addition, most participants were Caucasian,
between the ages of 25-35, working part or full-time, married, and many reported past
difficulties with depression or anxiety. While this reduces the generalizability of the results it
allows greater understanding of the variables under consideration in a sample of women who are
primarily college-educated, working mothers in the United States.

A limitation of the current investigation is the lack of infant outcome data for women
who did not return post-delivery measures. Thus it is unknown if infant health or well-being
played a role in these women not completing the study. Another limitation is that symptoms and
diagnostic status were not re-assessed at a later time interval, which would have provided some
indication of the chronicity of symptoms. While some researchers have found that the rate of
PTSD declines over the first year post-partum, others have reported stability during this time-
period (Lyons et al., 1998; White, Matthey, Boyd, and Barnett, 2006) or that PTSD increases
(Zaers et al., 2008). Given that early assessment of PTSD could be affected by the physiological
recovery from pregnancy and the physiological and psychological disruption that occurs when
caring for a newborn (e.g. sleep disruption, adjustment to parenting, etc.), better understanding
the course of symptom development and resolution is important. It would be useful to determine
whether women who evidence pre-delivery vulnerabilities may have a different trajectory for
recovery than women who develop the disorder based on the experience of obstetrical
intervention alone.

In addition, while current PTSD and trauma-related Adjustment Disorder were assessed
during pregnancy and pre-existing cases could be differentiated from “new” cases of postpartum
PTSD, lifetime prevalence was not assessed. Thus it is unknown whether women in the “new
cases” category may have met criteria for diagnosis of Posttraumatic Stress Disorder in the past.
Greater clarification of pre-existing diagnosis, including assessment of other psychopathology such as substance abuse and other anxiety disorders, would increase the value of this study.

Summary and Implications

Adding to the extant literature is the finding that women with pre-existing depression and PTSD are particularly vulnerable to the development of Posttraumatic Stress Disorder stemming from childbirth and can experience that birth as traumatic even when delivery does not include obstetrical intervention. These women may need additional support during the perinatal period. Whether strategies might be found to mitigate the stressfulness of childbirth for these women (e.g. by continuous labor support, specially trained obstetrical providers, etc.) would be an interesting question for later investigations. Services are warranted as there is evidence that women with lingering birth-related traumatic reactions suffer disruption of attachment, chronic psychopathology, and negative effects in their intimate relationships. For women without the diathesis of pre-delivery psychopathology a birth that includes obstetrical intervention is integral to the development of PTSD. Not all women who undergo interventions develop postpartum stress. It may be that these procedures vary in intensity (e.g. a c-section that is performed due to failure to progress may be less dangerous or upsetting to a woman than one that is performed due to fetal distress) or that some women are particularly resilient to the effect of these interventions. Perhaps familiarizing women with obstetrical interventions and the circumstances under which they are needed may reduce the distress associated with their use.

Several important conclusions may be drawn from the rates of PTSD (10.9%) and trauma-related Adjustment Disorder (19%) found in this study. Firstly, in addition to psychological vulnerabilities, measurement choices are playing a role in the variation of rates of childbirth-related PTSD found across studies. The Traumatic Events Scale (TES) appears to be a
more conservative measure of trauma than the Posttraumatic Stress Diagnostic Scale (PDS) however the TES lacks validation studies. The PDS may be particularly well-suited for screening where erring on the side of false positives is preferred and diagnostic interviews can later clarify the presence or absence of PTSD. This may be useful for establishing prevalence of postpartum PTSD or in recruiting for intervention studies. Secondly, the results indicate postpartum PTSD in American women is not as low as suggested by a prior study (Soet et al., 2003) and that providers should be aware of clinically relevant traumatic reactions resulting from childbirth and that they can occur even in the absence of obstetrical intervention. In addition, detection of prenatal depression is important for both treatment of the depression and for the possibility that treatment could prevent or reduce traumatic reactions to childbirth.

Overall it appears there may be two separate yet overlapping pathways to traumatic stress after childbirth with obstetrical interventions a sufficient but not necessary ingredient in the development of postpartum Posttraumatic Stress Disorder. Ultimately it may be important to differentiate women without pre-existing trauma vulnerabilities from those with these vulnerabilities in order to provide effective treatment for PTSD resulting from traumatic birth.

Among women with greater levels of anxiety-proneness, those who also evidence greater belief in their ability to cope during labor are less likely to develop trauma symptoms after childbirth. This extends what was known before about the relationship between trait anxiety and trauma symptoms. It is not clear how labor self-efficacy produces this effect (e.g. by increasing the likelihood of using these strategies thus affecting the perception of childbirth) or whether labor self-efficacy could be increased, but this effect is promising and in need of further investigation.
Clinically relevant levels of depression were present among the women most fearful of childbirth suggesting that underlying belief systems associated with depression (e.g. negative expectations about the self, world, and others) may influence childbirth fear. This is the first study to comprehensively assess childbearing fear in American women and rates of childbearing fear were similar to those seen in women from other countries. However, unlike studies of Swedish women, childbearing fear was not shown to predict postpartum trauma symptoms. In contrast, greater trait anxiety and anxiety sensitivity did predict greater childbirth fear, the latter construct adding to what was known about predictors of pre-delivery fear. Belief in the ability to cope during childbirth, and social support in the context of greater labor self-efficacy also predicted fear. These findings suggest potential for strategies that may diminish fear such as psychoeducation regarding normal physiological changes and symptoms in pregnancy and childbirth, and the acquisition of coping skills for labor and delivery. An intriguing and untested possibility, for example, would be the use of doulas to address concerns about physical symptoms and changes, to teach coping skills, and to increase social support during pregnancy and childbirth, or group prenatal care to accomplish similar goals.

While this study provided confirmation of the relevance of postpartum stress reactions and childbearing fear in American women there is no information regarding chronicity or remission of postpartum trauma nor what type of intervention strategies might be fruitful for addressing fear of childbirth or trauma after childbirth. Much work is needed to better understand how to treat both phenomena in pregnant and postpartum women.
List of References
References


Appendix A

Pre-Delivery Questionnaire

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<th>Demographics</th>
<th>PLEASE CIRCLE YOUR ANSWERS TO THE QUESTIONS BELOW</th>
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<tr>
<td>1</td>
<td>Your age (Fill in the blank)</td>
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| 2 | Your marital status (CIRCLE only one choice) | I am:  
1. Married, no prior marriages  
2. Married, with prior marriages  
3. Single  
4. Single, living with significant other  
5. Separated or Divorced |
| 3 | Your racial/ethnic identity (CIRCLE the group that you most identify yourself with) | I consider my race to be:  
1. African American  
2. Hispanic  
3. Asian  
4. Native American  
5. White  
6. More than one race/ethnicity |
| 4 | Number of children born to you | I have:  
1. No other children  
2. 1 child  
3. 2 children  
4. More than 2 children |
| 5 | Breast feeding status. | I am currently planning to breast-feed my baby:  
YES  
NO |
| 6 | Infant due date. (Please give the date your baby is due to be born) | My baby’s due date is:  
______________________ |
| 7 | Family income per year (CIRCLE your family's current yearly income) | Our family's total income this year is:  
1. Less than $10,000  
2. Between $10,000 and $20,000  
3. Between $20,000 and $30,000 |
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<td>4.</td>
<td>Between $30,000 and $40,000</td>
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<td>5.</td>
<td>Between $40,000 and $50,000</td>
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<td>6.</td>
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| **8** | **Your employment status**  
(CIRCLE only one choice) | I am:  
1. Employed full-time  
2. Employed part-time  
3. Not employed right now  
4. other:______________________ |

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| **9** | **Your education**  
(CIRCLE the HIGHEST level of education you have finished) | I have:  
1. No high school  
2. Some high school but did not graduate  
3. High school diploma  
4. A GED (Graduate Equivalent Diploma)  
5. Some college  
6. A college degree  
7. A post-graduate degree |

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<td><strong>10</strong></td>
<td><strong>Have you ever been in counseling?</strong></td>
<td>YES NO</td>
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<td><strong>11</strong></td>
<td><strong>Have you ever been treated with medication for mental health difficulties (for example with an anti-depressant or anti-anxiety drug).</strong></td>
<td>YES NO</td>
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| **12** | If you answered “YES” to question 10 or 11 please circle any/all of the problems that you were being treated for. | 1. depression  
2. anxiety  
3. Bi-Polar Disorder  
4. Schizophrenia  
5. marriage or couples therapy  
6. PTSD (posttraumatic stress disorder)  
7. premenstrual dysphoric disorder  
8. other______________________ |

**Obstetrical Information**  
PLEASE CIRCLE YOUR ANSWERS TO THE QUESTIONS BELOW

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<td><strong>13</strong></td>
<td><strong>What is your current week of pregnancy?</strong></td>
<td>30 31 32 33 34 35 36 37 38 39 40 41</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>14</strong></td>
<td><strong>Who is your medical provider for your pregnancy?</strong></td>
<td>My main medical provider for my pregnancy is a:</td>
</tr>
</tbody>
</table>
15 Where are you planning to deliver your baby? (please circle one)
   1. VCU (also known as MCV)
   2. DePaul Hospital
   3. The Midwifery Center at DePaul
   4. St. Francis
   5. Other

16 Have you given birth to a baby before?
   YES          NO

17 Type of prior birth. (please circle all that you have experienced; if you have not given birth before please skip this question)
   My prior delivery was:
   1. a vaginal delivery
   2. an assisted vaginal delivery (the doctor used forceps or vacuum extraction to help the baby come out)
   3. a c-section

18 If you had a c-section in the past was your c-section:
   My prior c-section was:
   1. planned ahead of time
   2. was an emergency
   3. was not an emergency, but happened after a trial of labor

19 Have you ever asked or thought about asking your doctor/midwife for a c-section because you were afraid to give birth? (please circle one)
   YES          NO

20 Have you ever had a miscarriage?
   YES          NO
   If yes, how many times ______

21 Have you ever given birth to a baby who was not alive?
   YES          NO

22 Was your current pregnancy planned?
   YES          NO

23 Are you happy you are having this baby?
   YES          NO          Don’t Know

24 Are you planning to have a professional labor support person (often called a doula) at your labor?
   YES          NO

25 Are you participating in group prenatal care at VCU (also called Centering Pregnancy©)?
   YES          NO
## Post-Delivery Questionnaire

<table>
<thead>
<tr>
<th>Demographics</th>
<th>PLEASE CIRCLE YOUR ANSWER TO THE QUESTIONS BELOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Your age. (Fill in the blank)</td>
</tr>
<tr>
<td></td>
<td>Give current age: _______</td>
</tr>
<tr>
<td>2</td>
<td>Your current marital status. (CIRCLE only one choice)</td>
</tr>
<tr>
<td></td>
<td>I am:</td>
</tr>
<tr>
<td></td>
<td>6. Married, no prior marriages</td>
</tr>
<tr>
<td></td>
<td>7. Married, with prior marriages</td>
</tr>
<tr>
<td></td>
<td>8. Single</td>
</tr>
<tr>
<td></td>
<td>9. Single, living with significant other</td>
</tr>
<tr>
<td></td>
<td>10. Separated or Divorced</td>
</tr>
<tr>
<td>3</td>
<td>Your racial/ethnic identity.</td>
</tr>
<tr>
<td></td>
<td>I consider my race to be:</td>
</tr>
<tr>
<td></td>
<td>7. African American</td>
</tr>
<tr>
<td></td>
<td>8. Hispanic</td>
</tr>
<tr>
<td></td>
<td>9. Asian</td>
</tr>
<tr>
<td></td>
<td>10. Native American</td>
</tr>
<tr>
<td></td>
<td>11. White</td>
</tr>
<tr>
<td></td>
<td>12. More than one race/ethnicity</td>
</tr>
<tr>
<td>4</td>
<td>Number of children you’ve given birth to.</td>
</tr>
<tr>
<td></td>
<td>I now have:</td>
</tr>
<tr>
<td></td>
<td>5. No children</td>
</tr>
<tr>
<td></td>
<td>6. 1 child</td>
</tr>
<tr>
<td></td>
<td>7. 2 children</td>
</tr>
<tr>
<td></td>
<td>8. More than 2 children</td>
</tr>
<tr>
<td>5</td>
<td>Breast feeding status.</td>
</tr>
<tr>
<td></td>
<td>I am currently breast-feeding my baby:</td>
</tr>
<tr>
<td></td>
<td>YES      NO</td>
</tr>
<tr>
<td>6</td>
<td>Infant birth date (Please give the date your baby was born)</td>
</tr>
<tr>
<td></td>
<td>My baby was born on:</td>
</tr>
<tr>
<td></td>
<td>____________________</td>
</tr>
<tr>
<td>7</td>
<td>Family income per year (CIRCLE your family’s current yearly income)</td>
</tr>
<tr>
<td></td>
<td>Our family’s total income this year is:</td>
</tr>
<tr>
<td></td>
<td>7. Less than $10,000</td>
</tr>
<tr>
<td></td>
<td>8. Between $10,000 and $20,000</td>
</tr>
<tr>
<td></td>
<td>9. Between $20,000 and $30,000</td>
</tr>
<tr>
<td></td>
<td>10. Between $30,000 and $40,000</td>
</tr>
<tr>
<td></td>
<td>11. Between $40,000 and $50,000</td>
</tr>
<tr>
<td></td>
<td>12. More than $50,000</td>
</tr>
<tr>
<td></td>
<td>Your employment status (CIRCLE only one choice)</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Your education (CIRCLE the HIGHEST level of education you have finished to date)</th>
<th>I have:</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>8. No high school</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Some high school but did not graduate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. High school diploma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. A GED (Graduate Equivalent Diploma)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. Some college</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13. A college degree</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14. A post-graduate degree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Obstetrical Information  PLEASE CIRCLE YOUR ANSWER TO THE QUESTIONS BELOW</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>In what week of your pregnancy was your baby born?</td>
<td>30  31  32  33  34  35  36  37  38  39  40  41</td>
</tr>
<tr>
<td>11</td>
<td>Who delivered your baby?</td>
<td>6. doctor (obstetrician)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. midwife</td>
</tr>
<tr>
<td>12</td>
<td>Where did you deliver your baby?</td>
<td>1. VCU (also known as MCV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. DePaul Hospital</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. The Midwifery Center at DePaul</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. St. Francis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Other _____________________</td>
</tr>
<tr>
<td>13</td>
<td>Did your baby have to stay in the NICU (neonatal intensive care unit)?</td>
<td>YES NO Don't Know</td>
</tr>
<tr>
<td>14</td>
<td>Type of birth.</td>
<td>My baby was born by:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. a vaginal delivery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. an assisted vaginal delivery (the doctor or midwife used forceps or vacuum extraction to help the baby come out)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. a c-section</td>
</tr>
<tr>
<td>15</td>
<td>If you had a c-section was your c-section: (skip question if you did NOT have a c-section)</td>
<td>My recent c-section was:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. planned ahead of time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. was an emergency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. was not an emergency, but happened after a trial of labor</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Options</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>16</td>
<td>Was your baby born alive?</td>
<td>YES     NO</td>
</tr>
<tr>
<td>17</td>
<td>Were you hospitalized at any time before your delivery for pregnancy</td>
<td>YES     NO</td>
</tr>
<tr>
<td></td>
<td>related problems?</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Was your labor induced?</td>
<td>YES     NO</td>
</tr>
<tr>
<td>19</td>
<td>Was Pitocin used to help your labor?</td>
<td>YES     NO</td>
</tr>
<tr>
<td>20</td>
<td>Did you have an epidural for pain relief?</td>
<td>YES     NO</td>
</tr>
<tr>
<td>21</td>
<td>Did you use any of these methods to help you during labor (please</td>
<td>1. birthing ball</td>
</tr>
<tr>
<td></td>
<td>circle all/any that apply)?</td>
<td>2. massage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. muscle relaxation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. hypnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. breathing techniques</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. meditation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. changes in posture or position</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. walking around</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. warm shower or bath</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Jacuzzi or hospital tub</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. other ______________________</td>
</tr>
<tr>
<td>22</td>
<td>Did your doctor or midwife perform an episiotomy (an incision or cut</td>
<td>YES     NO</td>
</tr>
<tr>
<td></td>
<td>near your vagina to help the baby come out)?</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>23</td>
<td>Did you need stitches in your vaginal area after delivering the baby?</td>
<td>YES     NO</td>
</tr>
<tr>
<td>24</td>
<td>Besides a nurse, midwife or doctor, who was with you during your labor</td>
<td>1. spouse/boyfriend/significant</td>
</tr>
<tr>
<td></td>
<td>and delivery? (please circle all that apply)</td>
<td>other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. mother (mother-in-law)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. father (father-in-law)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. friend (s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. sister</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. brother</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. cousin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. other children</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. doula (professional labor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>support person)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. other ______________________</td>
</tr>
</tbody>
</table>

130
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| 25| How would you rate the care you got from your doctor or midwife?         | 1. very poor  
2. poor  
3. ok  
4. good  
5. very good |
| 26| How would you rate the care you got from the staff such as the nurse(s)? | 1. very poor  
2. poor  
3. ok  
4. good  
5. very good |
| 27| Are you happy you have this baby?                                        | YES      NO      Don't Know                     |
| 28| Did you participate in group prenatal care at VCU (also called Centering Pregnancy©). | YES      NO                                      |

29 Your birth story: Please write a description of your labor and delivery in your own words. This can be as long or short as you want and can include as much or as little information as you want. This section is optional so you can skip this section if you prefer not to write anything. There is more space on the next page if you need it.
Your birth story continued:
Your birth story continued:
Appendix B

Study Completers

In this investigation rate of PTSD was based upon the total number of women who completed the study (i.e. returned both time 1 and time 2 data), which is consistent with how prior studies in this area have calculated incidence rates (Ayers & Pickering, 2001; Creedy et al., 2000; Czarnocka & Slade, 2000; Skari et al., 2002; Soderquist et al., 2006; Soet et al., 2003; White et al., 2006; Wijma et al, 1997; Zaers et al., 2008). These studies have also relied on the sample of study completers when conducting analyses of factors related to the development of traumatic stress after childbirth.

In addition, the response rate for the current investigation was 81%, which is similar to the response rate for the aforementioned investigations (Ayers & Pickering, 2001=75%; Creedy et al., 2000=84%; Czarnocka & Slade, 2000=74.5%; Skari et al., 2002=85%; Soet et al., 2003=92%; White et al., 2006=71%; Wijma et al, 1997 80%; Zaers et al., 2008=78%). Comparisons between study completers and drop-outs have typically shown that women who are single, non-Caucasian, younger, and lower in income are less likely to complete the postpartum measures, which is consistent with the current investigation.
Appendix C

Prior Difficult Birth

To explore possible reasons for the finding that women with prior difficult births were not significantly more fearful of childbirth than other birth-experienced women without prior difficult birth a series of t-tests were conducted comparing women with prior difficult birth who were in obstetrical care to women with prior difficult birth in midwifery care. The table below details the means, standard deviations, t-tests, significance levels, and confidence intervals for these analyses. Importantly, type one error was not controlled in this series of tests as were conducted for exploratory purposes only.
Table 15

T-tests Comparing Women with Prior Difficult Birth who were in Midwifery versus Obstetrical Care

<table>
<thead>
<tr>
<th>Measure</th>
<th>OB Care (n=4)</th>
<th>Midwifery Care (n=8)</th>
<th>Test Statistic (df)</th>
<th>p</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBSEI Self-Efficacy Scale Only</td>
<td>154.00 (74.67)</td>
<td>231.87 (40.92)</td>
<td>t(10)=-2.38</td>
<td>.03</td>
<td>-150.66</td>
<td>-5.09</td>
</tr>
<tr>
<td>EPDS Depression</td>
<td>13.50 (2.08)</td>
<td>9.37 (3.78)</td>
<td>t(10)=2.01</td>
<td>.07</td>
<td>-.46</td>
<td>8.71</td>
</tr>
<tr>
<td>STAI Trait Anxiety</td>
<td>47.25 (7.14)</td>
<td>32.37 (6.97)</td>
<td>t(10)=3.46</td>
<td>.01</td>
<td>5.30</td>
<td>24.45</td>
</tr>
<tr>
<td>Childbearing Fear WDEQ-A</td>
<td>77.75 (12.87)</td>
<td>46.75 (17.49)</td>
<td>t(10)=3.12</td>
<td>.01</td>
<td>8.83</td>
<td>53.16</td>
</tr>
<tr>
<td>ASI-R Anxiety Sensitivity</td>
<td>84.75 (13.52)</td>
<td>51.12 (10.85)</td>
<td>t(10)=4.69</td>
<td>.01</td>
<td>17.63</td>
<td>49.61</td>
</tr>
</tbody>
</table>

Note. CBSEI=Childbirth Self-Efficacy Inventory; EPDS=Edinburgh Postnatal Depression Scale; STAI=State-Trait Anxiety Inventory; WDEQ-A=Wijma Delivery Expectancy Questionnaire; ASI-R=Anxiety Sensitivity Index Revised.
Appendix D
Fear and Epidural Use

Researchers have shown increased use of analgesia during labor and delivery in women who are more fearful of pain. Women in this study who were more fearful of childbearing were more likely to report use of epidural analgesia during labor and delivery\(^3\). Fear of childbearing and parity (i.e. having given birth before or not) were entered into a logistic regression analysis predicting use of epidural analgesia, which was significant \(\chi^2(2, n=61)=15.16, p<.01\), explaining between 22% (Cox and Snell R Square) and 29% (Naglekerke R Square) of the variance in epidural use, and correctly classified 69% of cases. Mean childbearing fear was 44.10 (SD=20.89) for women not requesting epidural and 60.97 (SD=21.94) for women reporting epidural use. Table 11 below provides coefficient details. Greater childbearing fear and being a first-time mother (i.e. parity) were significant predictors of the choice to use epidural analgesia.

Table 16

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>Odds Ratio</th>
<th>95.0% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>WDEQ-A</td>
<td>.036</td>
<td>.014</td>
<td>6.77</td>
<td>1</td>
<td>.009</td>
<td>1.01</td>
<td>1.07</td>
</tr>
<tr>
<td>Parity</td>
<td>-1.43</td>
<td>.589</td>
<td>5.95</td>
<td>1</td>
<td>.015</td>
<td>.075</td>
<td>.75</td>
</tr>
<tr>
<td>Constant</td>
<td>-.991</td>
<td>.804</td>
<td>1.53</td>
<td>1</td>
<td>.218</td>
<td>.361</td>
<td>--</td>
</tr>
</tbody>
</table>

*Note.* WDEQ-A refers to Wijma Delivery Expectation Questionnaire

---

\(^3\)This analysis was based on study completers only (n=73) and excluded women who delivered via c-section, which necessitates the use of either epidural or general anesthetic. All study completers who delivered via c-section reported use of epidural analgesia during surgery.
On a single-item pain-rating (scale of 1-6) question from the WDEQ-B, there were no differences in pain ratings between women who did ($n=33, M=3.70, SD=1.04$) and did not ($n=28, M=3.57, SD=1.20$) elect epidural analgesia, suggesting epidural use may not be a result of more pain in childbearing.
Appendix E

Predictors of Diagnosis of PTSD/AD after Childbirth

A significant relationship was found in this study between depression and comorbid PTSD depression during pregnancy to trauma symptoms after childbirth, and mode of delivery to trauma symptoms after childbirth. Direct logistic regression was performed to determine the risk of being diagnosed with PTSD/Adjustment Disorder after childbirth if one has PTSD and depression during pregnancy or undergoes an operative or instrument delivery. Assignment of a trauma diagnosis is more stringent than total score on PTSD symptoms due to inclusion of additional criteria (e.g. presence of threat to self or others, responding with fear, and causing clinically significant symptoms) and thus would be considered a more conservative approach to looking at the development of traumatic reactions to childbirth.

Diagnostic status prior to delivery (no diagnosis, PTSD or depression, and co-morbid PTSD with depression) and mode of delivery (unassisted vaginal delivery, instrument delivery, and operative delivery) were simultaneously entered into Logistic Regression predicting postpartum trauma diagnostic assignment (PTSD/Adjustment Disorder versus no diagnosis) after childbirth. The model as a whole accounted for between 28% (Cox and Snell R Square) and 40% (Nagelkerke R squared) of the variance in postpartum trauma diagnostic status, \( \chi^2 (4, n=71)=24.39, p<.01 \), correctly classifying 78% of cases, which suggests these predictors distinguished between those who were and were not diagnosed with trauma after
childbirth. As seen in Table 17 on the following page, pre-delivery diagnostic status and mode of delivery were significant predictors of childbirth-related trauma diagnostic status.

The strongest predictor of postpartum trauma diagnosis was pre-delivery diagnosis of co-morbid PTSD and depression followed by operative delivery. Women who delivered by c-section were eight times more likely, and women who delivered with instrument assistance were five times more likely (this was marginally significant), to be assigned a trauma diagnosis after childbirth than women who underwent unassisted vaginal deliveries. Women who had co-morbid PTSD and depression during pregnancy were 20 times more likely to receive a diagnosis of PTSD/Adjustment Disorder as a result of childbirth than women without a pre-delivery diagnosis of psychopathology.

All twenty-two women who were assigned a postpartum diagnosis of PTSD or Adjustment Disorder had either undergone a c-section/instrument delivery \( n=5 \); had a prenatal diagnosis \( n=11 \) of PTSD/AD, depression, or co-morbid trauma and depression; or had both an operative/assisted delivery and pre-existing diagnosis \( n=6 \). For women who underwent an operative or instrument delivery and who did not receive a postpartum trauma diagnosis \( n=7 \), all but one lacked a pre-partum psychiatric diagnosis of depression or PTSD (the participant who did evidenced mild levels of trauma symptomology).
Table 17

*Logistic Regression Predicting Postpartum Trauma Diagnosis from Pre-Delivery Diagnosis and Mode of Delivery*

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal</td>
<td>1.74</td>
<td>1.00</td>
<td>8.04</td>
<td>2</td>
<td>.018</td>
<td>5.71</td>
<td>.093</td>
</tr>
<tr>
<td>Instrument</td>
<td>1.00</td>
<td>3.02</td>
<td>1</td>
<td>.080</td>
<td>5.12</td>
<td>.801</td>
<td>40.69</td>
</tr>
<tr>
<td>Operative</td>
<td>2.09</td>
<td>6.80</td>
<td>1</td>
<td>.009</td>
<td>8.12</td>
<td>1.68</td>
<td>39.42</td>
</tr>
<tr>
<td>Antenatal Diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1.88</td>
<td>.737</td>
<td>12.39</td>
<td>2</td>
<td>.002</td>
<td>6.56</td>
<td>.014</td>
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<tr>
<td>PTSD or Depression</td>
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<td>.971</td>
<td>9.70</td>
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<td>.002</td>
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<tr>
<td>PTSD &amp; Depression</td>
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<td></td>
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<tr>
<td>Constant</td>
<td>-2.33</td>
<td>.544</td>
<td>19.02</td>
<td>1</td>
<td>.000</td>
<td>.093</td>
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</table>
Figure 1. Displays the flow of participants in the study from recruitment through study completion.
Appendix G

Study Flyer and Brochure for Recruitment
Study Predicting Childbearing Stress

Are you pregnant and aged 18 or older?
Would you be willing to answer questions that will help us learn more about stress after labor and delivery?

If so, ask your provider or front desk-person for a research packet today.

- In this short study you will fill out questionnaires—one time during the two months before you deliver and one time about one month after delivery. This will take one to two hours.
- Your answers could help us learn more about the factors that are involved in post-partum stress reactions.
- Women who complete the study could win a $100.00 gift certificate to Babies R Us.
- If you are willing to participate in the study, or have any questions about the study, please contact the researcher:

Jennifer J. Runnals: confidential voicemail
(804) 385-xxxx or (757) 870-xxxx or runnalsjj@vcu.edu

This investigation is being conducted by a doctoral candidate in clinical psychology at Virginia Commonwealth University as part of her dissertation. All answers to study questions, and your participation in this study, will be kept confidential. Your health professionals will continue to provide quality care even if you decide not to participate in the study. January 17th, 2008.
This investigation is being conducted by a doctoral candidate in clinical psychology at Virginia Commonwealth University as part of her dissertation. All answers to study questions, and your participation in this study, will be kept confidential.

Thank you for taking the time to read about this research study. If you have questions before you decide on whether to participate in the study, please call or e-mail the researcher and she will be happy to provide you with more information.

If you are at least 18 years old, pregnant, and interested in helping us learn more about stress reactions in women after they have had a baby, please consider participating in this study on Childbearing Stress Reactions. You will be asked to fill out questionnaires. There are no medical tests involved in the study.

Contact Researcher
Jennifer J. Runnels, M.S.
Confidential Phone Number
(804) 383-xxxx or (737) 570-xxxx
E-mail: runnelsjj@vcu.edu

Your help is needed to learn more about stress after labor and delivery.
Women who complete the study could win a $100.00 gift certificate to Babies R Us.
Stress after Labor & Delivery

Welcoming a baby into your life is a happy event. Some stress reactions after having a baby are normal and expected.

Some stress reactions are too much, but little is known about how and why this can happen.

Your help is needed to learn more about how and why some women experience stress reactions after labor and delivery that are "too much".

In this study, you will be asked to:

- Fill out questionnaires sometime during the 12 weeks before you have your baby. This would take about one to two hours.
- The questions cover topics such as information about yourself (level of education, work, marital status), concerns you may have about the actual labor and delivery process, your history (if any) of upsetting events such as being in a car accident, the amount of support you get from the people in your life, and so on.
- You will also be asked to fill out similar questionnaires between the 4th and 8th week after you deliver your baby.

Important Study Information

- Your answers will be confidential.
- You must be at least 18 years old.

Postage will be paid. You can mail your pocket to the researcher after you have a chance to fill out the questions.

The researcher is available to answer your questions about the study at anytime before, during, or after the study.

This study has been approved by the Institutional Review Board at Virginia Commonwealth University (IRB # H11010).

There is no cost to you. You will continue to receive quality medical care even if you decide not to be in the study.

If you would like to take part in the study, please call or e-mail the researcher listed below.

Contact Researcher
Jennifer J. Runnals, M.S.
Confidential Phone Number
(804) 385-xxxx or (757) 870-xxxx
Vita

Jennifer Jane Runnals was born on April 25th, 1971, in Brunswick, Maine, and is an American citizen. She graduated from Ayer High School in Ayer, Massachusetts in 1989. She received her Bachelor of Science in Psychology, with a concentration in Industrial and Organizational Psychology, from Christopher Newport University, Newport News, Virginia in 1993. She received a Master of Science in Clinical Psychology from Augusta State University, Augusta, Georgia in 1999 and subsequently worked as a psychometrist in private practice until moving to Washington D.C. and taking a position with Johnsnon O’Connor Research Foundation where she worked for three years, achieving promotion to Director of that regional office. Ms. Runnals received a Master of Science in Clinical Psychology from Virginia Commonwealth University, Richmond, Virginia, in 2006. She completed her pre-doctoral internship in Clinical Psychology at the Durham Veterans Affairs Medical Center, Durham, North Carolina in 2010.