The mother-child attachment bond before and after birth: the role of maternal perception of traumatic childbirth

Martina Smorti[1], Lucia Ponti[2], Simon Ghinassi[2], & Gherardo Rapisardi[3]

[1] Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Via Savi 10, 56126 Pisa, Italy.

[2] Department of Education, Languages, Intercultures, Literatures and Psychology, University of Florence, Italy, Via San Salvi, 12, Pad. 26 – 50135, Florence, Italy.

[3] Department of Infancy and Adolescence Mental Health, USL Toscana Centro, Firenze, Viale Pieraccini 24, 50139, Florence, Italy

Short Title: Traumatic childbirth and attachment bond

Correspondence concerning this article should be addressed to Lucia Ponti, Department of Education, Languages, Intercultures, Literatures and Psychology, University of Florence, Via San Salvi, 12, Pad. 26 – 50135, Florence, Italy, Tel: +39 055 2755079, Fax: + 39 055 6236047, E-mail: pontilucia@gmail.com

The mother-child attachment bond before and after birth: the role of maternal perception of traumatic childbirth

Abstract

The quality of the mother-child attachment bond is a relevant factor for the psychosocial well-being of a child. However, some variables could affect this relationship, such as a perceived traumatic childbirth experience. The aim of this study was to explore the mediating role of the childbirth experience on the relationship between prenatal and postnatal attachment. A predictive study was conducted on 105 pregnant women aged 26 to 44 years. The data was collected at two different times: at week 31-32 of gestation (T1) and three months after childbirth (T2). The quality of maternal prenatal attachment has a significant and direct effect on postnatal mother-child attachment. Moreover, the quality of prenatal attachment represents a protective factor for the quality of childbirth experience, promoting a higher quality of postnatal attachment bond. Our results highlight the importance of supporting women throughout the perinatal period, starting from pregnancy to after childbirth.

Keywords: prenatal attachment; postnatal attachment; traumatic childbirth experience

Introduction

The attachment bond between a mother and her child, as conceptualized by Bowlby [1], has an important function for the child's cognitive, physical and emotional development, and this is well supported by literature [2]. Most literature has analyzed this bond after the birth of the infant; however, the most recent studies have highlighted how this aspect begins before birth, during pregnancy, when women start to develop a mental representation of their unborn children. This particular bond between the mother and her fetus has been conceptualized and assessed as prenatal attachment [3]. This form of attachment, expressed through the maternal sensitive disposition to knowing, being with, protecting, gratifying needs, and avoiding loss [4], activates the caregiving system and plays a protective function towards the fetus [1, 4].

Recent studies have consistently shown that the quality of prenatal attachment, which is linked to the centrality of pregnancy and the extent to which gestation has an impact on a woman's life story and identity [5], favors the transition to motherhood [6, 7] and is closely and positively related to postnatal attachment [8]. In particular, it has been amply demonstrated that a positive maternal prenatal attachment to the fetus improves the mother's ability to assume responsive caregiving behaviors after childbirth, her sensitivity to child's needs [4, 9], and her involvement during interactions with the newborn are more active and stimulating [10]. On the contrary, low prenatal attachment is related to a lack in the mother's prenatal care of herself and her baby, leading to possible complications and risks during pregnancy and delivery [11].

However, the relationship between prenatal and postnatal attachment is not always direct and linear. Results reported in literature are not consistent, and some research has found only a modest correlation between prenatal and postnatal attachment, showing that the amount of postnatal attachment explained by prenatal attachment is small [12].

In light of these results, it is possible to hypothesize that there may be additional variables that can influence the link between a mother's prenatal and postnatal attachment. For example, Damato [13] found a modest correlation between prenatal and postnatal attachment in mothers of twins highlighting the significant role of other variables. Postpartum depression, having a cesarean delivery, and the experience of neonatal intensive care unit (NICU) admission for 1 or both twins further influenced the relationship between prenatal attachment and postnatal attachment [13]. This research underlines the role of delivery, like depression, as a factor influencing maternal bonding before and after childbirth. In addition to the objective variables of delivery, another variable on the relationship between prenatal and postnatal attachment may be the specific way childbirth is subjectively experienced by women. The childbirth experience is a moment of central importance in a woman's life and is strongly linked to her relationship with her (unborn) child, given that it concerns their first encounter.

In fact, childbirth, besides being a natural, physiological and sensitive experience, may be lived with a set of ambivalent emotions: the joy of the first encounter with one's child could be accompanied by anxiety, intense fear of pain, and loss of control, to the point where it provokes stress-related symptoms at the level of posttraumatic stress disorder (PTSD) or other mental disorders [14]. In other words, if, for the vast majority of women, childbirth represents a satisfactory and rewarding experience, for approximately one third it constitutes a possible distressing traumatic experience. In this case, women report an experience of intrusion, maladaptive beliefs, avoidance, re-experiencing, emotional numbing and arousal, hyperarousal, flashbacks and nightmares, dissociation, sense of threat, shame, anger and fear [15].

Given these considerations, it is plausible that the childbirth experience lived as a traumatic event could significantly affect the relationship between prenatal and postnatal

attachment, as well as a woman's ability to take care of her newborn. Extensive literature has shown that the quality of birth experience is associated with the quality of both prenatal and postnatal attachment. In particular, a positive prenatal attachment is strictly linked to the mother's sensitivity and interconnection with the unborn child and this, in turn, can help women cope with the delivery experience in a more positive way [16]. In contrast, a low maternal prenatal attachment to the child is negatively linked to the experience of birth in terms of greater use of oxytocin and analgesia, and duration of labor [17].

The experience of childbirth appears to significantly influence postnatal maternal attachment and the mother's emotions and feelings towards her child [18]. In particular, a positive childbirth experience is a significant predictor of the mother's psychological well-being that, in turn, is strictly associated to her ability to take care of the newborn child [19], and to the mother's self-efficacy regarding breastfeeding [20, 21]. On the contrary, the presence of post-traumatic stress symptoms linked to the childbirth experience influences the maternal representations of the newborn in a negative way. Mothers presenting symptoms of intrusions, avoidance, and hyperarousal perceive the newborn as less emotionally warm towards them [22]. In addition, a difficult or traumatic childbirth experience hinders the development of a positive maternal postnatal attachment [23] with difficulty to emotionally connect with the newborn [23, 24] and negatively influencing early interactions between the mother and her newborn [25]. Childbirth experience as a traumatic event has also been found to be associated with a greater probability of developing postpartum depression [19], a condition that significantly affects the ability of a woman to properly and carefully perform the maternal role [26], and increases the risk of negative consequences for the health and wellbeing of both the mother and child [16, 27].

Starting from the above considerations, the main aim of this study was to analyze the influence that the maternal prenatal attachment to fetus has on postnatal attachment by exploring the mediating role of childbirth experience as a traumatic event. In particular, we hypothesized that the woman's prenatal attachment to her unborn child would have both direct and indirect effects on her postnatal attachment to child. Specifically, we supposed that the quality of prenatal attachment would be a protective factor for a childbirth experience lived as a traumatic event, and that the quality of this experience, in turn, could affect the subsequent postnatal attachment.

Method

Participants and procedures

A predictive study was performed at two different time points: week 31-32 gestation (T1) and 3 months after the childbirth (T2).

At T1 a total of 112 women attending a delivery prenatal course in the maternity ward of a public hospital of the metropolitan area of Firenze, with about 2800 deliveries per year, were recruited. The data collection was conducted over a period of 5 months. Inclusion criteria were the following: native Italian women; age > 18 years; no previous psychopathological diagnosis, singleton and no risk pregnancy. All participants were asked to fill out a questionnaire with their socio-demographic data (age, educational level, marital and work status, number of children) and a measure to assess their prenatal attachment toward their unborn child.

At T2, women were contacted by email with a link to respond to a battery of questionnaires aimed at measuring their post-partum stress symptoms and their postnatal attachment toward their newborns. From the initial sample, 7 women did not fill out the online questionnaires without giving any information about their withdrawal. Therefore, the final sample was

constituted by 105 women, aged from 26 to 44 years (M = 34.97; SD = 4.43). Our sample is representative of the general population of women giving birth in this hospital that meet our inclusion criteria. More than 92% were of a middle socioeconomic level: 31.4% had a high school diploma only, while 61% also had a university degree. Regarding their work status, 89.5% had a job. Regarding marital status, 100% of the women lived with their partners. For 61.9%, this was their first baby, 31.4% already had a child, and 6.7% had two children.

The study was conducted in accordance with the guidelines for ethical treatment of human participants of the Italian Psychological Association. Written formal consent was obtained after the Ethical Committee of the Local Health Authorities (CEAVNO) had approved the study (n. 12749/2018). All the women were previously informed about the purposes of the study and could withdraw from participation at any time. Participation in the survey was voluntary and no monetary reward was given.

Measures

Prenatal attachment

The women's prenatal attachment to unborn child was assessed using the Italian version of the *Prenatal Attachment Inventory* (PAI) [28]. This scale consists of 21 items, rated on a 4-point Likert scale from 1 (almost never) to 4 (almost always). A high score on this dimension reflects a higher attachment bond to child during pregnancy. In the present sample, the internal consistency value was satisfying, with a Cronbach's alpha of .89.

Childbirth experience as a traumatic event

The Italian adapted form of *Perinatal PTSD Questionnaire* (PPQ) [29] was used to assess childbirth experience as a traumatic event. The PPQ is a self-report questionnaire developed to assess the level of PTSD symptoms linked to the childbirth experience and subsequent post-partum in accordance with the DSM-5 criteria. In particular, items of the PPQ measure the presence of unwanted intrusions, symptoms of avoidance or numbing of responsiveness, and symptoms of hyperarousal. This questionnaire is composed of 14 items rated on a 5-point Likert scale from 0 (not at all or never) to 4 (very often). Higher scores correspond to a higher experience of perinatal post-traumatic distress. In the present sample, the Cronbach's alpha was .72.

Postnatal attachment

Finally, the maternal post-natal attachment to newborn was assessed using the Italian version of the *Maternal Postnatal Attachment Scale* (MPAS) [3]. The MPAS is a self-report questionnaire composed of 19 items rated on a 5-point Likert scale from 1 (low attachment) to 5 (high attachment). Higher scores on the MPAS correspond to higher levels of maternal postnatal attachment. In the present study, the MPAS showed good internal consistency, with a Cronbach value of .82.

Data analysis

Descriptive statistics were calculated for all participants. To explore whether there were differences in prenatal attachment, postnatal attachment, and childbirth experience as a traumatic event between primiparas and multiparous women, three *t*-tests were conducted. Finally, in order to verify the hypothesized model, a mediational analysis was conducted. In order to examine the

significance of the mediation effects in analysis, a bias-corrected (BC) bootstrap confidence interval was adopted (using 1000 resamples).

Results

No significant differences emerged between primiparas and multiparous women with respect to prenatal attachment ($t(103) = -.222$; $p = .83$), postnatal attachment ($t(103) = -.428$; $p = .63$), and childbirth experience as a traumatic event ($t(103) = .487$; $p = .63$). For this reason, we did not consider this aspect for the subsequent analyses.

In table 1, the mean, standard deviation, skewness, kurtoses and bivariate correlation calculated for all variables are reported.

INSERT TABLE 1 ABOUT HERE

High levels of prenatal attachment were significantly and positively associated with postnatal attachment. Moreover, both prenatal and postnatal attachment were negatively correlated with the childbirth experience as a traumatic event.

Finally, results of mediational analysis, tested using the Maximum Likelihood estimator (ML) [30], showed that the levels of prenatal attachment have significant and positive effects on the level of postnatal attachment, both directly and indirectly through the childbirth experience as a traumatic event ($\beta = .09$, $p < .05$; CI 95%: .153; .493). In figure 1, statistical coefficients of direct effect are reported.

INSERT FIGURE 1 ABOUT HERE

Discussion

The main focus of this study was to explore the relationship between prenatal and postnatal attachment, studying the role played by traumatic childbirth experience. Literature has consistently highlighted that a traumatic childbirth experience represents a significant risk factor for the development of a warm and close attachment bond between a mother and her newborn [23, 31]. However, to our knowledge, no study has investigated the role of prenatal attachment as a predictor factor of this experience. This study offers an empirical contribution, increasing knowledge in this field.

Overall, our results showed that the quality of a mother's prenatal attachment to her own unborn child is strictly linked to the quality of postnatal attachment. Specifically, a high level of prenatal attachment favors a higher quality of postnatal attachment to the newborn infant, both directly and indirectly, through the quality of childbirth experience. In fact, in addition to the direct path, prenatal attachment also promotes the presence of a lower level of PTSD symptoms linked to the childbirth experience, which, in turn, favors the onset of a better bond between mother and infant after birth. These data were consistent with findings that indicated that prenatal attachment improves the mother's emotional response to her infant after childbirth and her future ability to assume a responsive and warm maternal role [4, 9]. Therefore, this important emotional bond, which begins in the mother's womb when she develops a mental image of her future child, predicts postnatal attachment, favoring in the mother the desire for closeness and proximity to child, a sense of confidence, competence and satisfaction in being a mother, and a general feeling of peace and comfort during interactions with the child. Moreover, data are consistent with findings indicating that a high level of prenatal attachment during pregnancy is associated with a

better capacity of women to cope with childbirth in a positive way [16], favoring the development of a positive postnatal attachment [17].

Despite the undeniable interest of the aspects investigated, there are some limitations to the present study. First, the proposed theoretical model cannot be considered exhaustive, and other variables can certainly play a significant role in affecting postnatal attachment and the level of PTSD symptoms linked to the childbirth experience. For example, literature has shown that the quality of maternal social support perceived by pregnant women significantly influences the quality of the birth experience [17, 19]. Another variable, linked to personal characteristics of mother which can influence the way a possible traumatic experience is lived, is represented by the mother's capacity for mentalization [32]. In the presence of a perceived difficult birth experience, the infant's temperament can represent a significant variable able to affect the psychological adjustment of the mother and her relationship with the newborn [33]. Finally, the quality of romantic relationship, such as the dyadic coping or romantic attachment, could constitute an important protector factor in moderating the relationship between childbirth traumatic experience and subsequent adjustment. For example, Zerach and Magal [34] found that the quality of dyadic adjustment affects the relationship between the exposure to stressful childbirth and PTSS symptoms in men.

Second, only healthy women with singleton and no-risk pregnancies were included in this sample. Therefore, it would be interesting to analyze other psychological and clinical conditions more strongly related to PTSD, such as maternal depression during gestation, fear of childbirth, or twin or complicated pregnancies [35], in order to better understand the relationship between the variables taken into consideration. Moreover, other variables related to childbirth and birth outcome, such as delivery complications, assisted birth and lower birth weight, which have been

found to be related to PTSD, should be further considered, given that delivery complications are relevant risk factors for the development of posttraumatic stress syndrome after childbirth [35, 36, 37]. Moreover, the data is based only on self-report questionnaires. Self-report questionnaires present some limitations and, therefore, it would be interesting to confirm the results using other study designs. For instance, future studies should evaluate maternal attachment not only through self-report, but also through observational methods of maternal behaviors in a face-to-face situation with her infant. Videotaping and coding of interaction may allow the assessment of the maternal ability to conceive the infant as having a mind, which is the basis for maternal sensitivity, linked to the quality of parental bond [38].

Despite these limitations, the results provide an important contribution to the knowledge of the prenatal antecedents that could influence the childbirth experience and the quality of the early mother–child attachment bond. This increase in understanding has relevant clinical and social implications, highlighting the importance of supporting women during the entire perinatal period, from pregnancy to after childbirth. In particular, our results underline the importance of nurses to recognize the possible emotional difficulties of women both with respect to the representation they have towards their children and the childbirth experience. Nurses are the professionals with whom women on the pathway to motherhood spend the most time. The possibility that they may notice the presence of emotional difficulties towards the unborn child and/or toward childbirth experience could start a psychological support service to help women create a deeper emotional connection with the child and feelings of greater self-confidence referring to childbirth. Furthermore, during and after childbirth, nurses could pay attention to the possible presence of PTSD symptoms and activate programs that can reduce the negative effects that this condition has on women and on the attachment bond that they develop with their

newborn. In this regard, literature has highlighted the positive effect of expressive writing. As documented by previous studies, this technique favors the elaboration and mentalization of emotions, worries and fears experienced by women, and helps them to lower the mechanisms of avoidance and physiological symptoms of hyperarousal typical of a traumatic childbirth experience [32].

Ethical Compliance Statement

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

Compliance with Ethical Standards: All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflicts of Interest: The authors declare that they have no conflict of interest.

Informed Consent: Informed consent was obtained from all participants included in the study.

References

[1] J. Bowlby, Basic, New York, 1988.

[2] E. Meins, J.F. Bureau, C. Fernyhough, Mother–child attachment from infancy to the preschool years: Predicting security and stability, Child Dev. 89 (3) (2018) 1022-1038. https://doi.org/10.1111/cdev.12778.

[3] J.T. Condon, C.J. Corkindale, The assessment of parent-to-infant attachment: Development of a self-report questionnaire instrument, J Reprod Infant Psychol. 16 (1) (1998) 57-76. https://doi.org/10.1080/02646839808404558.

[4] J. Walsh, E.G. Hepper, B.J. Marshall, Investigating attachment, caregiving, and mental health: a model of maternal-fetal relationships, BMC Pregnancy Childbirth 14 (1) (2014) 383. https://doi.org/10.1186/s12884-014-0383-1.

[5] C. Ionio, M. Smorti, E. Mascheroni, G. Ongaro, E. Cattaneo, A. Gemignani, S. Von Wunster, L. Bonassi, What is the role played by pregnancy in the construction of a woman's identity and her association with her child-to-be? J Reprod Infant Psychol. (2019) 1-13. https://doi.org/10.1080/02646838.2019.1695042.

[6] E.R. Fowles, Relationships among prenatal maternal attachment, presence of postnatal depressive symptoms, and maternal role attainment, J Soc Pediatr Nurs. 1 (2) (1996) 75-82. https://doi.org/10.1111/j.1744-6155.1996.tb00004.x.

[7] C. Mazzeschi, C. Pazzagli, G. Radi, V. Raspa, L. Buratta, Antecedents of maternal parenting stress: the role of attachment style, prenatal attachment, and dyadic adjustment in first-time mothers, Front Psychol. 6 (2015) 1443. https://doi.org/10.3389/fpsyg.2015.01443.

[8] A.J.B. Maas, E.S. de Cock, C.M. Vreeswijk, A.J. Vingerhoets, H.J. van Bakel, A longitudinal study on the maternal–fetal relationship and postnatal maternal sensitivity, J Reprod Infant Psychol. 34 (2) (2016) 110-121. https://doi.org/10.1080/02646838.2015.1112880.

[9] F. Tani, V. Castagna, L. Ponti, Women who had positive relationships with their own mothers reported good attachments to their first child before and after birth, Acta Paediatr. 107 (4) (2018) 633-637. https://doi.org/10.1111/apa.14162.

[10] A. Siddiqui, B. Hägglöf, Does maternal prenatal attachment predict postnatal mother–infant interaction? Early Hum. Dev. 59 (1) (2000) 13-25. https://doi.org/10.1016/S0378-3782(00)00076-1.

[11] K. Lindgren, Relationships among maternal–fetal attachment, prenatal depression, and health practices in pregnancy, Res Nurs Health. 24 (3) (2001) 203-217. https://doi.org/10.1002/nur.1023.

[12] M.E. Müller, Prenatal and postnatal attachment: A modest correlation, J Obstet Gynecol Neonatal Nurs. 25 (2) (1996) 161-166. https://doi.org/10.1111/j.1552-6909.1996.tb02420.x.

[13] E.G. Damato, Prenatal attachment and other correlates of postnatal maternal attachment to twins, Adv. Neonatal Care 4 (5) (2004) 274-291. https://doi.org/10.1016/j.adnc.2004.07.005.

[14] C. Junge, T. von Soest, K. Weidner, A. Seidler, M. Eberhard-Gran, S. Garthus-Niegel, Labor pain in women with and without severe fear of childbirth: A population-based, longitudinal study, Birth 45 (4) (2018) 469-477. https://doi.org/10.1111/birt.12349.

[15] S. Ayers, K. McKenzie-McHarg, A. Eagle, Cognitive behaviour therapy for postnatal post-traumatic stress disorder: case studies, J Psychosom Obstet Gynaecol. 28 (3) (2007) 177-184. https://doi.org/10.1080/01674820601142957.

[16] M. Smorti, L. Ponti, F. Tani, Maternal depressive symptomatology during pregnancy is a risk factor affecting newborn's health: a longitudinal study, J Reprod Infant Psychol. (2019) 1-9. https://doi.org/10.1080/02646838.2019.1581919.

[17] F. Tani, V. Castagna, L. Ponti, Mothers' social perceived support, anxiety and prenatal attachment to child: Which direct and indirect influences on delivery clinical indices? Int J Health Sci Res. 7 (4) (2017) 346-352.

[18] N. Erickson, M. Julian, M. Muzik, Perinatal depression, PTSD, and trauma: Impact on mother–infant attachment and interventions to mitigate the transmission of risk, Int. Rev. Psychiatry (2019) 1-19. https://doi.org/10.1080/09540261.2018.1563529.

[19] F. Tani, V. Castagna, Maternal social support, quality of birth experience, and post-partum depression in primiparous women, J Matern Fetal Neonatal Med. 30 (6) (2017) 689-692. https://doi.org/10.1080/14767058.2016.1182980.

[20] O. Halperin, O. Sarid, J. Cwikel, The influence of childbirth experiences on women′ s postpartum traumatic stress symptoms: A comparison between Israeli Jewish and Arab women, Midwifery 31 (6) (2015) 625-632. https://doi.org/10.1016/j.midw.2015.02.011.

[21] K. Hinic, Predictors of breastfeeding confidence in the early postpartum period, J Obstet Gynecol Neonatal Nurs. 45 (5) (2016) 649-660. https://doi.org/10.1016/j.jogn.2016.04.010.

[22] J. Davies, P. Slade, I. Wright, P. Stewart, Posttraumatic stress symptoms following childbirth and mothers' perceptions of their infants, Infant Ment Health J. 29 (6) (2008) 537-554. https://doi.org/10.1002/imhj.20197.

[23] S. Dekel, F. Thiel, G. Dishy, A.L. Ashenfarb, Is childbirth-induced PTSD associated with low maternal attachment? Arch Womens Ment Health 22 (1) (2019) 119-122. https://doi.org/10.1007/s00737-018-0853-y.

[24] M. Forcada-Guex, A. Borghini, B. Pierrehumbert, F. Ansermet, C. Muller-Nix, Prematurity, maternal posttraumatic stress and consequences on the mother–infant relationship, Early Hum. Dev. 87 (1) (2011) 21-26. https://doi.org/10.1016/j.earlhumdev.2010.09.006.

[25] C. Ionio, P. Di Blasio, P. (2014). Post-traumatic stress symptoms after childbirth and early mother–child interactions: an exploratory study, J Reprod Infant Psychol. 32 (2) (2014) 163-181. https://doi.org/10.1080/02646838.2013.841880.

[26] L. Vismara, L. Rollè, F. Agostini, C. Sechi, V. Fenaroli, S. Molgora, S., E. Neri, L. Prino, F. Odorisio, A. Trovato, C. Polizzi, P. Brustia, L. Lucarelli, F. Monti, E. Saita, R. Tambelli, Perinatal parenting stress, anxiety, and depression outcomes in first-time mothers and fathers: a 3-to 6-months postpartum follow-up study, Front Psychol. 7 (2016) 938. https://doi.org/10.3389/fpsyg.2016.00938.

[27] M. Smorti, L. Ponti, F. Tani, The effect of maternal depression and anxiety on labour and the well-being of the newborn, J Obstet Gynaecol, (2019) 1-6. https://doi.org/10.1080/01443615.2018.1536697.

[28] M.E. Müller, Development of the Prenatal Attachment Inventory, West J Nurs Res. 15 (2) (1993) 199–215.

[29] J.L. Callahan, S.E. Borja, M.T. Hynan, Modification of the Perinatal PTSD Questionnaire to enhance clinical utility, J. Perinatol. 26 (9) (2006) 533. https://doi.org/10.1038/sj.jp.7211562

[30] L.K. Muthén, B.O. Muthén, Mplus user's guide, seventh ed., Muthén & Muthén, Los Angeles, 1998–2007.

[31] S. Church, M. Scanlan, Post-traumatic stress disorder after childbirth. Do midwives have a preventative role? Pract Midwife 5 (6) (2002) 10.

[32] P. Di Blasio, C. Ionio, E. Confalonieri, Symptoms of Postpartum PTSD and Expressive Writing: A Prospective Study, J Prenat Perinat Psychol Health 24 (1) (2009) 49-65. https://doi.org/10.2466/02.13.

[33] P. Di Blasio, C. Ionio, Postpartum stress symptoms and child temperament: A follow-up study, J Prenat Perinat Psychol Health, 19 (3) (2005) 185-198.

[34] G. Zerach, O. Magal, (2017). Exposure to stress during childbirth, dyadic adjustment, partner's resilience, and psychological distress among first-time fathers, Psychol Men Masc. 18 (2) (2017) 123-133. http://dx.doi.org/10.1037/men0000048.

[35] S. Ayers, R. Bond, S. Bertullies, K. Wijma, The aetiology of post-traumatic stress following childbirth: a meta-analysis and theoretical framework. Psychol Med. 46 (6) (2016) 1121-1134. http://dx.doi.org/10.1017/S0033291715002706.

[36] S. Garthus-Niegel, T. von Soest, C. Knoph, T.B. Simonsen, L. Torgersen, M. Eberhard-Gran, The influence of women's preferences and actual mode of delivery on post-traumatic stress symptoms following childbirth: a population-based, longitudinal study, BMC Pregnancy Childbirth 14 (1) (2014) 191. https://doi.org/10.1186/1471-2393-14-191.

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

[38] C. Riva Crugnola, E. Ierardi, M.P. Canevini, Reflective functioning, maternal attachment, mind-mindedness, and emotional availability in adolescent and adult mothers at infant 3 months. Attach Hum Dev. 20 (1) (2018) 84-106. https://doi.org/10.1080/14616734.2017.1379546.

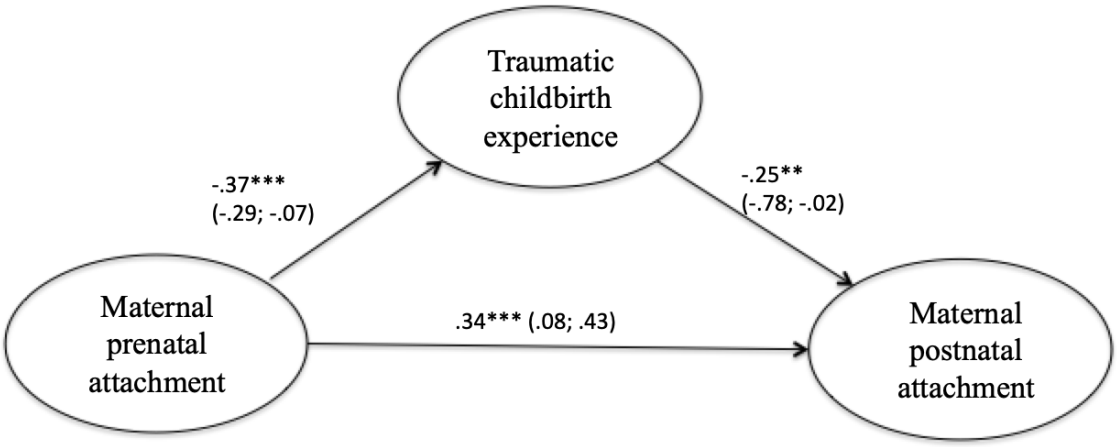

Figure 1. Theoretical tested model and standardized solutions. In parentheses as shown the 95% confidence intervals.
Note. *** $p < .001$, ** $p < .01$

Table 1. Descriptive statistics and bivariate correlations for all variables

	Range	M	SD	Skewness	Kurtosis	1	2	3
1. PAI	21-84	63.00	9.02	-.401	-.057	-	.43**	-.37**
2. MPAS	19-95	83.14	6.77	-.821	.692		-	-.38**
3. PPQ	0-56	5.13	4.24	1.027	.726			-

Note. *** $p < .001$, ** $p < .01$; PAI: *Prenatal Attachment Inventory;* MPAS: *Maternal Postnatal Attachment Scale;* PPQ: *Perinatal PTSD Questionnaire*

Author signatures

I, Martina Smorti, declare that I had primary responsibility for protocol and analytical framework for the study, that I have seen and approved the final version and that it has neither been published nor submitted elsewhere. I also declare that I have no conflict of interest.

I, Lucia Ponti, declare that I performed the data analysis and contributed to draft the methods and results sections, that I have seen and approved the final version and that it has neither been published nor submitted elsewhere. I also declare that I have no conflict of interest.

I, Simon Ghinassi, declare that I performed to draft the introduction and discussion sections of the manuscript, that I have seen and approved the final version and that it has neither been published nor submitted elsewhere. I also declare that I have no conflict of interest.

I, Gherardo Rapisardi, declare that I has the primary responsibility for patient screening, and participant's enrolment, that I have seen and approved the final version and that it has neither been published nor submitted elsewhere. I also declare that I have no conflict of interest.