Measurement and conceptualization of maternal PTSD following childbirth:

Psychometric properties of the City Birth Trauma Scale – French version (City BiTS-F)

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Abstract

Objective*:** The City Birth Trauma Scale (City BiTS) assesses posttraumatic stress disorder symptoms following childbirth (PTSD-FC). Recent studies investigating the latent factor structure of PTSD-FC in women reported mixed results. No validated French questionnaire exists to measure PTSD-FC symptoms. Therefore, this study firstly aimed to validate the French version of the City BiTS (City BiTS-F). Secondly, it aimed to establish the latent factor structure of PTSD-FC. ***Method: French-speaking women with infants aged 1 to 12 months old (*n* = 541) completed an online cross-sectional survey. Questionnaires included the City BiTS-F, the PTSD Checklist, the Edinburgh Postnatal Depression Scale, and the anxiety subscale of the Hospital Anxiety and Depression Scale. Additionally, sociodemographic and medical data were collected. ***Results:*** The two-factor model with birth-related symptoms (BRS) and general symptoms (GS) fitted the data well, whereas the four-factor model was not confirmed. The bifactor model with a general factor and the BRS and GS gave the best fit to the data, suggesting that use of the total score in addition to the BRS and GS subscales scores is justified. High reliability (α = .88 to .90), and good convergent and divergent validity were obtained. Discriminant validity was calculated with weeks of gestation, gravidity, history of traumatic childbirth and event, and mode of delivery. ***Discussion:*** The City BiTS-F is a reliable and valid measure of PTSD-FC symptoms in French-speaking women. Both, total score and BRS or GS subscale scores can be calculated. This psychometric tool is of importance for clinical and research purposes.

Keywords: PTSD, childbirth, trauma, validation, French

Clinical Impact Statement

The City Birth Trauma Scale (City BiTS) is a measure of posttraumatic stress disorder symptoms following childbirth (PTSD-FC) based on the DSM-5 PTSD criteria (Ayers et al., 2018). The current study established its psychometric properties within a French-speaking postpartum population. Our results suggested that PTSD-FC consists of two components, *birth-related symptoms* (e.g., distressing birth-related flashbacks) and *general symptoms* (e.g., anhedonia, aggressiveness). Mothers with a history of traumatic childbirth, a history of traumatic event or with an emergency caesarean section showed higher PTSD-FC symptoms. The use of this validated psychometric tool is highly recommended within French-speaking postpartum mothers.

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Robust evidence shows that childbirth may fulfil the Diagnostic and Statistical Manual of Mental Disorders, 5th ed (DSM-5) criteria for a traumatic stressor, as mothers may perceive a threat to the life of their and/or their infant's life (American Psychiatric Association, 2013). Indeed, in community samples, 3-4% of mothers develop posttraumatic stress disorder following childbirth (PTSD-FC) (Grekin & O'Hara, 2014; Yildiz et al., 2017). This prevalence increases to 16-19% in high-risk samples, such as following preterm birth or stillbirth (Grekin & O'Hara, 2014; Yildiz et al., 2017). Symptom clusters of PTSD-FC include intrusions, avoidance of reminders, negative cognitions and mood, and hyperarousal (American Psychiatric Association, 2013).

Experiencing PTSD-FC is not only distressing or debilitating for mothers but may also interfere with the couple relationship, their ability to breastfeed, their mother-infant bonding, and their interactions with their infant (Garthus-Niegel et al., 2018; Garthus-Niegel et al., 2018; Horsch et al., 2017) . This in turn may have a negative impact on different aspects of the development of the infant (Cook et al., 2018; Garthus-Niegel et al., 2017; Garthus-Niegel et al., 2018). Early detection of PTSD-FC is thus primordial. Often misdiagnosed for the comorbid condition of postpartum depression, PTSD-FC is overlooked as a concern, a fact supported by the lack of routine screening (Ayers et al., 2018).

Until recently, validated questionnaires measuring PTSD were addressing populations experiencing traumatic events other than childbirth, Therefore, developing a questionnaire specifically to assess PTSD-FC was crucial (McKenzie-McHarg et al., 2015). In response to these difficulties, Ayers and colleagues developed the City Birth Trauma Scale (City BiTS), a self-report questionnaire specifically assessing PTSD-FC symptoms in postpartum women according to DSM-5 (Ayers et al., 2018). This questionnaire was reported to be highly internally consistent, with good psychometric properties (Ayers et al., 2018). Their exploratory factor analyses suggested a two-factor structure: a first factor called *birth-related symptoms*,

consisting of intrusions and avoidance symptoms and a second factor called *general symptoms*, containing negative cognitions and mood, and hyperarousal symptoms (Ayers et al., 2018).

The City BiTS was subsequently validated in other languages, notably in Hebrew (Handelzalts et al., 2018), in Croatian (Nakić Radoš et al., 2020), in Spanish (Caparros-Gonzalez et al., 2021), and in Turkish (Bayrı Bingöl et al., 2020). All four studies confirmed the two-factor structure (Bayrı Bingöl et al., 2020; Caparros-Gonzalez et al., 2021; Handelzalts et al., 2018; Nakić Radoš et al., 2020). Moreover, an excellent data fit emerged with a bifactor model with the general factor and two specific factors of the birth-related symptoms and general symptoms, indicating that subscale scores bring additional value to the City BiTS total score (Nakić Radoš et al., 2020). However, a meta-analysis investigating the structure of PTSD symptoms following other types of traumatic events concluded that lower order models, such as the two- and four-factor models of PTSD symptomatology yielded a better model fit across studies (Yufik & Simms, 2010). This study thus considered the two- and the four-factor models, as well as the bifactor model.

The aims of this study were to validate the French version of the City BiTS (City BiTS-F) in French-speaking women and to determine the latent factor structure of PTSD-FC symptoms. More specifically, our objectives were to: *1)* test the four-factor model with four correlated PTSD-FC symptom clusters (intrusions, avoidance, negative cognitions and mood, and hyperarousal), the two-factor model with two correlated dimensions of PTSD-FC symptoms (birth-related symptoms and general symptoms) and the bifactor model with the general factor and two specific factors of the birth-related symptoms and general symptoms (Ayers et al., 2018; Handelzalts et al., 2018); *2)* determine the reliability of the City BiTS-F; *3)* determine the convergent validity of the City BiTS-F against the PTSD Checklist for DSM-5 (PCL-5); *4)* determine the divergent validity of the City BiTS-F via correlations with the Edinburgh Postnatal Depression Scale (EPDS) and the Hospital Anxiety and Depression Scale – anxiety subscale (HADS-A); and *5)* test the discriminant validity as possible differences in the City BiTS-F total

and subscale scores between known-groups, concerning gravidity, weeks of gestation, mode of birth, history of traumatic childbirth, and history of traumatic event. Thus, based on previous studies of PTSD-FC, we formulated the following hypotheses. The two-factor model yields a better fit to the dataset than the four-factor model (*H1a*). Regarding the bifactor model, due to inconsistent findings, no directional hypothesis was formulated (*H1b*). The City BiTS-F has high internal consistency (*H2*). The City BiTS-F has high convergent validity, with moderate correlations expected between City BiTS-F and PLC-5 (*H3*). The City BiTS-F has high divergent validity, resulting in low correlations with the EPDS (*H4a*) and HADS-A (*H4b*). The City BiTS-F has high discriminant validity with higher levels of PTSD-FC symptoms, as measured by the City BiTS-F, in women who had a lower gravidity, less weeks of gestation, a history of traumatic childbirth, a history of another traumatic event, or an emergency caesarean section would have (*H5*).

Method

Participants

Both, mothers and birth partners were invited to participate in an online cross-sectional study to validate the City BiTS-F (for mothers) or the adapted version of City BiTS-F (for partners). The data collection for the birth partners is still ongoing and will be reported elsewhere; this paper will thus report the data collected for mothers (which is how the original English versions for mothers and partners were validated (Ayers et al., 2018; Webb et al., 2021).

Mothers were eligible if their infants were between 1 to 12 months old, were major, and were French speaking. This study included 541 mothers, of which 58.9% had an unassisted vaginal birth, 17.4% an operative vaginal birth, 15.2% an emergency caesarean section, and 8.5% a planned caesarean section. Further, 22% of participants reported a history of traumatic event or a previous traumatic childbirth (Table 1).

Measures

City Birth Trauma Scale (City BiTS)

The City BiTS comprises 29 items evaluating PTSD-FC symptoms according to the PTSD criteria of DSM-5 (American Psychiatric Association, 2013; Ayers et al., 2018). Exposure to a traumatic stressor (criterion A) is assessed via two items (*yes = 0, no = 1*). Symptom frequency of intrusions (criterion B; 5 items), avoidance (criterion C; 2 items), negative cognitions and mood (criterion D; 7 items), hyperarousal (criterion E; 6 items), as well as symptoms of derealization and depersonalization (PTSD dissociative subtype; 2 items) occurring during the week prior to assessment is measured through a Likert scale (*0 = not at all*, *1 = once*, *2 = 2–4 times*, or *3 = ≥5 times*).

Four additional items evaluate the onset of symptoms (criterion F; *0 = before childbirth*, *1 = ≤6 months following childbirth*, *2 = >6 months following childbirth*, or *NA = no symptoms*) and duration (criterion F; *0 = < 1 month*, *1 = 1–3 months*, or *2 = >3 months*), as well as distress and interference with everyday functioning (criterion G; *0 = yes*, *1 = no* or *2 = sometimes*). The last item assesses potential physical causes to symptoms (exclusion criterion H; *0 = yes*, *1 = no*, or *2 = sometimes*). The total score including criteria B-E items ranges from 0 to 60. A higher score suggests greater severity of PTSD-FC symptoms. The City BiTS comprises two subscales, namely birth-related symptoms and general symptoms. The nine items of the birth-related symptom scale assess symptoms of criteria B and C, as well as those of two birth-related items of the criterion D. The 11-items of the general symptom scale cover the rest of the items of criterion D, and those of criteria E. Internal consistency of the original study was both high for the birth-related symptom scale (α = .83 to .88) and the general symptom scale (α = .92).

The forward-backward method was carried out to translate and culturally adapt the City BiTS (Wild et al., 2005). First, two French-speaking researchers translated the City BiTS into French. Another independent researcher then conducted the back translation into English. This was then discussed and culturally adapted with the authors of this current validation study, as well as the main author of the original English version (Prof. Susan Ayers). All researchers were

experts in the field of perinatal mental health and used to assessing birth-related PTSD criteria of DSM-5. No major discrepancies emerged from the process. A copy of the City BiTS-F is available on the following website, together with all other translated versions (https://blogs.city.ac.uk/citybirthtraumascale/translations).

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5)

The PCL-5 evaluates PTSD symptom severity and frequency over the last month (Blevins et al., 2015). This 20-item self-report questionnaire covering PTSD criteria B-E uses a 5-point Likert scale (*0 = not at all* to *4 = extremely*). The total score results from the sum of the items, and greater scores indicate greater PTSD symptom severity (range: 0-80). The French version showed excellent psychometric properties (Ashbaugh et al., 2016). Internal consistency in our study was excellent (α = .91).

Edinburgh Postnatal Depression Scale (EPDS)

The EPDS is a self-report questionnaire examining postnatal depression symptoms over the last week (Cox et al., 1987). Participants responded to the 10 items on a 4-point Likert scale. The total score ranges from 0 to 40, with a higher score indicating a higher level of symptom severity. Good psychometric properties were reported for the French version of the EPDS (Guedeney & Fermanian, 1998) and internal consistency in this study was excellent (α = 91).

Anxiety Subscale of the Hospital Anxiety and Depression Scale (HADS-A)

The HADS-A is a self-report questionnaire measuring severity of anxiety symptoms over the last week. The 7 items of the HADS-A score on a 4-point Likert scale (Zigmond & Snaith, 1983). A higher total score indicates higher symptom severity (range: 0-21). The French version demonstrated good psychometric characteristics (Bocerean & Dupret, 2014). The Cronbach's alpha in the current study was adequate at .81.

Sociodemographic and Medical Data

Mothers were asked to provide the following information: age, marital status, educational level, history of traumatic event, history of traumatic childbirth, gravidity (i.e., the number of times the participant was pregnant, excluding the last pregnancy), parity, mode of delivery, and weeks of gestation.

Procedure

The online survey was hosted on Sphinx iQ2 and data were stored on a secure server of a Swiss university hospital. Data collection occurred between June and September 2020. This survey was advertised through social media (i.e., Facebook and Instagram), via personal and professional networks, and through nurseries. Participants read an information sheet and agreed to participate before responding to the questionnaires. Data were saved once participants completed the last page of the survey. Therefore, information related to early dropouts was not recorded. The local ethics committee of the Canton de Vaud approved the study stating that an anonymous survey did not require a full approval process. The current study was written up according to the Journal Article Reporting Standards (JARS) for quantitative design (American Psychological Association, 2018).

Following participation in this validation study, participants also had the chance to participate in a second part of the online survey that assessed infant sleep and temperament. Results of this second sub-study are not included in this paper but will be reported elsewhere. Data are available free of charge and without restriction from the open access repository Zenodo (https://doi.org/10.5281/zenodo.4441996) (Sandoz & Horsch, 2021).

Statistical analysis

Descriptive and exploratory analyses were conducted first to ensure that the data was appropriate for factor analysis. We checked that participants used the full range 0 to 3 of responses for all City BiTS-F items. Following the usual best practice for conducting the confirmatory factor analysis, we decided to exclude outliers (Kline, 2011). Four outliers (<1%) were identified based on Mahalanobis distance, with an alpha level of 0.001 applied on

subscale scores. Including the incomplete records, seven participants in total (1.5%) were excluded and the confirmatory factor analysis (CFA) was conducted on 534 mothers. As the City BiTS-F items are ordinal and their distribution skewed, we used a robust weighted least square (WLSMV) estimator (Brown, 2015; Li, 2016). All other analyses were conducted on the full sample of 541 participants. The internal consistency of the questionnaires used for the discriminant analysis was tested with Cronbach's alpha.

Several fit indices were used to evaluate the models: Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR). As a non-significant $\chi 2$ test, indicating a good fit, is rarely obtained with a large data set (Barrett, 2007), we used the statistic adjusted by its degrees of freedom instead. RMSEA values below .06, CFI and TLI values above .95, and SRMR values below .08 indicate a good fit (Hu & Bentler, 1999). According to Kline (2015) , a model demonstrates reasonable fit if the value of $\chi 2/df$ does not exceed 3.0. Following the recommended practices in bifactor analysis (Rodriguez et al., 2016), we evaluated the bifactor model on several ancillary indices, such as the explained common variance (ECV) associated with the general and each specific factor, the individual explained common variances (IECV), the omega hierarchical (ωH), the measure of construct replicability (H), and the factor determinacy (FD). Omega H score of the general factor above 0.80 indicates that the total score can be considered as unidimensional (Reise et al., 2012). H values above 0.80 suggest well-defined latent variable (Reise et al., 2012). Factors with FD below 0.90 should not be used (Gorsuch, 1980).

Reliability was examined as the internal consistency by the Cronbach's alpha coefficient. Convergent and divergent validity were tested with the Pearson's correlation coefficient. Discriminant validity was examined by known group differences with a series of one-way analyses of variance (ANOVA). Kruskal-Wallis rank sum tests were performed in place of one-way ANOVAs when the scores were not normally distributed or when the tests for homogeneity

of variances between groups were significant. Linear regressions were used for continuous variables. Pairwise comparisons with Holm corrections were applied as *post-hoc* tests, when applicable.

All these analyses were conducted with R v4.0.2 running under RStudio v1.1.463, with the lavaan v0.6-7 and psych v2.0.7 packages to help prepare the data and obtain descriptive and psychometric properties of the questionnaires. Significance was reached at <.05.

Results

Descriptive Statistics and Exploratory Analysis

Descriptive analysis showed participants used the full range from 0 to 3 of the City BiTS-F items covering the DSM-5 PTSD criteria B-E. Indices were checked to ensure that the data were appropriate for factor analysis.

Confirmatory Factor Analysis

The four-factor model composed of the intrusions, avoidance, negative cognitions and mood, and hyperarousal factors yielded a poor fit to the data, $\chi 2$ (164) = 923.88, $\chi 2/df$ = 5.63, *RMSEA* = .09, *SRMS* = .10, *CFI* = .93, *TLI* = .92. The intrusions and the avoidance factors were highly correlated (*r* = .91***), as well as the negative cognitions and mood, and the hyperarousal factors (*r* = .85***). The intrusions factor was accountable for 24% of the items variance, the avoidance factor for 14%, the negative cognitions and mood factor for 32% and the hyperarousal factor for 30%.

The two-factor model composed of the birth-related symptoms and general symptoms factors produced a better fit to the data according to all fit indices, $\chi 2$ (169) = 560.06, $\chi 2/df$ = 3.31, *RMSEA* = .07, *SRMR* = .07, *CFI* = .96, *TLI* = .96. Table 2 displays standardized factors loading for the two-factor model. The two factors of birth-related symptoms and general symptoms were moderately correlated (*r* = .54***). The birth-related factor was accountable for 51%, and the general symptoms factor for 49% of the total variance of the items.

The bifactor model with a general factor and the birth-related symptoms and general symptoms gave the best fit to the data, with all indices matching the cut-off values for a good fit, $\chi 2$ (150) = 427.98, $\chi 2/df$ = 2.85, *RMSEA* = .06, *SRMS* = .05, *CFI* = .98, *TLI* = .97. Standardized factors loading for the bi-factor model are shown in Table 3. The *ECV* indices showed that 56% of the common variance across the 20 items was due to the general factor, with birth-related symptoms accounting for 13% and the general symptoms factor for 31%, supporting the presence of a strong global factor. The ωH = .73 of the general factor was below the 0.80 cut-off value. The factor-level indices indicated that the birth-related symptoms might not be a well-defined latent variable (i.e. ωH = 0.19, *H* = 0.69, *FD* = 0.87). The average *IECV* = 0.57 indicated that the items measured the general factor more strongly than the intended factors. Items 8, 9 and 10 with large loading on the general factor and *IECV* values greater than 0.85 indicated that these items were reflecting mostly the content of the general dimension (Stucky & Edelen, 2014)..

Reliability

Analysis of the internal consistency by Cronbach's alpha revealed high reliability of α = .90 for the total symptoms scale, as expected. Results showed a high reliability of α = .88 for the birth-related subscale, and α = .89 for the general symptoms subscale, as predicted. Inter-correlations ranged from 0.12 to 0.70 for the birth-related symptoms subscale and from 0.30 to 0.76 for the general symptoms one.

Convergent Validity

Convergent validity of the City BiTS-F and its subscales was tested via correlations with the total score of the PCL-5 (Table 4). The PLC-5 total score was significantly correlated with the total score of City BiTS-F (*r* = .87). Regarding the correlation between the PCL-5 total score and the City BiTS-F subscales, the correlations were high with the birth-related symptoms (*r* = .71) and the general symptoms (*r* = .76) subscales.

Divergent Validity

Divergent validity of the City BiTS-F was tested via correlations with the HADS-A score and with the EPDS total score (Table 4). We found significant moderate correlations with the total score of the City BiTS-F and the HADS-A total score(r = .68). The correlations with HADS-A total score and City BiTS-F were small with the birth-related symptoms (r = .39) and high with the general symptoms (r = .72) subscales.

The correlations with the EPDS total score showed a significantly high correlation (r = .78) with the total score of the City BiTS-F (Table 4). The correlation were small with the birth-related symptoms (r = .46) and high with the general symptoms (r = .82) subscales (Table 4).

Discriminant Validity

As illustrated in Table 5, discriminant validity of the total score of the City BiTS-F and its subscales was examined via known-group differences. The association between the weeks of gestation and the City BiTS-F total score was marginally significant with lower weeks of gestation increasing the score level. The association between the gravidity and the total score, as well as with the general symptoms was positively significant, i.e., the higher the gravidity was, the greater the total score and the general symptoms subscale score were. Further, the City BiTS-F total score and its birth-related symptoms and general symptoms subscales were sensitive to the mode of delivery, history of traumatic childbirth, and history of traumatic event. The *post hoc* tests showed that women who experienced an emergency caesarean section reported higher City BiTS-F total and birth-related symptom scores compared to women who experienced a vaginal birth or a vaginal operative birth (Table 6). Women who experienced an emergency caesarean section reported higher birth-related symptoms scores compared to women who experienced a planned caesarean. Finally, women who experienced a planned caesarean reported higher birth-related symptoms scores compared to women who experienced a vaginal birth. Women who had a previous traumatic childbirth reported significantly higher levels of City BiTS-F total scores, as well as significantly higher levels of both subscales scores, than women who did not have a previous traumatic childbirth. Similarity,

women who had experienced a previous traumatic event reported significantly higher levels of City BiTS-F total scores, as well as significantly higher levels of both subscale scores, than women who did not experience a previous traumatic event.

Discussion

The aims of this study were the validation of the French version of the City Birth Trauma Scale (City BiTS-F) in a large sample of adult French-speaking women who gave birth in the past year and the evaluation of the latent factor structure of PTSD-FC symptoms. The original version of the City BiTS was recently designed and published to measure PTSD-FC among English speaking women (Ayers et al., 2018). Four validation studies of the City BiTS have already been published for the Hebrew, Croatian, Spanish, and Turkish languages (Bayrı Bingöl et al., 2020; Caparros-Gonzalez et al., 2021; Handelzalts et al., 2018; Nakić Radoš et al., 2020), thereby demonstrating high interest in this scale. In agreement with the other versions, the City BiTS-F was found to be reliable and valid. Internal consistency for the total scale and each of the symptom cluster subscales was very satisfactory, with Cronbach's alpha values above a very good level of 0.8. Similarly, internal consistency was found to be very satisfactory for the symptom cluster subscales of the two-factor model.

The DSM-5 defined a four-cluster structure for PTSD symptoms (i.e., intrusions, avoidance of reminders, negative cognitions and mood, hyperarousal) (American Psychiatric Association, 2013). In this study, the four-cluster model did not yield a good fit to the data. The high correlations between the intrusions and the avoidance factor, and the negative cognitions and mood with the hyperarousal factor, suggest that these factors were potentially two measures of the same underlying construct, and thus, indicated the existence of higher order factors.

Since the change in the conceptualization of PTSD to the current four-factor model used in DSM-5, few studies have examined different factor models in order to find the best fit. Available data is conflicting, with different publications fostering a two- (e.g., Bondjers et al.,

2019; Thorisdottir et al., 2020), three- (e.g., Gelaye et al., 2017), five- (e.g., Drake-Brooks et al., 2020; Gentes et al., 2014), six- (e.g., Cyniak-Cieciura et al., 2017; Drake-Brooks et al., 2020), or seven-factor model (e.g., Cyniak-Cieciura et al., 2017; Drake-Brooks et al., 2020; Hansen et al., 2017). In the current study, the two-factor model composed of the birth-related symptoms and general symptoms factors was fitting well the data, according to all fit indices. This two-factor solution corresponds with the structure of the original scale (Ayers et al., 2018) and other validation studies of the City BiTS questionnaire (Bayrı Bingöl et al., 2020; Caparros-Gonzalez et al., 2021; Handelzalts et al., 2018; Nakić Radoš et al., 2020). However, aligned with the Croatian validation study (Nakić Radoš et al., 2020), a bifactor model, with a general factor and two specific factors of birth-related symptoms and general symptoms provided a best fit to the data. These findings suggest that the use of the total score scale is justified in addition to the use of the birth-related symptoms and the general symptoms subscales (Reise et al., 2012). Accountable for 56% of the explained common variance, the general factor suggested the presence of a strong overall dimension, along with the general symptom factor, accounting for 31% of additional variance of the general factor. The birth-related symptoms scale, with 13% of the additional variance of the general factor, was a less well-defined latent variable.

Convergent and divergent validity testing showed high validity. The present study provides evidence of convergent validity for the City BiTS-F, with its significant correlation with the PTSD total score of the PCL-5. Both, birth-related symptoms and the general symptoms of the City BiTS-F correlated significantly with the PTSD total score of the PCL-5, implying that both factors are associated with PTSD-FC symptoms. Our results reveal higher convergent validity than the Croatian version of the City BiTS (Nakić Radoš et al., 2020), in which general symptoms correlated more with measures of depression and anxiety, while birth-related symptoms correlated more with the PTSD symptoms. Divergent validity of the City BiTS-F was tested via correlations with depression scores and anxiety scores. The total score of the City BiTS-F correlated significantly with the depression total score. The depression score correlated

moderately with City BiTS-F birth-related symptoms and strongly with the general symptoms of the City BiTS-F, implying that these factors are differently associated with symptoms of postpartum depression. We found the same pattern with the anxiety scores that correlated moderately with City BiTS-F birth-related symptoms and strongly with the total score of the City BiTS-F and the City BiTS-F general symptoms. These results are consistent with the results of the Croatian version of the City BiTS (Nakić Radoš et al., 2020).

The City BiTS-F total score and its subscale scores were significantly higher in women with a history of traumatic childbirth or a history of traumatic event in comparison with mothers without such previous trauma exposure. Moreover, experiencing an emergency caesarean section was related to greater City BiTS-F total and birth-related symptoms compared to women who experienced a vaginal birth or a vaginal operative birth. In comparison with women who had a planned caesarean section, again women with an emergency caesarean section reported higher birth-related symptoms. Finally, compared to a vaginal birth experience, a planned caesarean section was linked to higher birth-related symptoms.. The CTBS-F total score was positively associated with gravidity and negatively with weeks of gestation. The total score and the general symptoms of the City BiTS-F were significantly more associated with gravidity. In addition, the City BiTS-F total score tended to be more elevated when childbirth occurred at lower weeks of gestation. Thus, the City BiTS-F total score and its subscales showed good discriminant validity to the mode of delivery, history of traumatic childbirth, and history of traumatic event. The birth-related symptom subscale and the total score showed better discriminant validity, as it was sensitive to the mode of delivery (emergency caesarean section). This is partly consistent with the results of the Hebrew and Croatian versions of the City BiTS in postpartum women (Handelzalts et al., 2018; Nakić Radoš et al., 2020). Many studies showed a higher prevalence rate of PTSD after emergency cesarean section, among other risk factors (e.g., Orovou et al., 2020). It is now well accepted that emergency caesarean section qualifies

as a psychological trauma, which may result in PTSD-FC (Horsch, Vial, et al., 2017; Yildiz et al., 2017).

This study has some limitations. First, although our efforts in recruiting the target sample were successful, the sample was recruited online, producing a potential selection bias from internet recruitment. Most of the participants were in a couple relationship (94.6%) and almost half of them had a university degree (47%), which is not representative of the general population. Further, no information linked to ethnicity was collected. Nevertheless, the characteristics of the participants of this study (i.e., maternal age, mode of delivery, parity, marital status) are similar to the ones of the English women of the original study (Ayers et al., 2018). Second, the data is based only on self-reporting, which is an important limitation in this research. It is indeed not possible to establish a clinical diagnosis of PTSD or depression through the use of self-report questionnaires. Future research should define clinical cut-offs and severity categories. Third, this study has a cross-sectional design, thus not providing information on the trajectory of the symptoms. Future studies should use clinical samples using structured clinical interviews in addition to self-report questionnaires, as well as longitudinal designs to observe the trajectory of symptoms.

In conclusion, the City BiTS-F is a reliable and valid measure of PTSD-FC symptoms according to the DSM-5 criteria. The City BiTS-F demonstrated high internal consistency for the total scale and for the symptom cluster subscales. Two factors were identified of birth-related symptoms and general symptoms, both demonstrating high internal consistency. The City BiTS-F is a useful tool for both, research and clinical practice.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5 ed.). American Psychiatric Publishing.

American Psychological Association. (2018). *Quantitative Research Design (JARS–Quant)*. Retrieved January 6, 2021 from https://apastyle.apa.org/jars/quantitative?_ga=2.171378665.898627145.1609843041-1712127619.1609843041

Ashbaugh, A. R., Houle-Johnson, S., Herbert, C., El-Hage, W., & Brunet, A. (2016). Psychometric Validation of the English and French Versions of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5). *PLoS One*, *11*(10), e0161645. https://doi.org/https://doi.org/10.1371/journal.pone.0161645

Ayers, S., Wright, D. B., & Thornton, A. (2018). Development of a measure of postpartum PTSD: the City Birth Trauma Scale. *Frontiers in Psychiatry*, *9*, 409. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6153962/pdf/fpsyt-09-00409.pdf

Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and individual differences*, *42*(5), 815-824. https://doi.org/https://doi.org/10.1016/j.paid.2006.09.018

Bayrı Bingöl, F., Bal, M. D., Dişsiz, M., Sormageç, M. T., & Yildiz, P. D. (2020). Validity and reliability of the Turkish version of the City Birth Trauma Scale (CityBiTS). *Journal of Obstetrics and Gynaecology*, 1-9. https://doi.org/10.1080/01443615.2020.1821354

Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of traumatic stress*, *28*(6), 489-498. https://doi.org/https://doi.org/10.1002/jts.22059

Bocerean, C., & Dupret, E. (2014). A validation study of the Hospital Anxiety and Depression Scale (HADS) in a large sample of French employees. *BMC Psychiatry*, *14*, 354. https://doi.org/https://doi.org/10.1186/s12888-014-0354-0

Bondjers, K., Hyland, P., Roberts, N. P., Bisson, J. I., Willebrand, M., & Arnberg, F. K. (2019). Validation of a clinician-administered diagnostic measure of ICD-11 PTSD and Complex PTSD: the International Trauma Interview in a Swedish sample. *Eur J Psychotraumatol*, *10*(1), 1665617. https://doi.org/10.1080/20008198.2019.1665617

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2 ed.). Guilford Press.

Caparros-Gonzalez, R. A., Romero-Gonzalez, B., Peralta-Ramirez, M. I., Ayers, S., Galán-Paredes, A., & Caracuel-Romero, A. (2021). Assessment of posttraumatic stress disorder among women after childbirth using the City Birth Trauma Scale in Spain. *Psychological Trauma: Theory, Research, Practice, and Policy*. https://doi.org/https://doi.org/10.1037/tra0001007

Cook, N., Ayers, S., & Horsch, A. (2018). Maternal posttraumatic stress disorder during the perinatal period and child outcomes: A systematic review. *J Affect Disord*, *225*, 18-31. https://doi.org/https://doi.org/10.1016/j.jad.2017.07.045

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, *150*(6), 782-786. https://doi.org/https://doi.org/10.1192/bjp.150.6.782

Cyniak-Cieciura, M., Staniaszek, K., Popiel, A., Pragłowska, E., & Zawadzki, B. (2017). The structure of PTSD symptoms according to DSM-5 and IDC-11 proposal: A multi-sample analysis. *European Psychiatry*, *44*, 179-186. https://doi.org/https://doi.org/10.1016/j.eurpsy.2017.02.491

Drake-Brooks, M. M., Hinkson, K. D., Osteen, P., & Bryan, C. J. (2020). Examining the DSM-5 latent structures of posttraumatic stress disorder in a national sample of student veterans. *Journal of anxiety disorders*, *74*, 102262. https://doi.org/https://doi.org/10.1016/j.janxdis.2020.102262

Garthus-Niegel, S., Ayers, S., Martini, J., von Soest, T., & Eberhard-Gran, M. (2017). The impact of postpartum post-traumatic stress disorder symptoms on child development: a population-based, 2-year follow-up study. *Psychol Med*, *47*(1), 161-170. https://doi.org/10.1017/s003329171600235x

Garthus-Niegel, S., Horsch, A., Ayers, S., Junge-Hoffmeister, J., Weidner, K., & Eberhard-Gran, M. (2018). The influence of postpartum PTSD on breastfeeding: A longitudinal population-based study. *Birth*, *45*(2), 193-201. https://doi.org/https://doi.org/10.1111/birt.12328

Garthus-Niegel, S., Horsch, A., Bickle Graz, M., Martini, J., von Soest, T., Weidner, K., & Eberhard-Gran, M. (2018). The prospective relationship between postpartum PTSD and child sleep: A 2-year follow-up study. *J Affect Disord*, *241*, 71-79. https://doi.org/https://doi.org/10.1016/j.jad.2018.07.067

Garthus-Niegel, S., Horsch, A., Handtke, E., von Soest, T., Ayers, S., Weidner, K., & Eberhard-Gran, M. (2018). The Impact of Postpartum Posttraumatic Stress and Depression Symptoms on Couples' Relationship Satisfaction: A Population-Based Prospective Study. *Frontiers in Psychology*, *9*, 1728. https://doi.org/https://doi.org/10.3389/fpsyg.2018.01728

Gelaye, B., Zheng, Y., Medina-Mora, M. E., Rondon, M. B., Sánchez, S. E., & Williams, M. A. (2017). Validity of the posttraumatic stress disorders (PTSD) checklist in pregnant women. *BMC Psychiatry*, *17*(1), 179. https://doi.org/10.1186/s12888-017-1304-4

Gentes, E. L., Dennis, P. A., Kimbrel, N. A., Rissling, M. B., Beckham, J. C., & Calhoun, P. S. (2014). DSM-5 posttraumatic stress disorder: Factor structure and rates of diagnosis. *Journal of Psychiatric Research*, *59*, 60-67. https://doi.org/https://doi.org/10.1016/j.jpsychires.2014.08.014

Gorsuch, R. L. (1980). Factor Score Reliabilities and Domain Validities. *Educational and Psychological Measurement*, *40*(4), 895-897. https://doi.org/10.1177/001316448004000412

Grekin, R., & O'Hara, M. W. (2014). Prevalence and risk factors of postpartum posttraumatic stress disorder: a meta-analysis. *Clin Psychol Rev*, *34*(5), 389-401. https://doi.org/https://doi.org/10.1016/j.cpr.2014.05.003

Guedeney, N., & Fermanian, J. (1998). Validation study of the French version of the Edinburgh Postnatal Depression Scale (EPDS): new results about use and psychometric properties. *Eur Psychiatry*, *13*(2), 83-89. https://doi.org/https://doi.org/10.1016/s0924-9338(98)80023-0

Handelzalts, J. E., Hairston, I. S., & Matatyahu, A. (2018). Construct validity and psychometric properties of the Hebrew version of the City Birth Trauma Scale. *Frontiers in Psychology*, *9*. https://doi.org/10.3389/fpsyg.2018.01726

Hansen, M., Hyland, P., Karstoft, K.-I., Vaegter, H. B., Bramsen, R. H., Nielsen, A. B. S., Armour, C., Andersen, S. B., Høybye, M. T., Larsen, S. K., & Andersen, T. E. (2017). Does size really matter? A multisite study assessing the latent structure of the proposed ICD-11 and DSM-5 diagnostic criteria for PTSD. *Eur J Psychotraumatol*, *8*(sup7), 1398002. https://doi.org/10.1080/20008198.2017.1398002

Horsch, A., Jacobs, I., Gilbert, L., Favrod, C., Schneider, J., Morisod Harari, M., & Bickle Graz, M. (2017). Impact of perinatal asphyxia on parental mental health and bonding with the infant: a questionnaire survey of Swiss parents. *BMJ Paediatrics Open*, *1*(1), e000059. https://doi.org/https://doi.org/10.1136/bmjpo-2017-000059

Horsch, A., Vial, Y., Favrod, C., Morisod Harari, M., Blackwell, S. E., Watson, P., Iyadurai, L., Bonsall, M. B., & Holmes, E. A. (2017). Reducing intrusive traumatic memories after emergency caesarean section: A proof-of-principle randomized controlled study. *Behav Res Ther*, *94*, 36-47. https://doi.org/https://doi.org/10.1016/j.brat.2017.03.018

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55. https://doi.org/https://doi.org/10.1080/10705519909540118

Kline, R. B. (2015). *Principles and practice of structural equation modeling* (4 ed.). Guilford publications.

Li, C.-H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior research methods*, *48*(3), 936-949. https://doi.org/https://doi.org/10.3758/s13428-015-0619-7

McKenzie-McHarg, K., Ayers, S., Ford, E., Horsch, A., Jomeen, J., Sawyer, A., Stramrood, C., Thomson, G., & Slade, P. (2015). Post-traumatic stress disorder following childbirth: an update of current issues and recommendations for future research. *Journal of Reproductive and Infant Psychology*, *33*(3), 219-237. https://doi.org/https://doi.org/10.1080/02646838.2015.1031646

Nakić Radoš, S., Matijaš, M., Kuhar, L., Anđelinović, M., & Ayers, S. (2020). Measuring and conceptualizing PTSD following childbirth: Validation of the City Birth Trauma Scale. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(2), 147-155. https://doi.org/10.1037/tra0000501

Orovou, E., Dagla, M., Iatrakis, G., Lykeridou, A., Tzavara, C., & Antoniou, E. (2020). Correlation between Kind of Cesarean Section and Posttraumatic Stress Disorder in Greek Women. *International Journal of Environmental Research and Public Health*, *17*(5), 1592. https://doi.org/https://doi.org/10.3390/ijerph17051592

Reise, S. P., Scheines, R., Widaman, K. F., & Haviland, M. G. (2012). Multidimensionality and Structural Coefficient Bias in Structural Equation Modeling: A Bifactor Perspective. *Educational and Psychological Measurement*, *73*(1), 5-26. https://doi.org/10.1177/0013164412449831

Rodriguez, A., Reise, S. P., & Haviland, M. G. (2016). Evaluating bifactor models: Calculating and interpreting statistical indices. *Psychological Methods*, *21*(2), 137-150. https://doi.org/10.1037/met0000045

Sandoz, V., & Horsch, A. (2021). *Dataset of Measurement and conceptualization of maternal PTSD following childbirth: Psychometric properties of the City Birth Trauma Scale – French version (City BiTS-F)* Zenodo. https://doi.org/http://doi.org/10.5281/zenodo.4441996

Stucky, B. D., & Edelen, M. O. (2014). Using hierarchical IRT models to create unidimensional measures from multidimensional data. . In S. P. R. D. A. Revicki (Ed.), *Handbook of item response theory modeling: Applications to typical performance assessment* (pp. 183-206). Routledge/Taylor & Francis Group.

Thorisdottir, A. S., Mason, J. E., Vig, K., & Asmundson, G. J. G. (2020). Factor Structure and Measurement Invariance of the Alcohol Use Disorders Identification Test (AUDIT) in a Sample of Military Veterans with and without PTSD. *Substance Use & Misuse*, *55*(8), 1370-1377. https://doi.org/10.1080/10826084.2020.1744656

Webb, R., Smith, A. M., Ayers, S., Wright, D. B., & Thornton, A. (2021). Development and Validation of a Measure of Birth-Related PTSD for Fathers and Birth Partners: The City Birth Trauma Scale (Partner Version) [Original Research]. *Frontiers in Physiology*, *12*(545). https://doi.org/10.3389/fpsyg.2021.596779

Wild, D., Grove, A., Martin, M., Eremenco, S., McElroy, S., Verjee-Lorenz, A., Erikson, P., Translation, I. T. F. f., & Cultural, A. (2005). Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health*, *8*(2), 94-104. https://doi.org/https://doi.org/10.1111/j.1524-4733.2005.04054.x

Yildiz, P. D., Ayers, S., & Phillips, L. (2017). The prevalence of posttraumatic stress disorder in pregnancy and after birth: a systematic review and meta-analysis. *J Affect Disord*, *208*, 634-647. https://doi.org/https://doi.org/10.1016/j.jad.2016.10.009

Yufik, T., & Simms, L. J. (2010). A meta-analytic investigation of the structure of posttraumatic stress disorder symptoms. *Journal of abnormal psychology*, *119*(4), 764-776. https://doi.org/10.1037/a0020981

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta psychiatrica scandinavica*, *67*(6), 361-370. https://doi.org/https://doi.org/10.1111/j.1600-0447.1983.tb09716.x

Table 1

Descriptive Characteristics of the Sample

	Participants (*n* = 541)	
	M (*SD*)	*n* (%)
Maternal age	30.14 (4.25)	
Marital status		
In a couple relationship		511 (94.6)
Single, separated, divorced, or widowed		30 (5.6)
Educational level		
Compulsory education or primary school or less		41 (7.6)
Post-compulsory education (e.g., apprenticeship)		130 (24.1)
University of Applied Science or University Diploma of Technology Degree		116 (21.4)
University		254 (47.0)
History of traumatic event		120 (22.2)
History of traumatic childbirth		120 (22.2)
Gravidity	1.24 (1.40)	
Parity	1.42 (0.70)	
Weeks of gestation	39.12 (2.09)	
Mode of delivery		
Vaginal birth		319 (59.0)
Operative vaginal birth		94 (17.4)
Emergency caesarean section		82 (15.2)
Planned caesarean section		46 (8.5)

Note. Gravidity refers to the number of times participants were on average pregnant, excluding the last pregnancy.

Table 2

Standardized Factor Loadings for the Two-Factor Model of the City BiTS-F (n = 534)

Items	BRS	GS
Birth-Related Symptoms		
1. Recurrent unwanted memories of the birth…	0.79	
2. Bad dreams or nightmares about the birth …	0.66	
3. Flashbacks to the birth and/or reliving the experience.	0.66	
4. Getting upset when reminded of the birth.	0.89	
5. Feeling tense or anxious when reminded of the birth.	0.90	
6. Trying to avoid thinking about the birth.	0.87	
7. Trying to avoid things that remind me of the birth …	0.44	
8. Not able to remember details of the birth.	0.47	
9. Blaming myself or others for what happened during the birth.	0.80	
10. Feeling strong negative emotions about the birth.	0.86	
General Symptoms		
11. Feeling negative about myself or thinking something awful will happen.		0.74
12. Lost interest in activities that were important to me.		0.82
13. Feeling detached from other people-		0.82
14. Not able to feel positive emotions …		0.84
15. Feeling irritable or aggressive.		0.864
16. Feeling self-destructive or acting recklessly.		0.75
17. Feeling tense and on edge.		0.87
18. Feeling jumpy or easily startled.		0.69
19. Problems concentrating.		0.75
20. Not sleeping well … not due to the baby's sleep pattern.		0.67

Note. BRS = birth-related symptoms; City BiTS-F = City Birth Trauma Scale – French Version; and GS = general symptoms.

Table 3

Standardized Factor Loadings for the Bifactor Model of the City BiTS-F (n = 534)

Items	G	BSR	GS
Intrusions			
1. Recurrent unwanted memories of the birth…	0.65	0.49	
2. Bad dreams or nightmares about the birth …	0.60	0.28	
3. Flashbacks to the birth and/or reliving the experience.	0.52	0.48	
4. Getting upset when reminded of the birth.	0.68	0.51	
5. Feeling tense or anxious when reminded of the birth.	0.78	0.46	
Avoidance			
6. Trying to avoid thinking about the birth.	0.68	0.59	
7. Trying to avoid things that remind me of the birth …	0.69	0.52	
Negative cognitions and mood			
8. Not able to remember details of the birth.	0.51	-0.05	
9. Blaming myself or others for what happened during the birth.	0.84	0.02	
10. Feeling strong negative emotions about the birth.	0.92	0.01	
11. Feeling negative about myself or …will happen.	0.58		0.45
12. Lost interest in activities that were important to me.	0.47		0.68
13. Feeling detached from other people-	0.46		0.70
14. Not able to feel positive emotions …	0.54		0.63
Hyperarousal			
15. Feeling irritable or aggressive.	0.37		0.88
16. Feeling self-destructive or acting recklessly.	0.51		0.54
17. Feeling tense and on edge.	0.39		0.80

18. Feeling jumpy or easily startled.	0.46	0.51
19. Problems concentrating.	0.42	0.62
20. Not sleeping well … not due to the baby's sleep pattern.	0.51	0.43

Note. BRS = birth-related symptoms;City BiTS-F = City Birth Trauma Scale – French Version; G = general factor; and GS = general symptoms.

Table 4

Pearson Inter-correlations of the City BiTS-F Two-Factor Model, and Pearson Correlations with HADS-A, EPDS and PCL-5 (n = 541)

Variable	*M* (*SD*)	1	2	3	4	5
City BiTS-F						
1. Total score	13.2 (10.9)	-				
2. Birth-related symptoms	4.4 (5.6)	0.80***	-			
3. General symptoms	8.8 (7)	0.89***	0.44***	-		
4. HADS-A	7.8 (4.3)	0.68***	0.39***	0.72***	-	
5. PCL-5	16.0 (13.4)	0.87***	0.71***	0.76***	0.69***	-
6. EPDS	9.1 (6.7)	0.78***	0.46***	0.82***	0.79***	0.78***

Note. City BiTS-F = City Birth Trauma Scale – French Version; EPDS = Edinburgh Postnatal Depression Scale; HADS-A = anxiety subscale of the Hospital Anxiety and Depression Scale; and PCL-5 = PTSD Checklist for DSM-5.

p-values: *** ≤ .001.

Table 5

Differences in the CTBS-F and its Subscales between Known-Groups (N = 541)

Obstetric variables	Total score	BRS	GS
	β, p	*β, p*	*β, p*
Weeks of gestation	*β* = -0.44, *p* = .06	*β* = -0.22, *p* = .06	*β* = -0.22, *p* = .14
Gravidity	*β* = 0.68, *p* <.05	*β* = 0.06, *p* = .74	*β* = 0.62, *p* < .01
Obstetric variables	Total score	Birth-related Symptoms	General symptoms
	M (*SD*)	*M (SD)*	*M (SD)*
Mode of delivery			
Planned caesarean section (*n* = 46)	14.8 (13.0)	5.2 (6.2)	9.6 (8.1)
Emergency caesarean section (*n* = 101)	18.7 (12.4)	8.2 (7.6)	10.4 (6.9)
Vaginal operative birth (*n* = 75)	12.8 (9.1)	4.4 (4.9)	8.4 (7.0)
Vaginal birth (*n* = 319)	11.3 (9.9)	3.0 (4.2)	8.3 (7.2)
	$\chi^2(3) = 30.51$, *p* <.001	$\chi^2(3) = 50.70$, *p* <.001	$\chi^2(3) = 9.20$, *p* = .03
History of traumatic childbirth			
Yes (*n* = 120)	18.4 (11.6)	7.48 (6.6)	10.9 (7.5)
No (*n* = 421)	11.7 (10.3)	3.5 (5.0)	8.2 (7.0)
	$\chi^2(1) = 34.99$, *p* <.001	$\chi^2(1) = 45.46$, *p* <.001	$\chi^2(1) = 13.1$, *p* <.001
History of traumatic event			
Yes (*n* = 120)	18.4 (12.4)	6.6 (6.5)	11.8 (7.8)

No (*n* = 421)	11.7 (10.2)	3.7 (5.2)	8.0 (7.2)
	$\chi^2(1) = 35.20$, p <.001	$\chi^2(1) = 24.72$, *p* <.001	$\chi^2(1) = 23.62$, *p* <.001

Note. BRS = birth-related symptoms; CTBS-F = City Birth Trauma Scale – French Version; and GS = general symptoms.

Table 6

Pairwise Comparisons for the Mode of Delivery with Holm Corrections (n = 534)

		Total score	**BRS**	**GS**
		M (SD)	*M (SD)*	*M (SD)*
Planned CS	Emergency CS	14.8 (13.0) - 18.7 (12.4)	5.2 (6.2) - 8.2 (7.6)	9.6 (8.1) - 10.4 (6.9)
		ns	**	ns
Planned CS	Operative VB	14.8 (13.0) - 12.8 (9.1)	5.2 (6.2) - 4.4 (4.9)	9.6 (8.1) - 8.4 (7.0)
		ns	ns	ns
Planned CS	VB	14.8 (13.0) - 11.3 (9.9)	5.2 (6.2) - 3.0 (4.2)	9.6 (8.1) - 8.3 (7.2)
		ns	*	ns
Emergency CS	Operative VB	18.7 (12.4) - 12.8 (9.1)	8.2 (7.6) - 4.4 (4.9)	10.4 (6.9) - 8.4 (7.0)
		**	***	ns
Emergency CS	VB	18.7 (12.4) - 11.3 (9.9)	8.2 (7.6) - 3.0 (4.2)	10.4 (6.9) - 8.3 (7.2)
		***	***	ns
Operative VB	VB	12.8 (9.1) - 11.3 (9.9)	4.4 (4.9) - 3.0 (4.2)	8.4 (7.0) - 8.3 (7.2)
		ns	ns	ns

Note. BRS = birth-related symptoms; CS = caesarean section; GS = general symptoms; VB = vaginal birth.

p-values: * $p < .05$; ** $p > .01$; *** $p \leq .001$; ns = non signficiant