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Abstract

Objective: Around 50% of women report symptoms that indicate some aspect of their childbirth experience was “traumatic”, and at least 3.1% meet diagnosis for PTSD 6 months post partum. Here we aimed to conduct a prospective longitudinal study and examine predictors of birth-related trauma – predictors that included a range of pre-event factors – as a first step in the creation of a screening questionnaire.

Method: Of the 933 women who completed an assessment in their third trimester, 866 were followed-up at 4 to 6 week postpartum. Two canonical discriminant function analyses were conducted to ascertain factors associated with experiencing birth as traumatic and, of the women who found the birth traumatic, which factors were associated with those who developed PTSD.

Results: A mix of 16 pre-birth predictor variables and event-specific predictor variables distinguished women who reported symptoms consistent with trauma from those who did not. Fourteen predictor variables distinguished women who went on to develop PTSD from those who did not.

Conclusions: Anxiety sensitivity to possible birthing problems, breached birthing expectations, and severity of any actual birth problem, predicted those who found the birth traumatic. Prior trauma was the single most important predictive factor of PTSD. Evaluating the utility of brief, cost-effective, and accurate screening for women at risk of developing birth-related PTSD is suggested.

The arrival of a new baby is typically an event that is associated with much anticipatory and experienced joy. However, despite low mortality rates in developed countries (World Health Organization, 2004) the birthing process can, for a few, also be accompanied by feelings of terror, fear for the mother's or baby's life and a sense of helplessness or lack of control (Geller, 2004; Soderquist, Wijma, & Wijma, 2002). While experiencing some anticipatory anxiety may almost be viewed as normative, there are some women whose actual birthing experience results in them meet diagnostic criteria for either partial or full PTSD. In a large Australian sample of pregnant women (Alcorn, O'Donovan, Patrick, Creedy, & Devilly, 2010), 3.6% met full PTSD criteria (diagnosed using the Posttraumatic Diagnostic Scale; Foa, Cashman, Jaycox, & Perry, 1997) 4 to 6 weeks postpartum. By 6 months, this figure had risen to 5.8%. Controlling for antenatal psychopathology (pre-existing trauma and clinically significant depression and anxiety) only reduced these rates to 1.2% and 3.1% respectively. These rates are comparable to other reports where the rates of PTSD following childbirth have ranged from 1% to 6% (Creedy, Shochet, & Horsfall, 2000; Ayers & Pickering, 2001). These numbers are also similar to the 12-month prevalence rate of PTSD after experiencing a potentially traumatic event. Creamer, Burgess, and McFarlane (2001) found the proportion of women who met criteria for PTSD following any trauma to be 2.9%.

These prevalence rates are of concern as PTSD following childbirth is associated with significant problems in mother-infant attachment (Allen, 1998), partner relationships (Beck, 2004) and increased use of the healthcare system (Switzer, Dew, Thompson, Goycoolea, Derricott & Mullins, 1999). It is reasonable to propose that further investigation of factors that predict PTSD will inform and improve clinical practice. Several studies have made a significant contribution to the field already. Soderquist and colleagues (Soderquist, Wijma, & Wijma, 2006; Soderquist, Wijma, Thorbert, & Wijma, , 2009) in one of the most comprehensive studies to date, found that depression in early pregnancy, stress, coping capacity and severe fear of childbirth in late pregnancy to be significant predictors of PTSD, although pre birth state anxiety was not. Other researchers found anxiety sensitivity (Fairbrother & Woody, 2007; Keogh, Ayers, & Francis, 2002), depression (Soderquist, Wijma, Thorbert, & Wijma, 1999; Maggioni, Margola, Filippi, 2006; van Son,

Verkerk, van der Hart, Komproe, & Pop, 2005) and dissociation (van Son et al., 2005) to be key predictors. Obstetric intervention (Creedy, et al., 2002, Fairbrother & Woody, 2007, Soet, Brack, & Dilorio, 2003) also has been identified as important, as has a negative relationship with hospital staff (Creedy et al., 2000, Soet et al., 2003). Pain, a history of sexual trauma and feeling powerless during the birth have also been found to predict PTSD-type symptomatology (Soet, et al., 2003). Testing a cognitive model, Ford and colleagues (Ford, Ayers, & Bradley, 2010) found a direct effect of social support at three months with some additional variance accounted for by cognitive variables. It is also possible that extreme pre-existing stressors such as child sexual abuse that result in post traumatic stress prior to delivery also increases the likelihood of PTSD, a finding obtained in other areas of trauma research (McNally, 2003; Yehuda & McFarlane, 1995).

A major problem with identifying risk factors is that typically there is only access to individuals after a traumatic event. A sample of childbearing women, on the other hand, provides an opportunity to screen prospectively for predisposing factors. The current literature provides a wide range of possible predictors of birth-related trauma, however, no study has conducted a prospective, longitudinal, comprehensive examination of individual risk factors and pre-event factors and birth factors and their association with the development of PTSD, as defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). Thus, taking this body of research as a starting point we surveyed childbearing women in their third trimester regarding their history, birthing expectations (based upon previous research, as exemplified above), and then followed-up these women again 1 month postpartum. We then assessed women for: a) finding the birth traumatic; and b) meeting the criteria for PTSD. Predictors (both pre-birth predictors and event related predictors) for both of these states were then computed.

In taking a two-stage approach, it is possible to investigate the process of the development of PTSD in a more refined and systematic manner using current diagnostic nomenclature rather than symptom severity as the key outcome variable.

Method

Sample, Power and Procedure

Participants consisted of consecutive attendees at antenatal clinics in Brisbane, Australia and surrounding areas. Researchers approached consecutive attendees who were waiting for their scheduled antenatal appointments. Women were eligible to participate if they were at least 18 years of age, in their third trimester of pregnancy (from 28 weeks gestation), able to read and write in English, and contactable by phone (Alcorn et al., 2010). Nine-hundred and thirty-three women (87% of those approached) agreed to take part, and completed the first phase that took place in the third trimester of pregnancy. At the second study phase, which took place between 4 to 6 weeks postpartum, data were obtained from 866 women (93% retention rate). The mean age of the 933 women who commenced the study was 28.6 years (*SD* = 5.64) and average relationship length was 6 years. Approximately 86% were Caucasian, with the remaining being members of diverse racial groups. The modal educational level was just less than high school completion (grades 10 or 11; 24.7%). Most women were married (53.9%) or cohabitating (30.1%); had a gross annual household income between $36,000 -$50,000AUS (23%) and $51,000 - $80,000AUS (23.2%); nominated homemaker for their employment status (48.7%); and indicated that they already had children (577 women or 61.8%). This sample of women was representative of the Australian birthing population in terms of socio-economic status, age and self-identified ethnicity (Alcorn, et al., 2010). Informed consent was obtained from all participants. The Griffith University Ethics Committee and the participating hospitals granted ethics approval for human investigation.

The study consisted of four data-gathering phases: third trimester; 4-6 weeks postpartum; 12 weeks postpartum and 24 weeks postpartum. Only data from the first two phases are reported in the current research.

Delineating between those who found the birth traumatic and those who did not (first phase of statistical analysis) with 16 potential predictor variables (see below), and the dependant outcome as binary

(yes/no), assuming a moderate effects size ($f^2 \geq 0.06$), and setting the probability of a Type I Error as no greater than 5% ($\alpha < 0.05$); and the power level at 80% ($1-\beta = 0.8$), the sample needed to be at least 322. As stated, we had 933 participants. In the case of the second equation (delineating between those who developed PTSD and those who did not) the only difference was the number of potential predictor variables (14; see further below), the required sample size was 306. We had 394 participants.

Measures

Assessment of PTSD and Trauma Symptom Severity Postpartum.

The Post Traumatic Diagnostic Scale (PDS; Foa et al., 1997) was used to provide diagnoses of PTSD resulting from childbirth and information on symptom severity. Part 2 of the PDS was expanded to assess the nature of the birth event (i.e., whether or not it was traumatic). Importantly, in phrasing the questions, women were asked specifically in relation to their birth experience. The concurrent validity of the PDS has been examined against the Clinician Administered PTSD Scale (CAPS) with our sample and found to have good validity (Alcorn, et al., 2010). Further detailed information on the scoring of DSM Criteria A1 and A2 and the administration of the questionnaire, scoring and concurrent validity is provided elsewhere (Alcorn, et al., 2010). In short, all six diagnostic criteria for PTSD were assessed: the event, four symptom clusters, and functional impairment.

Assessments of Predictor Variables.

The inclusion of possible predictor variables was based on findings from previous studies examining PTSD and symptom severity. In order to identify specific items for a possible future screening questionnaire variables included individual items from questionnaires. Antenatal and perinatal variables included: depression (the Edinburgh Postnatal Depression Scale – EPDS; Cox, Holden, & Sagovsky, 1987), anxiety (the State-Trait Anxiety Inventory -STAI Forms Y-1 and Y-2; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), peritraumatic dissociation (the Peritraumatic Dissociative Experiences Self Report Questionnaire -PDEQ-SR; Marmar, Weiss, & Metzler, 1997), alcohol use (the Alcohol Use Disorders Identification Test – AUDIT;

Saunders, Aaslans, Amundsen, & Grant, 1993), personality characteristics (the Revised Eysenck Personality Questionnaire - short form, EPQ-RS; Eysenck & Eysenck, 1997), social support (the Interpersonal Support Evaluation List, ISEL; Peirce, Frone, Russell, & Cooper, 1996), and coping style (the Coping Style Questionnaire, CSQ; Billings & Moos, 1981).

Additional questions included a modified version of the Birth Expectation and Experience Scale (BES; Slade, MacPherson, Hume & Maresh, 1993), items to assess social support, history of seeing a health care professional for emotional problems, and history of postnatal depression. Other psychological problems and family history of psychological problems were also assessed. Perceived stress was measured at each phase around events based on the DSM-IV-TR axis IV (American Psychiatric Association, 2000). Information on obstetric history and factors specific to the birth included questions on: gestational age; premature birth; any medical problems; instrument assisted vaginal delivery; a caesarean section; general anesthesia or analgesia; number of previous pregnancies, live births, stillbirths, and miscarriages; whether the pregnancy was planned; and any medical issues in relation to fertility.

Statistical Analysis

Two discriminant analyses were conducted to address the two research questions posed. The same procedure (set out in Table 1) was used in both analyses. The first equation sought to distinguish those women who reported that the birth was traumatic (met PTSD criteria A). The second equation sought to distinguish those women who found the birth traumatic and who went on to develop PTSD, from those who found the birth traumatic but did not develop PTSD. Both equations began with 537 potential predictor variables, but narrowed the number of potential predictors based on their significant correlation with the dependent variable. Those variables that were not significantly correlated with the dependent variable were discarded at this stage. This list (different for each equation) was again reduced by controlling for possible Type 1 error by using the Holm procedure (Holland & Copenhaver, 1988). The Holm procedure begins with all the significant correlations identified, and then sorts these results from the most to the least significant. It then

calculates the cumulative significance at each step down the sorted list. The point, at which this cumulative significance exceeds the usual significance criteria (.05), is the point at which all remaining significant tests are deemed Type 1 errors, and therefore discarded. The third and final step, to find the optimal set of predictor variables, involved a step-wise procedure. The remaining predictor variables were sorted from the most to the least useful in distinguishing the groups of women. Each variable was then added to the discriminant analysis in turn, and the improvement in the predictive equation was tested with a significance test. Where the next predictor variable in the sequence failed to contribute significantly to the predictive accuracy of the equation, this and no further predictive variables were entered into the equation. The potential future applicability of each of these two classification equations was assessed by applying an out-of-sample cross-validation procedure. This procedure, known as a "leave-one-out" procedure, is intended to mimic how well these solutions may apply to datasets other than the dataset on which the current results were developed. The procedure involves computing a number of separate discriminate equations (one for each participant in the analysis). In each case, one participant is temporarily removed from the analysis, and the results are calculated on the rest of the participants. These results are then applied to the one woman who was left out of the equation, and the accuracy or inaccuracy of the prediction for that woman is then recorded. This participant is then returned to the dataset and the procedure is then repeated sequentially for each woman in the study. The accuracy of these predictions is then tallied and presented as the out-of-sample cross-validation of our results. These results are then contrasted with the typical "within-sample" classification accuracy of our results.

Insert Table 1 here

Results

Factors predicting a birth as traumatic.

Sixteen predictor variables (see Table 2) significantly distinguished between those women who found the birth traumatic (i.e., meeting criteria A1 and A2), and those who did not (Wilk's λ =.38, χ^2 (16) = 128.58, p<.05).

Insert Table 2 here

The within-sample accuracy of the classification of this model was 66.4%, and this dropped to 60.5% when out-of-sample cross-validation was applied. While this is well above a random 50% guess rate, the 39.5% error rate points to the difficulty in identifying a homogenous set of predictor variables.

Factors predictive of PTSD in women who found the birth traumatic

Of the 45.5% of women who reported that their birth experience was traumatic (n = 394), 7.9% developed PTSD between 4 and 6 weeks postpartum (n = 31). The next analysis looking at predictors of PTSD was based on 305 women due to missing data. Of these 305 women, 26 (8.5%) met criteria for PTSD. The PTSD rate of those with missing data is not significantly different to those without missing data (p=.36). Fourteen predictor variables (Table 3) significantly distinguished between those women who developed PTSD and those women who found the birth traumatic but did not develop PTSD (Wilks' λ =.37, χ^2 (14) =146.05, p<.05).

Insert Table 3 here

The within-sample accuracy of the classification of this solution was 94.1%. Out-of-sample cross-validation indicated that this solution was stable, as accuracy only dropped by 0.2% to 93.9%. Even if one knew the prior probability of developing PTSD, educated guessing would yield 7.8% false-positives and 7.8%

false-negatives, resulting in an overall accuracy of 84.5%. Thus, the discriminant function presented here is more accurate than both blind chance, having prior knowledge of the probability of developing PTSD, and does not have an exaggerated false-negative hit rate and low true positive hit rate to which such low base rate disorders are prone in predictive analyses.

Discussion

In this prospective study it was possible to identify the psychosocial, psychiatric, antenatal and perinatal factors predictive of women reporting that their birth was traumatic in the immediate postnatal period and further, those who went on to report symptoms that were consistent with a diagnosis of PTSD. There is interesting convergence emerging in the field with a growing consensus that trauma related to childbirth is a real phenomenon. Wijma, Soderquist, and Wijma (1997) reported that 1.7% of women scored in the clinical range on a diagnostic measure of PTSD, the Traumatic Event Scale at one to thirteen months after childbirth. Similarly, Ayers and Pickering (2001) found that 1.5% of women at 6 months after childbirth, also scored in the clinical range on the PTSD symptom scale. A somewhat higher rate of 5.6% were reported by Creedy et al. (2000), also using the PTSD symptom scale. The one study to have used full DSM IV criteria, Alcorn et al. (2010), found that 3.1% of women met criteria at 6 months after birth, after controlling for previous traumatic events, clinically significant anxiety and depression during pregnancy. These figures have led to international recognition of the importance of post-traumatic stress disorder following childbirth (Ayers, Joseph, McKenzie-McHarg, Slade, & Wijma, 2008). The findings reported in the current paper extend this focus by identifying variables that are predictive of initially birth related trauma and subsequent PTSD, thus possibly allowing for screening of at risk women.

Predictors of a traumatic birth experience

Results identified sixteen predisposing and event-related factors that distinguished women who had experienced a traumatic birth from those who did not. Most of the predisposing factors were psychological rather than clinical such as medical procedures. For example, while some anticipatory anxiety is

understandable, indeed normal (Geller, 2004), women who felt particularly worried about their own and their baby's health and had both heightened anxiety and fear of pain were particularly at risk. Primagravidas were also more likely to report that their birth was traumatic; perhaps reflecting a discrepancy between pre birth expectations and the actual birth experience (Wijma et al., 1997). Social support also appeared as a predictor as reflected in a negative answer to a question in which a woman is asked if she had someone whom she could rely upon to drive her to a doctor in the event of illness. Thus, taken together it is reasonable to propose that anxiety related to the birth and social isolation in first time mothers could be key variables affecting the birth experience.

Interestingly, two variables indicating a lack of problems, a sense of emotional comfort and emotional steadiness, were also predictive of birth trauma. Thus, for some women who generally are at ease with themselves, a difficult birth challenges their self-concept as managing or coping under trying circumstances. Indeed previous research suggests that deviations from a "normal" birth or from "normal" beliefs about the birth are generally not expected, and violate assumptions about the birth experience (Allen, 1998). Notably, women who have had their children removed from their care or whose children are now old enough to live independently (and, hence, were at greater risk for complications) were also more likely to report that the birth was traumatic.

The event-related psychological variables that predicted birth trauma were a perceived lack of control during labour, low self-efficacy, discrepancy in expectations around the birthing event, and feeling unprepared for the birth were all psychological variables related to self-reported trauma. Two predictor variables may be associated with birth complications. These were the length of time before a mother held her baby and the number of days postpartum analgesia was prescribed. While both variables are arguably proxy measures of birth complications, birth complications per se were not predictive. Clearly further research is necessary, but it is possible that birth expectations include the belief that holding your baby immediately after birth is both desirable and necessary for many women. The prescription of analgesia may be an important factor that relates in part to both anxiety around the birth and maternal fear of pain that

may be experienced. It is notable that previously anxiety sensitivity and pain severity have been associated with PTSD (e.g., Reiss, Peterson, Gursky, & McNally, 1986). While Keogh et al. (2002) did not find reported pain post-delivery to be predictive of PTSD, anxiety sensitivity was predictive. Thus, it may in fact be the fear of pain combined with both anxiety proneness and subsequent analgesia (i.e., a measure of actual pain experienced), which influences whether a woman will report that her birth was traumatic.

It should be noted that while a 60.5% accuracy rate (when out-of-sample cross-validation was used; and a 66.4% within sample rate) is high, this does leave a 39.5% error rate. This suggests that heterogeneity of responses is still an issue that needs to be addressed in a screening measure. It may well be that once these questions are all together in one format that the accuracy rate increases, but it may also mean that further refinement of the screen is required. We recommend that these items be used with caution in clinical practice, being generally indicative rather than definitive of finding the birth traumatic. Further research will clarify this issue.

Predictors of PTSD as a result of a traumatic birth

Eleven of the 14 predictors for those women who developed PTSD were related to pre-event psychosocial and psychiatric factors – mainly previous trauma. Even two of the three remaining event-related predictors were related to the women's psychology rather than the actual birth (i.e., pain). These predict with about 94% certainty the women who will develop PTSD. Notably, the true positive hit rate (61.5%; i.e., successfully predicting those few people who do go on to develop the disorder) is far larger than one would expect with prior knowledge of probabilities and educated guessing (7.7%).

It is notable that seven out of the fourteen pre-birth predictors were trauma related. For example, three of these could be seen as psychological consequences of trauma that left women "jumpy", "overly alert" and "distant from others". These findings are even more remarkable when one considers that these trauma-related items only made up 10% of the potential predictor variables screened. It is also worth noting that if the potential predictor variables screened merely repeatedly

captured the same explanatory variance, then only one of them would have emerged from the stepwise procedure employed. That half the optimal predictive set of variables presented here were related to previous trauma clearly indicates that they capture different facets of the domain and collectively place a unique importance on this issue. It is remarkable that the experience of previous trauma has not been included in previous studies looking at the prediction of PTSD following childbirth. One of the few studies to have done so by Soet et al. (2003) found that a history of sexual trauma (but not other past trauma) was associated with a perception that the birth was traumatic. There are some important and interesting parallels between the current findings and research investigating the prediction of trauma in other populations. Two major meta-analyses on the risk factors of PTSD (Brewin, 2005; Ozer, Best, Lipsey &Weiss, 2003) also found that previous trauma is a significant risk factor of developing PTSD.

Two items on the Eysenck Personality Questionnaire - Revised (Eysenck & Eysenck, 1997) were found predictive. Firstly, the item “being tense or highly-strung” may not necessarily be related to previous trauma, but reflects neuroticism, which has previously been found to be a predictor of PTSD in childbirth (Engelhard, van der Hout & Vlaeyen, 2003). Secondly, the question “would you like other people to be afraid of you” was also found to be predictive. Endorsement of this item may reflect a desire to appear dangerous to others, perhaps with the hope that others will leave them alone. The further item of having sought professional help, for either a previous trauma or other emotional problems, is also consistent with previous research (Soderquist et al., 2006).

Two of the three event-related factors were possible symptoms of trauma: experience of anger, guilt or shame during the birth, and dissociation. The latter variable had the weakest correlation with PTSD, but perinatal dissociation has been associated with PTSD (van Son et al., 2005) while peritraumatic dissociation has been associated with the development of PTSD (Engelhard et al., 2003; Shalev, Peri, Canetti & Schreiber, 1996). Finally, women experiencing “a lot of pain” during labour was also a predictor of PTSD. Previous research has also found pain to be

predictive of PTSD (Creedy et al., 2000, Soet et al, 2003); however, other studies have not (Keogh et al., 2002; Lyons, 1998).

Strengths and Limitations

This study can be viewed predominantly as an exploratory study in which variables from a diverse literature on birth-related trauma were tested prospectively in a large sample of women. While the strength of the study is its prospective, longitudinal design, it is difficult to integrate the current findings within a single theoretical perspective. However, few studies have investigated variables involved in developing PTSD following a traumatic birth event. This study extends on previous research studies examining PTSD postpartum (e.g., Allen, 1998; Ayers & Pickering, 2001, Creedy et al., 2000; Czarnocka & Slade, 2000) and provides new insights into significant predictors of perceiving childbirth as traumatic, developing PTSD, PTSD symptom severity, and PTSD symptom change.

There are some aspects regarding measurement that need to be raised as possible limitations. Firstly, due to feasibility, infant temperament and biological factors were not assessed, yet such factors may play an important role in postpartum PTSD and such possibilities could be explored in additional studies. Further, while the PTSD instrument was a valid and reliable measure, it would be of interest to examine whether the results generalise to cases of diagnosable PTSD when assessed through a formal diagnostic interview rather than self-report. In addition, prior experiences of an abortion or miscarriage were examined within the one question. It would have been beneficial to examine these experiences separately to determine whether they had differential impacts on outcome. Another limitation of the study is that a separate rating scale was not provided to assess the intensity of individual affective responses. While separate rating scales were used to assess the occurrence of individual emotional states such as fear, helplessness, and horror, the intensity of emotional states was not. Rather, a single rating scale was used to assess the intensity of fear, helplessness, terror, and horror experienced during the birth and immediately after. The same scale format was also used for anger, guilt, and shame. By using separate rating scales the results may

have identified the intensity of certain emotional states as being associated with study outcomes. This warrants investigation in future studies.

Conclusion

The current findings provide an important starting point for the development of a screening questionnaire that can be used with women to ascertain whether they are at risk of developing birth-related PTSD. Such an instrument could include the 16 variables identified as predictors of PTSD: the first two questions would capture A1 and A2 criteria, and if both are met, then the 14 predictor variables could be assessed. This set of screening questions could be the basis for the further development of screening measures aimed at identifying women at risk of developing PTSD. As noted above, providing a complete questionnaire on one scale to childbearing women needs to be a first goal. Such an approach will clarify the hit-rate for both finding the birth traumatic and becoming traumatized by the birth. We suggest that the next steps should include using the identified variables in another sample of women to assess the capacity of this screen to predict accurately those who subsequently go on to develop PTSD. This would also include assessing the coherence / salience and comprehension of these identified items when presented to women as a screening tool in clinical practice. Such an approach is different to participating in a research study involving the completion of a wide range of standardised instruments. Eventually, such a screening instrument may be useful in a trial of intervention strategies that may inoculate against stress (Varker & Devilly, 2012). Expectations around the birthing experience warrant further consideration and investigation. It may be that helping women develop realistic expectations about the birthing experience, especially those with previous history of PTSD and affective distress, would help reduce birth trauma and subsequent PTSD.

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Table 1

Analytic procedure

	Analysis 1	Analysis 2
Participants	866 women	394 women who found the birth traumatic
Dependent variable (dichotomous)	PTSD Criteria A (i.e. found the birth traumatic), or not	DSM-IV-TR full PTSD criteria, or not
Number of potential predictor (independent) variables screened.	537	537
Step 1: Number of potential predictor variables that had a significant ($p<.05$) correlation (Spearman's ρ) with the dependent variable.	283	192
Step 2: Number of potential predictor variables remaining after Holm's procedure (cumulative $\alpha=.05$) was applied to reduce the likelihood of Type I and thus over interpreting what may be meaningless correlations.	167	75
Step 3: Number of predictor variables that	16	14

remained after a stepwise discriminant procedure[a] was applied to obtain the optimal subset of predictor variables. This was done because the predictive value of the variables remaining at Step 2 was likely to overlap.

[a] Prior probabilities were assumed to be proportionate to group size in each case.

Table 2

Variables that distinguish those who will find the birth traumatic, and those who will not

	Pooled within-groups correlation between variables and standardized canonical function	Correlation with finding the birth traumatic (ρ)
Pre-birth predictors		
• Worry about the health of their child and themselves during the labor and delivery	.30	.26
• Expected their labor to be anxiety provoking	.23	.20
• Have dependent children (as opposed to non-dependent children or no children)	-.19	-.18
• Have been so unhappy that they have been crying	.13	.17

• Feel fearful about the pain they may experience during the labor and childbirth	.07	.16
• In relation to a previous trauma, they have experienced feeling irritable or having fits of anger	.09	.11
• Report feeling comfortable (emotionally) during the third trimester.	-.05	.11
• Report generally feeling like a steady person	.19	.11
• Feel if they were sick and needed someone to drive them to the Dr., they would have trouble finding someone	-.02	-.11
Event-related predictors		
• Overall, how much control they felt during the labor and childbirth	-.27	-.35
• How they would rate their labor in relation to their expectations (worst/better than)	-.11	-.25
• How prepared they felt for the labor and childbirth	-.15	-.22
• A belief that what went wrong was because of chance or bad luck	.19	.22
• The level of satisfaction they felt with the way they coped during labor	-.23	-.21
• The length of time after the birth before they first held their baby	.11	.20

• The number of days after the delivery they were given analgesia	-.08	.14

Table 3

Variables that distinguish those who will develop PTSD, and those who do not

	Pooled within-groups correlation between variables and standardized canonical function	Correlation with PTSD (rho)
Pre-birth predictors		
• Problems related to a previous traumatic event had interfered with relationships with friends	.23	.31
• Problems related to a previous traumatic event had interfered with sex life	.26	.31
• As a result of a previous trauma experience they would call themselves jumpy or easily startled.	.25	.28
• They would like other people to be afraid of them	.25	.26
• Problems related to a previous traumatic	.02	.23

event had interfered with their ability to fall or stay asleep		
• They would call themselves tense or highly-strung	.30	.21
• Had seen a counselor in the previous 12 months for emotional problems	.20	.20
• Problems related to a previous traumatic event had led them to be overly alert	.09	.20
• Having had a distressing experience during a pap smear, vaginal or reproductive medical examination	.14	.20
• Described as a previous trauma they had experienced sexual contact when they were younger than 18 with someone who was 5 or more years older than them	.19	.17
• As a result of a previous trauma they had felt distant or cut off from other people around them as a result of a previous traumatic event	-.22	-.18
Event-related predictors		
• Experienced anger, guilt, or shame	.34	.30
• They felt a lot of pain during labor	.18	.25
• They felt as though they were a spectator watching what was happening to them	.15	.16