

## Research report

## PTSD after childbirth: A predictive ethological model for symptom development

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## ARTICLE INFO

## Article history:

Received 13 March 2015

Received in revised form

30 June 2015

Accepted 30 June 2015

Available online 4 July 2015

## Keywords:

Birth

PTSD

Risk factors

Prevalence

Path analysis

Longitudinal design

## ABSTRACT

**Background:** Childbirth can be a traumatic experience occasionally leading to posttraumatic stress disorder (PTSD). This study aimed to assess childbirth-related PTSD risk-factors using an etiological model inspired by the transactional model of stress and coping.

**Methods:** 348 out of 505 (70%) Dutch women completed questionnaires during pregnancy, one week postpartum, and three months postpartum. A further 284 (56%) also completed questionnaires ten months postpartum. The model was tested using path analysis.

**Results:** Antenatal depressive symptoms ( $\beta=.15$ ,  $p<.05$ ), state anxiety ( $\beta=.17$ ,  $p<.01$ ), and perinatal psychoform ( $\beta=.17$ ,  $p<.01$ ) and somatoform ( $\beta=.17$ ,  $p<.01$ ) dissociation were identified as PTSD symptom risk factors three months postpartum. Antenatal depressive symptoms ( $\beta=.31$ ,  $p<.001$ ) and perinatal somatoform dissociation ( $\beta=.14$ ,  $p<.05$ ) predicted symptoms ten months postpartum.

**Limitations:** Almost a third of our sample was lost at three months postpartum, and 44% at ten months. The sample size was relatively small. The present study did not control for prior PTSD. The PTSD A criterion was not considered an exclusion criteria for model testing, and the fit index of the ten months model was just below suggested cut-off values.

**Conclusions:** Screening for high risk pregnant women should focus on antenatal depression, anxiety and dissociative tendencies. Hospital staff and midwives are advised to be vigilant for perinatal dissociation after intense negative emotions. To help regulate perinatal negative emotional responses, hospital staff and midwives are recommended to provide information about birth procedures and be attentive to women's birth-related needs.

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## 1. Introduction

Childbirth has been identified as a potentially traumatic experience and may result in posttraumatic stress disorder (PTSD). PTSD is a chronic mental health disorder characterized by symptoms of persistent re-experiencing and avoidance of traumatic memories, and emotional numbing and hyperarousal (American Psychiatric Association [APA], 2013, 1994). With an average childbirth-related prevalence rate of 3%, PTSD affects one in every 33 mothers (Grekin and O'Hara's, 2014).

Knowledge about childbirth-related PTSD risk factors may help prevent the disorder, identify women at risk, and formulate

strategies that prepare women for the psychosocial impact of birth (Lev-Wiesel and Daphna-Tekoah, 2010; Olde et al., 2005). PTSD is not the result of a single cause (i.e., a traumatic stressor), but is the consequence of various interacting variables. We developed an etiological model of perinatal PTSD that explains the manner in which risk factors interact to predict PTSD severity. The model was based on individual and environmental factors suggested as important by recent studies and meta-analyses (e.g., Grekin and O'Hara, 2014), and designed to suit childbirth, with a special focus on perinatal dissociation. It included negative perinatal emotions, dissociative reactions, midwife and hospital staff social support, and their ability to impart birth-related information. The transactional model of stress and coping played an influential part in the development of the present etiological model, which was developed by Lazarus and Folkman (1984) and adapted to PTSD by Kleber and Brom (1992), to serve as a framework for evaluating the

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effects of stress and coping mechanisms on mental health outcome during stressful events.

The transactional model of stress and coping states that individuals use primary appraisal processes to evaluate the threat-severity of a stressor (i.e., the birth) and secondary appraisal processes to assess their ability to cope with the stressor. These cognitive processes result in emotional responses that reciprocally influence the event appraisal. Coping efforts are engaged to retain well-being by containing intense negative emotions, but can be diminished as a result of the women's emotional state (Czarnocka and Slade, 2000; Ford and Ayers, 2011; Garthus-Niegel et al., 2013; Maggioni et al., 2006; Soet et al., 2003; Van Son et al., 2005; Zaers et al., 2008). More invasive modes of birth (e.g., cesarean section), may raise the threat-perception of the stressful experience and negative emotional state, and are associated with childbirth-related PTSD (Adewuya et al., 2006; Alcorn et al., 2010; Ayers et al., 2009; Creedy et al., 2000; Czarnocka and Slade, 2000; Fairbrother and Woody, 2007; Fisher et al., 1997; Ford and Ayers, 2011; Lev-Wiesel et al., 2009; Lyons, 1998; Montmasson et al., 2012; Olde et al., 2005; Stamrood et al., 2011; Van Son et al., 2005). The emotional state of women is not only dependent on the stressful experience, it is also based on preexisting anxiety and depression levels. Antenatal anxiety could heighten the threat-perception of birth and increase peritraumatic distress (Zaers et al., 2008). Whereas depressive people are hypothesized to lack the mental resources to cope with peritraumatic distress (Lev-Wiesel et al., 2009).

If coping efforts fail, intense negative emotions can cause PTSD (Boudou et al., 2007; Goutaudier et al., 2012; Lemola et al., 2007; Lev-Wiesel et al., 2009; Lyons, 1998; Olde et al., 2005; Pantlen and Rohde, 2001). Lanius et al. (2010) provided neurobiological evidence on how intense negative emotional responses cause PTSD via dissociation. Dissociative reactions (e.g., derealization and depersonalization) occur when the woman's subjective experience of the birth becomes intolerable and involves an emerging division of the personality that manifests in various acute dissociative symptoms (Engelhard et al., 2003; Lev-Wiesel and Daphna-Te-koah, 2010; Olde et al., 2005; Van der Hart et al., 2006; Van Son et al., 2005). To avoid dissociative reactions, hospital staff could bolster women's coping abilities to contain intense perinatal negative emotional responses by offering support and information (Soet et al., 2003). The support and information provided during birth could reduce negative appraisals that can lead to PTSD (Lyons, 1998; Pantlen and Rohde, 2001; Wijma et al., 1997; Zaers et al., 2008).

The aim was to develop a model to predict PTSD symptom severity. Only two previous studies examined childbirth-related etiological models (Garthus-Niegel et al., 2013; Van Son et al., 2005). The current model-testing study is the first to correct for multiple hypotheses testing, to collect perinatal data within days after birth to minimize recall bias birth (Hassan, 2006), and measure all PTSD DSM-IV (APA, 1994) symptom domains. It is expected that:

- increased antenatal dissociative tendencies and perinatal negative emotional responses predict increased perinatal somatoform and psychoform dissociative reactions,
- increased antenatal state anxiety and depressive symptoms, perinatal negative emotional responses and somatoform and psychoform dissociative symptoms, predict increased postpartum PTSD severity,
- increased antenatal state anxiety and depressive symptoms, and perinatal, more severe modes of birth, predict increased postpartum PTSD severity via increased perinatal negative emotional responses and
- increased perinatal support, information given and felt listened

to by staff, predict decreased perinatal negative emotional responses.

## 2. Methods

### 2.1. Sample

Participants were pregnant Caucasian women who lived in a suburban region in the southern part of the Netherlands. All participants were clients of midwife practices. The study was conducted from September 2001 until April 2004. A total of 505 women completed antenatal questionnaires, 413 (81.8%) completed questionnaires during the first week postpartum, 436 (86.3%) completed questionnaires three months postpartum, and 284 (56%) completed questionnaires ten months postpartum. Data from 348 (68.9%) women were eligible to be compared over the first three measurement intervals (three months postpartum model) and data from 284 (56%) women were available for the ten months postpartum model (see flowchart Fig. 1). Demographic and birth characteristics are provided in Table 1. The reported elective (2.6 vs. 6.7%) and emergency cesarean section rates (4.9 vs. 8.2%) were somewhat lower compared to Dutch overall childbirth trends in during 1999–2012 (Stichting Perinatale Registratie Nederland (Foundation Perinatal Registration), 2013). Also, no infant death was reported during birth. Though the present sample was considered representative of the Dutch population of pregnant women, certain elements, like the lower section rates and lack of birth-related loss, may be associated with low-risk populations.

During antenatal care visits, midwives prepared women for birth via maternity consultation and checkups. Midwives made recommendations about baby yoga, pregnancy gym, and offer information (oral and brochures) about modes of birth and practical birth expectations. These visits took place on a monthly basis that gradually increased in frequency during the last months of pregnancy. Care was likely delivered by different midwives, though the women were often well known with the midwife that provided care during birth from care intervals throughout the pregnancy. Midwives made several postpartum routine consultation visits during the first six weeks.

A comparison between completers and dropouts revealed one significant difference at three months postpartum; participating women were older compared to non-participating women (mean age 31.1 vs 30.2 years,  $p=.01$ ). Two differences were detected at ten months postpartum: mean age (31.2 vs 30.3 years,  $p=.01$ ), and antenatal depression (EPDS score 7.5 vs 8.8,  $p=.03$ ).

### 2.2. Antenatal measures

The State Anxiety Inventory (STAI; Spielberger et al., 1970) has been used in various studies on childbirth-related PTSD. The state version uses 20 items to assess how people feel right now. Items are scored from 1 to 4. The sum scores range from 20 to 80. Higher scores indicate greater levels of anxiety. The internal consistency of the scale for the present sample was excellent (Cronbach's alpha.92).

The Dissociative Experiences Scale-Taxon (DES-T; Waller et al., 1996) was used to assess a dissociative trait, or rather dissociation of the personality. Two primary themes or content areas are represented by DES-T items: amnesia for dissociative states and derealization or depersonalization. The DES-T contains eight items with scores ranging between 0 and 100 on an 11-point scale: 0 indicating never and 100 indicating present all of the time. The internal consistency was satisfactory (Cronbach's alpha.64).

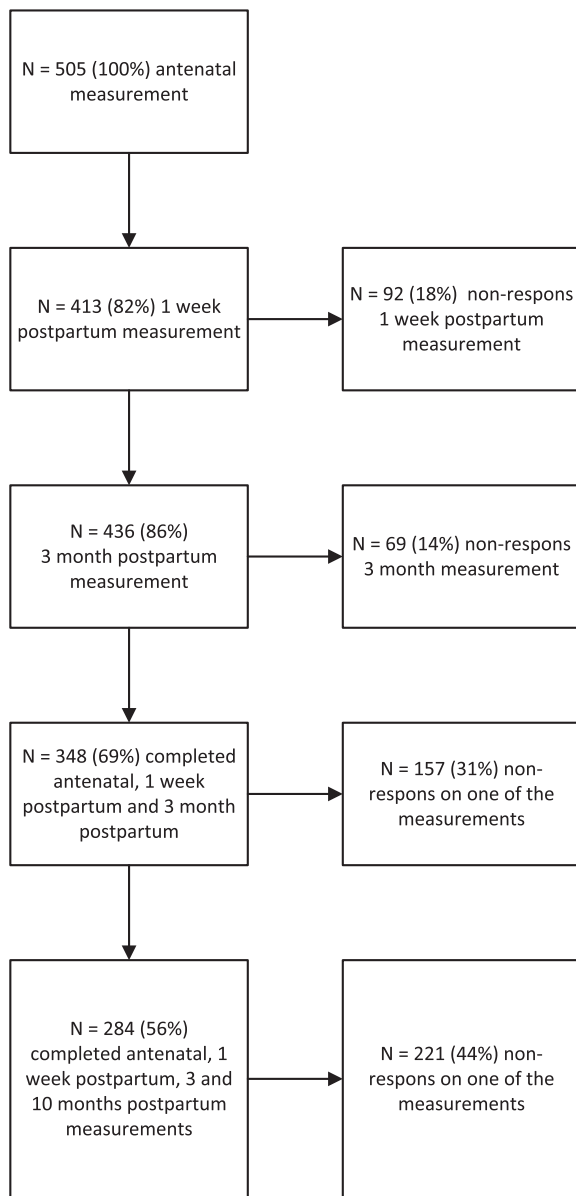


Fig. 1. Participant flowchart.

The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) is a 10-item scale that assesses the level of depressive symptoms during pregnancy and in the postpartum phase. Each item is scored from 0 to 3 according to increasing symptom severity. Sum scores range from 0 to 30. The EPDS has good psychometric properties and has been validated in the Netherlands (Pop et al., 1992). A cut-off value  $\geq 13$  was used to define “high depressive symptomatology”, representing an adequate level of specificity (Gaynes et al., 2005). The internal consistency was good (Cronbach’s  $\alpha=0.82$ ).

### 2.3. Perinatal measures

Mode of birth was assessed by a standardized form regularly used by midwives and gynecologists in the Netherlands. The sample was divided into five modes of birth: (1) spontaneous at home, with the aid of a midwife or general practitioner; (2) spontaneous at hospital; (3) birth with induction; (4) birth with vacuum extraction; and (5) birth by Cesarean section. Births that were not spontaneous were labeled instrumental. Mode of

**Table 1**  
Antenatal, perinatal, and postpartum demographic data.

Demographics		
<i>Antenatal</i>		
<b>Marital status</b>		<b>Numbers (%)</b>
Married or living together		344 (98.9)
<b>Given birth</b>		
Never		147 (42.2)
Once		161 (46.3)
Multiple times		40 (11.5)
<b>Education</b>		
Lower general secondary education		188 (54.0)
Higher general secondary education and pre-university education		32 (9.20)
Higher vocational education and university		128 (36.8)
<b>Occupation</b>		
Paid work		311 (89.6)
Unemployed		36 (10.4)
<b>Psychological factors</b>		
Depression during pregnancy (EPDS $\geq 13$ score)		43 (12.5)
Family history of depression		70 (20.4)
<b>Questionnaires</b>	<b>Scale acronym</b>	<b>Mean (SD)</b>
Depression	EPDS	7.7 (3.8)
State anxiety	STAI	29.1 (7.8)
Dissociation	DES-T	16.5 (26.5)
<i>Perinatal</i>		
<b>Mode of birth</b>		<b>Numbers (%)</b>
Spontaneous at home		166 (47.8)
Spontaneous at hospital		85 (24.5)
After induction vaginally		42 (12.1)
Vacuum extraction		28 (8.1)
Elective cesarean section		9 (2.6)
Emergency cesarean section		17 (4.9)
<b>Questionnaires</b>		<b>Mean (SD)</b>
Psychoform dissociation	PDEQ	18.4 (6.4)
Somatoform dissociation	SDQ-P	13.6 (3.9)
Peritraumatic emotions	PEL	19.7 (6.6)
Support delivered by staff	SUPPORT	37.7 (3.1)
Information delivered by staff and feeling listened to	INFO	8.5 (1.6)
<i>Postpartum</i>		
<b>Questionnaires</b>		<b>Mean (SD)</b>
PTSD 3 months postpartum	PSS-SR	4.17 (4.13)
PTSD 10 months postpartum	PSS-SR	3.54 (3.78)

Antenatal: Edinburgh Postnatal Depression Scale (EPDS); State Anxiety Inventory (STAI); Dissociative experiences taxon (DES-T). Perinatal: Peritraumatic Dissociative Experiences Questionnaire (PDEQ); Somatoform Dissociation Questionnaire-Peritraumatic (SDQ-P); Peritraumatic Emotions List (PEL); Postpartum: PTSD Symptom Scale (PSS-SR). *N* ranges between 348 and 342 with exception of PSS-SR score at 10 months (*N*=284)

birth was considered an ordinal variable in which each mode becomes more invasive.

Several measures were used to assess the women’s contact with the medical staff (hospital staff and midwives). Two single items were constructed on a 5-point Likert scale to examine whether women were given information and felt that they were being listened to. These items were pooled into a sum score (range 2–10) and refer to the variable ‘info’ in our model. The internal consistency of the scale was excellent (Cronbach’s  $\alpha=0.98$ ). In addition, a scale was created to measure the amount of support women experienced from the medical staff. The scale consisted of eight items, and responses ranged from 1 to 5 with sum scores from 5 to 40. The items contact with medical staff and perceived support were constructed by one of the authors [EO]. Women

were asked, “How would you describe the way you were treated by your birth attendant?” Example answers were: “supportive” or “sympathetic”. The internal consistency of the scale was excellent (Cronbach’s alpha.94).

The presence and severity of 12 negative emotions during a stressful event (i.e., childbirth) were assessed using the Peritraumatic Emotions List (PEL; Van der Velden et al., 1992). Examples of negative emotions were: fear, powerlessness, horror, and guilt. The items were scored on a 5-point Likert scale, sum scores ranged from 12 to 60. The internal consistency of the scale was good (Cronbach’s alpha.79).

Psychoform peritraumatic dissociation was assessed with the Dutch version of the Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1997), a ten-item questionnaire for assessing the subject’s recall of experiences during the trauma. Birth was set as the critical event. Items include de-realization, depersonalization, amnesia, and out-of-body experiences, rated on a scale from 1 to 5. The internal consistency for the scale was good (Cronbach’s alpha.86).

The Somatoform Dissociation Questionnaire-Peritraumatic (SDQ-P; Nijenhuis and Van der Hart, unpublished document) evaluates somatoform manifestations of dissociation during or immediately following an overwhelming event. Somatoform symptoms pertain to functions of movement, sensation, and perception. The items were derived from clinical observations, clinical reports in the literature, and the somatoform dissociation scale SDQ-20 (Nijenhuis et al., 1996). The SDQ-P has good internal consistency and convergent validity, as it is strongly associated with the PDEQ (Nijenhuis et al., 2001). The internal consistency of the scale was satisfactory (Cronbach’s alpha.65).

#### 2.4. Postpartum measures

The PTSD Symptom Scale (PSS-SR; Arntz, 1993 [Dutch translation]; Foa et al., 1993) assessed the severity of the 17 DSM-IV posttraumatic stress symptoms. The instrument has a 4-point scale with sum scores ranging from 0 to 51. Respondents had to report at least one intrusion (B criterion), three avoidance (C criterion), and two arousal symptoms (D criterion), and report a sum score of at least 18 to meet the symptom criteria for a PTSD diagnosis (Dunmore et al., 1999). The internal consistency of the scale was good (Cronbach’s alpha.81).

#### 2.5. PTSD caseness

In order to meet the DSM-IV stressor (A) criterion as a “traumatic experience”, participants had to believe that their or their baby’s life was threatened, or that they or their babies were being harmed during childbirth (A1), and report feelings of fear, powerlessness, or horror (A2). The PTSD diagnosis was based on fulfillment of the DSM-IV A–E criterias.

#### 2.6. Procedure

The prospective longitudinal research design included four assessment points. Women were approached during pregnancy and informed about the study by the midwife. All participants provided informed consent. This study was approved by the medical ethical committee of Máxima Medical Centre in Eindhoven/Veldhoven. The antenatal assessment occurred around the 18th week of pregnancy. Women were visited in their homes and asked to answer a set of oral questions and fill out the antenatal self-report questionnaires. In the first week postpartum, participants filled out the perinatal self-report questionnaires. The midwife collected the questionnaires during a visit eight days postpartum. The three and ten months postpartum self-report questionnaires were sent to the

participants’ home address via the mail.

#### 2.7. Statistical analysis

SPSS 20 was used to compute prevalence rates and cross tabs, and MPlus 7 for Pearson’s correlations and path analyses. All predictors were simultaneously entered into two models (three and ten months postpartum) using “forced entry” to increase future replication (Field, 2009). Both models were analyzed separately due to differences in the recovery process after birth; during the first three months women are still recovering from the physical and psychological impact of birth and have not resumed work because of maternity leave. Most women recovered after ten months from birth-related physical symptoms and resumed work. No co-variance between variables was pre-specified. We used the false discovery rate (FDR) to correct for multiple hypotheses testing because it increases power and minimizes the rejection of true null hypotheses compared to other correction methods (Benjamini and Hochberg, 1995).

Several goodness of fit indices were used to examine model fit (Hu and Bentler, 1999). The chi-square test ( $\chi^2$ ) was used as a measure of the discrepancy between the observed matrix and the model-based matrix. A non-significant  $\chi^2$  refers to a similarity between the observed data and the data as represented in the model. The Tucker Lewis Index (TLI) and Confirmatory Fit Index (CFI) measured the proportionate improvement of fit by comparing the target model to a more restricted model. TLI and CFI compensate for model complexity and are not influenced by sample size. The root mean square estimate of approximation (RMSEA) assessed how well an a priori model reproduced the sample data. Both the TLI and CFI should be greater than .95, but the RMSEA value should be less than .05 to indicate good fit. A RMSEA value as high as .08 represents reasonable fit. The significance level was .05.

### 3. Results

None of the women experienced birth-related loss. Birth was characterized as a traumatic experience for 73 (21%) of the 348 women. Crosstab analyses revealed a greater number of women with traumatic childbirth experiences in instrumental births than spontaneous births ( $\chi^2=13.3$ ,  $p<.05$ ). Home births and elective Cesarean sections had the lowest rate of traumatic childbirth experience (14.5% and 12.5% respectively), whereas emergency Cesarean section resulted in the highest rate (47.1%). Significantly more mothers experienced a traumatic childbirth ( $\chi^2=7.81$ ,  $p<.01$ ) in the hospital (27%) than at home (14.5%). Three months postpartum, six women (1.7%) scored above the PSS-SR symptom criteria scores and fulfilled the DSM-IV A criterion for a traumatic childbirth experience. Two (.57%) women fulfilled all PTSD DSM-IV criteria. At ten months, two (.70%) of the 284 women scored above the symptom criteria, and one (.35%) fulfilled all DSM-IV criteria.

#### 3.1. Three months postpartum model predicting PTSD severity

The correlation matrix is reported in Table 2. The three month postpartum model displayed reasonable ( $\chi^2=29.477$ ,  $df=16$ ,  $p=.02$ ) to good (TLI=.92, CFI=.96, RMSEA=.05) fit indices. Note that chi-square might not be the best fit statistic due to the relatively large sample population ( $N=348$ ). Table 3 and Fig. 2 present an overview of the model results.

Antenatal state anxiety ( $\beta=.17$ ,  $p<.01$ ), depressive symptoms ( $\beta=.15$ ,  $p<.05$ ), perinatal psychoform ( $\beta=.17$ ,  $p<.01$ ), and somatoform ( $\beta=.17$ ,  $p<.01$ ) dissociation predicted postpartum PTSD severity. Antenatal dissociative tendencies predicted perinatal



**Table 2**  
Correlation matrix for the models at three and ten months postpartum.

Measure	1	2	3	4	5	6	7	8	9	10	11
1. Antenatal depression	-										
2. Antenatal dissociation	.37*	-									
3. Antenatal anxiety	.64*	.41**	-								
4. Perinatal somatoform dissociation	.24**	.25**	.26**	-							
5. Perinatal psychoform dissociation	.25**	.25**	.26**	.31**	-						
6. Perinatal emotions	.28**	.14**	.33**	.32**	.44**	-					
7. Perinatal Mode of birth	-.05	.04	-.02	.01	.13*	.18**	-				
8. Perinatal Staff support	-.15**	-.15**	-.17**	-.13*	-.07	-.26**	-.34**	-			
9. Perinatal Staff information	-.08	-.10	-.11**	-.06	-.15**	-.23**	-.04	.34**	-		
10. Postpartum PTSD 3 Months	.36**	.32**	.37**	.32**	.33**	.31**	.05	-.13*	-.10	-	
11. Postpartum PTSD 10 Months	.44**	.33**	.38**	.29**	.20**	.27**	.04	-.15*	.02	.54**	-

\*  $p < .05$ .\*\*  $p < .001$ .**Table 3**  
Results model predicting PTSD symptom severity at 3 ( $N=348$ ) and 10 months ( $N=284$ ) postpartum (S.E. in the parentheses).

Variable	Predicts variable	3 months postpartum artum			10 months postpartum				
		B	$\beta$	p	95% CI ( $\beta$ )	B	$\beta$	p	95% CI ( $\beta$ )
Postpartum PTSD									
Antenatal depression		.16(.07)	.15(.06)	.02*	[.03, .27]	.31(.07)	.31(.07)	.00**	[.17, .44]
Antenatal anxiety		.09(.03)	.17(.06)	.008*	[.05, .29]	.06(.04)	.12(.07)	.10	[−.02, .26]
Perinatal psychoform dissociation		.11(.03)	.17(.05)	.002*	[.07, .28]	.01(.04)	.01(.06)	.88	[−.11, .13]
Perinatal somatoform dissociation		.17 (.05)	.17(.05)	.001*	[.07, .27]	.14(.06)	.14(.06)	.02*	[.02, .26]
Perinatal emotions		.05(.03)	.08(.06)	.14	[−.03, .19]	.06(.04)	.10(.06)	.13	[−.03, .22]
Perinatal emotions									
Antenatal depression		.19(.11)	.11(.07)	.09	[−.02, .24]	.19(.12)	.11(.07)	.10	[−.02, .24]
Antenatal anxiety		.19(.06)	.23(.07)	.001*	[.10, .36]	.20(.06)	.23(.07)	.00**	[.10, .36]
Perinatal staff support		−.22(.13)	−.10(.06)	.08	[−.22, .01]	−.22(.13)	−.10(.06)	.09	[−.22, .01]
Perinatal staff information [−.26,−.01]		−.67(.22)	−.16(.05)	.003*	[−.26, −.06]	−.67(.22)	−.16(.05)		.003*
Perinatal mode of birth [.04, .25]		.77(.28)	.15(.05)	.006*	[.04, .25]	.77(.28)	.15(.05)		.006*
Perinatal somatoform dissociation									
Antenatal dissociation		.03(.01)	.21(.05)	.00**	[.11, .31]	.03(.01)	.21(.05)	.00**	[.11, .31]
Perinatal emotions		.17(.03)	.29(.05)	.00**	[.20, .39]	.17(.03)	.30(.05)	.00**	[.20, .39]
Perinatal psychoform dissociation									
Antenatal dissociation		.05(.01)	.19(.05)	.00**	[.09, .28]	.05(.01)	.19(.05)	.00**	[.10, .28]
Perinatal emotions		.40(.05)	.42(.04)	.00**	[.33, .50]	.40(.05)	.42(.04)	.00**	[.33, .50]

\*  $p < .05$ .\*\*  $p < .001$ .

somatoform ( $\beta=.21$ ,  $p < .001$ ) and psychoform ( $\beta=.19$ ,  $p < .001$ ) dissociation. Antenatal state anxiety ( $\beta=.23$ ,  $p=.001$ ), perinatal information given by staff and feeling listened to ( $\beta=-.16$ ,  $p < .01$ ), and mode of birth ( $\beta=.15$ ,  $p < .01$ ) predicted negative perinatal emotional responses. Antenatal depressive symptoms ( $p=.09$ ) and perinatal staff support ( $p=.08$ ) did not predict emotional responses. Negative emotional responses did not predict PTSD severity at three months ( $p=.14$ ), but did predict perinatal somatoform ( $\beta=.29$ ,  $p < .001$ ) and psychoform ( $\beta=.42$ ,  $p < .001$ ) dissociation. A closer inspection of the indirect effect of negative emotional responses on PTSD symptoms via psychoform and somatoform dissociation showed a significant standardized total effect ( $\beta=.20$ ,  $SE=.005$ ,  $p < .001$ ), and indirect effects ( $\beta=.049$ ,  $SE=.017$ ,  $p < .01$ ). Whereas the direct effect of negative emotional responses was not significant ( $\beta=.083$ ,  $SE=.055$ ,  $p=.14$ ). All significant findings remained significant after correcting for multiple hypotheses testing. The model accounted for 24% ( $p < .001$ ) of the

PTSD symptom variability.

### 3.2. Ten months postpartum model predicting PTSD severity

The postpartum model exhibited fit indices that were just below suggested cut-off values ( $\chi^2=35.98$ ,  $df=16$ ,  $p=.003$ ) (TLI=.87, CFI=.93, RMSEA=.06). Table 3 and Fig. 3 present an overview of the model results. Antenatal depressive symptoms ( $\beta=.31$ ,  $p < .001$ ) and perinatal somatoform dissociation ( $\beta=.14$ ,  $p < .05$ ) predicted the severity of postpartum PTSD. Antenatal dissociative tendencies ( $\beta=.21$ ,  $p < .001$ ) predicted perinatal somatoform dissociation. Antenatal state anxiety ( $\beta=.23$ ,  $p < .001$ ), perinatal information given by staff and feeling listened to ( $\beta=-.16$ ,  $p < .01$ ), and mode of birth ( $\beta=.15$ ,  $p < .01$ ) predicted negative emotional responses. Antenatal depressive symptoms ( $p=.10$ ) and perinatal staff support ( $p=.08$ ) did not predict negative emotional responses. Negative emotional responses did not

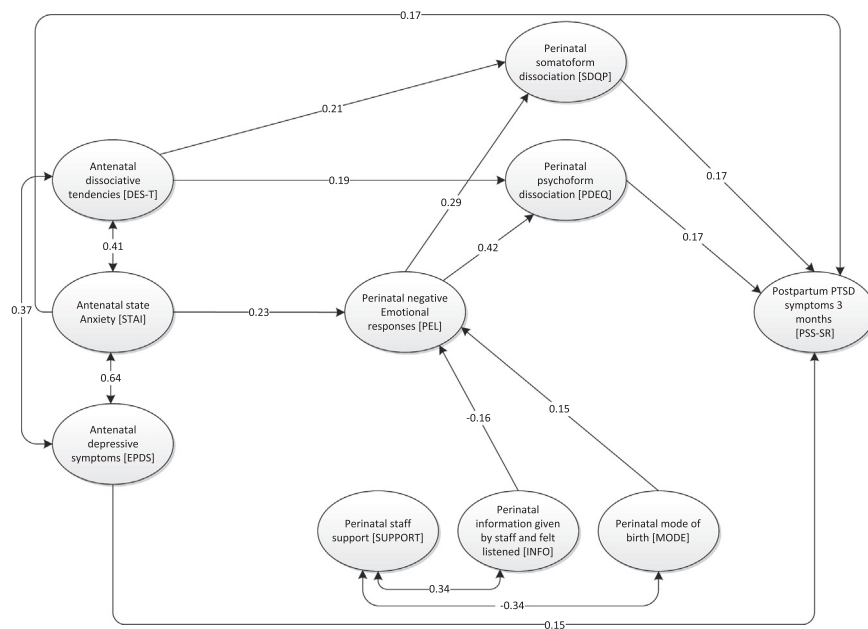


Fig. 2. Transactional stress model: empirical results 3 months postpartum.

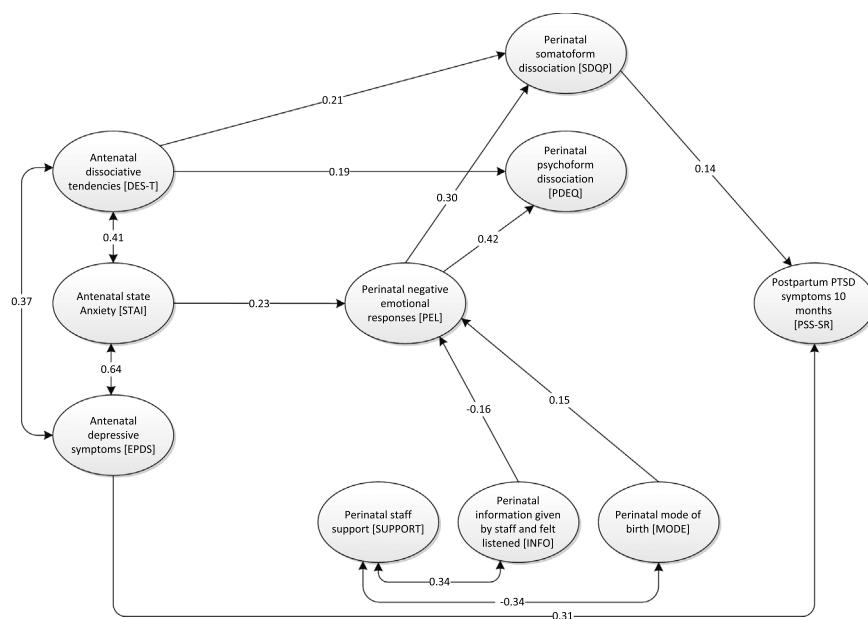


Fig. 3. Transactional stress model: empirical results 10 months postpartum.

predict PTSD severity ( $p=.13$ ), but did predict somatoform dissociation ( $\beta=.30$ ,  $p<.001$ ). A closer inspection of the indirect effect of negative emotional responses on PTSD severity via somatoform dissociation showed a significant standardized total effect ( $\beta=.14$ ,  $SE=.058$ ,  $p<.05$ ) and standardized indirect effect of psychoform dissociation ( $\beta=.041$ ,  $SE=.019$ ,  $p<.05$ ). The standardized direct effect was not significant ( $\beta=.10$ ,  $SE=.063$ ,  $p=.13$ ). All significant effects remained significant after multiple hypotheses testing. The model accounted for 24% ( $p<.001$ ) of the PTSD symptom variability.

#### 4. Discussion

The current study assessed risk factors in an etiological model of childbirth-related PTSD symptom severity. Childbirth was rated

as traumatic by 21% of the respondents, which fits within the range of traumatic births (i.e., 9–48%) in the scientific literature (Alcorn et al., 2010; Ayers et al., 2009; Creedy et al., 2000; Olde et al., 2005; Soet et al., 2003; Stamrood et al., 2011; Turton et al., 2001). The childbirth-related PTSD prevalence rate was .57% and .35% at three and ten months postpartum. Both rates are lower than the average childbirth-related prevalence rates (Grekin and O'Hara's, 2014). Antenatal depression predicted PTSD severity at three and ten months postpartum. Antenatal anxiety predicted PTSD severity at three months postpartum. Negative emotional responses during birth did not predict PTSD severity, unlike previous studies (Goutaudier et al., 2012; Lemola et al., 2007; Olde et al., 2005; Pantlen and Rohde, 2001). Instead, negative emotional responses predicted severity via psychoform and somatoform dissociation at three months postpartum, and via somatoform dissociation at ten months postpartum. The information hospital

staff and midwives provided during birth and their acknowledgment of the needs of women in their care, helped decrease negative emotional responses during birth.

#### 4.1. Interpretation prevalence rates

There are a number of explanations for the low PTSD rates in the current sample. Pregnant women with pregnancy complications possibly went directly to an obstetrician instead of partaking in this study. None of the women experienced a traumatic loss. Also, home births are a well-respected practice in the Netherlands for uncomplicated births, with hospitals and specialist care usually nearby in case of complications. Home birth offers an emotionally safe and familiar environment, which could decrease the intensity of negative emotions and cognitions and PTSD (Stamrood et al., 2011). PTSD prevalence rates furthermore depend on methodological choices, such as: the application of a cut-off score versus the DSM-IV criteria, and the time of postpartum measurement; prevalence rates decreased over time.

#### 4.2. Interpretation risk factors

Current results support a possible ‘recall bias’ of negative (traumatic) experiences among depressive pregnant women (Ford and Ayers, 2011). Alternatively, depression may—similar to dissociation—decrease the “integrative capacity” to process traumatic memories (Hassan, 2006; Van Son et al., 2005). Even if the results are attributable to some overlap between the PTSD and depression constructs (Söderquist et al., 2009), depression remains a practical risk indicator. The results refute Lev-Wiesel et al. (2009) hypothesis that antenatal depression predicts PTSD symptoms via negative emotional responses due to a lack of mental resources for coping with peritraumatic distress. Unlike depression, antenatal anxiety appears to exert most of its influence via negative emotions during birth, possibly due to existing elevations of anxiety or fear during childbirth (Fairbrother and Woody, 2007; Zaers et al., 2008). It is a useful indicator of the intensity of birth-related negative emotions. Such emotional reactions likely indicate that birth was appraised as threatening and difficult to control (Czarnocka and Slade, 2000). The emotions appear to overwhelm the individual and evoke dissociative symptoms that interfere with the integration of traumatic memories (Van der Kolk and Van der Hart, 1989). Pregnant women who exhibit a predisposition for dissociative reactions are at a greater risk of perinatal dissociation.

The information staff provide and their attentiveness to the needs of their patients during birth may create a sense of control and help regulate negative perinatal emotions (Lyons, 1998; Van Son et al., 2005). This might prevent perinatal dissociation which mediated subsequent PTSD symptom severity. Regulating negative emotions appears to become increasingly important during more invasive modes of birth if they elicit additional feelings of distress and helplessness (Fisher et al., 1997). In contrast to previous research (Lyons, 1998), the extent to which hospital staff and midwives were supportive did not influence negative emotional responses. Maggioni et al. (2006) stated that perceived support may ‘buffer’ women’s birth reactions only among a subsample of highly anxious women, which could explain why no significant relationship was found in the present sample.

#### 4.3. Strengths and limitations

The current study is one of the first to test a prospective longitudinal model of childbirth-related PTSD severity. It includes advanced statistical techniques and controlled for “multiple hypotheses testing”. Perinatal data was acquired within days of birth to minimize recall bias. There are a number of limitations. Almost

a third of our sample was lost at three months postpartum, and 44% at ten months. Although the response rate probably did not compromise the results, the prevalence rates may be less suited to generalize due to the study attrition and the presence of sample elements associated with low-risk populations. The sample size was relatively small considering the complexity of the model and does not allow for cross-validation. The present study did not control for prior PTSD which could distort the results, though this is not expected because participants were only asked to rate their childbirth-related PTSD symptoms. The PTSD DSM-IV A criterion was not considered an exclusion criteria for the path analysis because negative events and emotions that do not satisfy the A criterion can cause symptoms that would otherwise qualify as a PTSD diagnosis (Rubin et al., 2008). Therefore, the current results provide valuable information about PTSD development. The F criterion was not investigated, its inclusion may decrease prevalence rates. Mode of birth was considered an ordinal instead of categorical variable on a conceptual basis, this choice is debatable and its results should be interpreted with caution. The fit index of the ten months model was just below suggested cut-off values and questions the validity of the model, however, the results are very similar to the three months model which had acceptable fit indices. The current model explains only a part of the variation in symptom severity, it would be meaningful to investigate other predictors, such as the role of cognitions.

## 5. Conclusions

During pregnancy, anxious and depressive pregnant women run a greater risk of postpartum PTSD symptoms (Czarnocka and Slade, 2000; Ford and Ayers, 2011; Garthus-Niegel et al., 2013; Soet et al., 2003; Zaers et al., 2008). Anxious pregnant women also run a greater risk of experiencing negative emotions during pregnancy. Women with high levels of perinatal negative emotions were subsequently more likely to dissociate under intense stress, which may cause PTSD symptoms (Goutaudier et al., 2012). Women should be screened during pregnancy for antenatal anxiety, depression, and dissociative tendencies, for they are most likely to develop PTSD. Anxious pregnant women could perhaps benefit from techniques to help them regulate their emotional state during birth. Pregnant women may also be able to better cope with negative emotional reactions during birth, if health care professionals provide information about procedures, expectations, and possible emotional reactions during pregnancy (Lyons, 1998; Van Son et al., 2005).

During birth, hospital staff and midwives are encouraged to supply women with information about birth procedures (Soet et al., 2003), and respond to their needs. These actions appear more important than offering emotional support. Adequate information and need-response are likely to decrease negative emotions and increase the amount of control women experience (Lyons, 1998), especially when births become more invasive (Fisher et al., 1997). This might prevent psychoform and somatoform perinatal dissociation, which could lead to subsequent PTSD symptoms.

McNally (2009) argued that the conceptual bracket creep for PTSD allows almost anyone to be considered a trauma survivor. As an example of misuse, McNally referred to women diagnosed with PTSD after giving birth to healthy babies during uncomplicated births (Olde et al., 2005). The current study found no indication of a conceptual bracket creep and demonstrated that women can experience symptoms after birthing healthy babies in uncomplicated births that may accumulate into PTSD. Conceptual bracket creep is a legitimate issue that requires ongoing awareness and self-reflection in how researchers and therapists interpret

PTSD. Though only a small minority of women develop PTSD after birth, health care practitioners should be wary to simply dismiss this possibility as “nonsense”.

## Conflicts of interest

None.

## Role of funding source

No funding has been provided by a commercial company, charity or government department.

## Acknowledgments

We thank Prof. dr. Victor Pop, dr. Hennie Wijnen, and dr. Loes Molen for their assistance with the METC details.

## References

- Adewuya, A.O., Ologun, Y.A., Ibigbami, O.S., 2006. Post-traumatic stress disorder after childbirth in Nigerian women: prevalence and risk factors. *BJOG* 113, 284–288. [10.1111/j.1471-0528.2006.00861.x](http://dx.doi.org/10.1111/j.1471-0528.2006.00861.x).
- Alcorn, K.L., O'Donovan, A., Patrick, J.C., Creed, D., Devilly, G.J., 2010. A prospective longitudinal study of the prevalence of post-traumatic stress disorder resulting from childbirth events. *Psychol. Med.* 40, 1849–1859. [10.1017/S0033291709992224](http://dx.doi.org/10.1017/S0033291709992224).
- American Psychiatric Association, 1994. *Diagnostic and Statistical Manual of Mental Health Disorders* (4th ed). Author, Washington, DC.
- American Psychiatric Association, 2013. *Diagnostic and statistical manual of mental disorders*, 5th ed. American Psychiatric Publishing, Arlington, VA.
- Arntz, A., 1993. Dutch translation of the PSS-SR. Universiteit Maastricht, The Netherlands, Author.
- Ayers, S., Harris, R., Sawyer, A., Parfitt, Y., Ford, E., 2009. Posttraumatic stress disorder after childbirth: analysis of symptom presentation and sampling. *J. Affect. Dis.* 119, 200–204. <http://dx.doi.org/10.1016/j.jad.2009.02.029>.
- Benjamini, Y., Hochberg, Y., 1995. Controlling the false discovery rate: A practical and powerful approach to multiple testing. *J. R. Stat. Soc. Ser. B* 57, 289–300.
- Boudou, M., Séjourné, N., Chabrol, H., 2007. Douleur de l'accouchement, dissociation et détresse périnatales comme variables prédictives de symptômes de stress post-traumatique en post-partum [Childbirth pain, perinatal dissociation and perinatal distress as predictors of posttraumatic stress symptoms]. *Gynéc. Obstét. Fertil.* 35, 1136–1142.
- Cox, J.L., Holden, J.M., Sagovsky, R., 1987. Detection of postpartum depression: Development of the 10-item Edinburgh Postpartum Depression Scale. *Br. J. Psychiatry* 150, 782–786.
- Creedy, D.K., Shochet, I.M., Horsfall, J., 2000. Childbirth and the development of acute trauma symptoms: Incidence and contributing factors. *Birth* 27, 104–111. <http://dx.doi.org/10.1046/j.1523-536x.2000.00104.x>.
- Czarnocka, J., Slade, P., 2000. Prevalence and predictors of post-traumatic stress symptoms following childbirth. *Br. J. Clin. Psychol.* 39, 35–51. <http://dx.doi.org/10.1348/014466500163095>.
- Dunmore, E., Clark, D.M., Ehlers, A., 1999. Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behav. Res. Ther.* 37, 809–829. [http://dx.doi.org/10.1016/S0005-7967\(98\)00181-00188](http://dx.doi.org/10.1016/S0005-7967(98)00181-00188).
- Engelhard, I.M., Van den Hout, M.A., Kindt, M., Arntz, A., Schouten, E., 2003. Peritraumatic dissociation and posttraumatic stress after pregnancy loss: a prospective study. *Behav. Res. Ther.* 41, 67–78. [http://dx.doi.org/10.1016/S0005-7967\(01\)00130-00139](http://dx.doi.org/10.1016/S0005-7967(01)00130-00139).
- Fairbrother, N., Woody, S.R., 2007. Fear of childbirth and obstetrical events as predictors of postnatal symptoms of depression and post-traumatic stress disorder. *J. Psychosom. Obst. Gynecol.* 28. <http://dx.doi.org/10.1080/01674820701495065> 239–42.
- Field, A., 2009. *Discovering Statistics Using SPSS*, 3rd Ed. SAGE Publications, London.
- Fisher, J., Astbury, J., Smith, A., 1997. Adverse psychological impact of operative obstetric interventions: A prospective longitudinal study. *Aust. N. Z. J. Psychiatry* 31, 728–738. <http://dx.doi.org/10.3109/00048679709062687>.
- Foa, E.B., Riggs, D.S., Dancu, C.V., Rothbaum, B.O., 1993. Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *J. Trauma. Stress* 6, 459–473. <http://dx.doi.org/10.1007/BF00974317>.
- Ford, E., Ayers, S., 2011. Support during birth interacts with prior trauma and birth intervention to predict postnatal post-traumatic stress symptoms. *Psychol. Health* 26, 1553–1570. <http://dx.doi.org/10.1080/08870446.2010.533770>.
- Stichting Perinatale Registratie Nederland, 2013. *Perinatale registratie Nederland: Grote lijnen 1999–2012* [The Netherlands perinatal registry trends 1999–2012]. Stichting Perinatale Registratie Nederland, Utrecht. Retrieved from: [http://www.perinatereg.nl/uploads/174/146/Perinatale\\_Registratie\\_Nederland\\_-\\_Grote\\_Lijnen\\_1999-2012\\_2.pdf](http://www.perinatereg.nl/uploads/174/146/Perinatale_Registratie_Nederland_-_Grote_Lijnen_1999-2012_2.pdf).
- Garthus-Niegel, S., Von Soest, T., Vollrath, M.E., Eberhard-Gran, M., 2013. The impact of subjective birth experiences on post-traumatic stress symptoms: a longitudinal study. *Arch. Women's Ment. Health* 16, 1–10. <http://dx.doi.org/10.1007/s00737-012-0301-3>.
- Gaynes, B.N., Gavin, N., Meltzer-Brody, S., Lohr, K.N., Swinson, T., Gartlehner, G., et al., 2005. Perinatal depression: prevalence, screening accuracy, and screening outcomes. Summary, Evidence Report/Technology Assessment: Number 119. AHRQ Publication Number 05-E006-1. Agency for Healthcare Research and Quality, Rockville, MD.
- Goutaudier, N., Séjourné, N., Rousset, C., Lami, C., Chabrol, H., 2012. Negative emotions, childbirth pain, perinatal dissociation and self-efficacy as predictors of postpartum posttraumatic stress symptoms. *J. Reprod. Infant Psychol.* 30, 352–362. <http://dx.doi.org/10.1080/02646838.2012.738415>.
- Grekin, R., O'Hara's, M.W., 2014. Prevalence and risk factors of postnatal posttraumatic stress disorder: a meta-analysis. *Clin. Psychol. Rev.* 34, 389–401. <http://dx.doi.org/10.1016/j.cpr.2014.05.003>.
- Hassan, E., 2006. Recall Bias can be a threat to retrospective and prospective research designs. *Internet J. Epidemiol.* 3(2). Retrieved from: <http://archive.is-pub.com>. doi: 10.5580/2732.
- Hu, L., Bentler, P.M., 1999. Cutoff criteria for fit indices in covariance structure analysis: conventional criteria versus new alternatives. *Struct. Equ. Model.* 6, 1–55.
- Kleber, R.J., Brom, D., 1992. *Coping with Trauma: Theory, Prevention and Treatment*. Swets & Zeitlinger, Lisse.
- Lanius, R.A., Vermetten, E., Loewenstein, R.J., Brand, B., Schmahl, C., Bremner, et al., 2010. Emotion modulation in PTSD: clinical and neurobiological evidence for a dissociative subtype. *Am. J. Psychiatry* 167, 640–647. <http://dx.doi.org/10.1176/appi.ajp.2009.09081168>.
- Lazarus, R., Folkman, S., 1984. *Stress, Appraisal, and Coping*. Springer, New York.
- Lemola, S., Stadlmayr, W., Grob, A., 2007. Maternal adjustment five months after birth: the impact of the subjective experience of childbirth and emotional support from the partner. *J. Reprod. Infant Psychol.* 25, 190–202. <http://dx.doi.org/10.1080/02646830701467231>.
- Lev-Wiesel, R., Daphna-Tekoa, S., 2010. The role of peripartum dissociation as a predictor of posttraumatic stress symptoms following childbirth in Israeli Jewish women. *J. Trauma Dissociation* 11, 266–283. <http://dx.doi.org/10.1080/15299731003780887>.
- Lev-Wiesel, R., Chen, R., Daphna-Tekoa, S., Hod, M., 2009. Past traumatic events: are they a risk factor for high-risk pregnancy, delivery complications, and postpartum posttraumatic symptoms. *J. Women's Health*. <http://dx.doi.org/10.1089/jwh.2008.0774>.
- Lyons, S., 1998. A prospective study of post traumatic stress symptoms 1 month following childbirth in a group of 42 first-time mothers. *J. Reprod. Infant Psychol.* 16, 91–105. <http://dx.doi.org/10.1080/02646839808404562>.
- Maggioni, C., Margola, D., Filippi, F., 2006. PTSD, risk factors, and expectations among women having a baby: a two-wave longitudinal study. *J. Psychosom. Obst. Gynecol.* 27, 81–90. <http://dx.doi.org/10.1080/01674820600712875>.
- Marmar, C.R., Weiss, D.S., Metzler, T.J., 1997. The peritraumatic dissociative experiences questionnaire. In: Wilson, J.P., Keane, T.M. (Eds.), *Assessing Psychological Trauma and PTSD: A Handbook for Practitioners*. Guilford, New York, pp. 412–428.
- McNally, R.J., 2009. Can we fix PTSD in DSM-V? *Depress. Anxiety* 26, 597–600. <http://dx.doi.org/10.1002/da.20586>.
- Montmasson, H., Bertrand, P., Perrotin, F., El-Hage, W., 2012. Facteurs prédictifs de l'état de stress post-traumatique du postpartum chez la primipare [Predictors of postpartum post-traumatic stress disorder in primiparous mothers]. *J. Gynéc. Obst. Biol. Reprod.* 41, 553–560. <http://dx.doi.org/10.1016/j.jgyn.2012.04.010>.
- Nijenhuis, E.R.S., Spinhoven, P., Van Dyck, R., Van der Hart, O., 1996. The development and psychometric characteristics of the Somatoform Dissociation Questionnaire (SDQ-20). *J. Nerv. Ment. Dis.* 184, 688–694.
- Nijenhuis, E., Van Engen, A., Kusters, I., Van der Hart, O., 2001. Peritraumatic somatoform and psychological dissociation in relation to recall of childhood sexual abuse. *J. Trauma Dissociation* 2 (3), 47–66. [http://dx.doi.org/10.1300/J229v02n03\\_04](http://dx.doi.org/10.1300/J229v02n03_04).
- Olde, E., Van der Hart, O., Kleber, R.J., Van Son, M.J., Wijnen, H.A.A., Pop, V.J.M., 2005. Peritraumatic dissociation and emotions as predictors of posttraumatic stress symptoms following childbirth. *J. Trauma Dissociation* 6 (3), 125–142. [http://dx.doi.org/10.1300/J229v06n03\\_06](http://dx.doi.org/10.1300/J229v06n03_06).
- Pantlen, A., Rohde, A., 2001. Psychische Auswirkungen traumatisch erlebter Entbindungen [Psychologic effects of traumatic live deliveries]. *Zentralblatt Gynakol.* 123, 42–47.
- Pop, V.J., Komproe, I.H., Van Son, M.J., 1992. Characteristics of the Edinburgh post partum depression scale in The Netherlands. *J. Affect. Dis.* 26 (2), 105–110.
- Rubin, D.C., Berntsen, D., Johansen, M.K., 2008. A memory-based model of post-traumatic stress disorder: evaluating basic assumptions underlying the PTSD diagnosis. *Psychol. Rev.* 115, 985–1011. <http://dx.doi.org/10.1037/a0013397>.
- Söderquist, J., Wijma, B., Thorbet, G., Wijma, K., 2009. Risk factors in pregnancy for post-traumatic stress and depression after childbirth. *BJOG* 116, 672–680. <http://dx.doi.org/10.1111/j.1471-0528.2008.02083.x>.
- Soet, J.E., Brack, G.A., Dilorio, C., 2003. Prevalence and predictors of women's experience of psychological trauma during childbirth. *Birth* 30, 36–46. <http://dx.doi.org/10.1046/j.1523-536x.2003.00215.x>.
- Spielberger, C.D., Gorsuch, R.L., Lushene, R.E., 1970. *Manual for the State-Trait Anxiety Inventory (Self-Evaluation Questionnaire)*. Consulting Psychologists, Palo Alto, CA.



- Stamrood, C.A.I., Paarlberg, K.M., Huis in't Veld, E.M.J., Berger, L.W.A.R., Vingerhoets, A.J.J.M., Schultz, W.C.M.W., et al., 2011. Posttraumatic stress following childbirth in homelike- and hospital settings. *J. Psychosom. Obstet. Gynecol.* 32, 88–97. <http://dx.doi.org/10.3109/0167482X.2011.569801>.
- Turton, P., Hughes, P., Evans, C.D.H., Fainman, D., 2001. Incidence, correlates and predictors of post-traumatic stress disorder in the pregnancy after stillbirth. *Br. J. Psychiatry* 178, 556–560.
- Van der Hart, O., Nijenhuis, E.R.S., Steele, K., 2006. *The Haunted Self: Chronic Traumatization and Structural Dissociation of the Personality*. Norton, New York/London.
- Van der Kolk, B.A., Van der Hart, O., 1989. Pierre Janet and the breakdown of adaptation to psychological trauma. *Am. J. Psychiatry* 146, 1530–1540.
- Van der Velden, P.G., Van der Burg, S., Steinmetz, C.H.D., Van den Bout, J., 1992. Slachtoffers van bankovervallen [Victims of bank robberies]. Bohn Stafleu Van Loghum, Houten.
- Van Son, M.J., Verkerk, G., Van der Hart, O., Komproe, I., Pop, V., 2005. Prepartum depression, mode of delivery, and peripartumnatal dissociation as predictors of postpartum posttraumatic stress: An empirical study. *Clin. Psychol. Psychother.* 12, 297–312.
- Waller, N., Putnam, F.W., Carlson, E.B., 1996. Types of dissociation and dissociative types: a taxometric analysis of dissociative experiences. *Psychol. Methods* 1, 300–321. <http://dx.doi.org/10.1037//1082989X.1.3.300>.
- Wijma, K., Söderquist, J., Wijma, B., 1997. Posttraumatic stress disorder after childbirth: a cross sectional study. *J. Anxiety Disord.* 11, 587–597. [http://dx.doi.org/10.1016/S0887-6185\(97\)00041-00048](http://dx.doi.org/10.1016/S0887-6185(97)00041-00048).
- Zaers, S., Waschke, M., Ehler, U., 2008. Depressive symptoms and symptoms of posttraumatic stress disorder in women after childbirth. *J. Psychosom. Obstet. Gynecol.* 29, 61–71.