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### Post-Traumatic Stress Symptoms, Rumination, and Posttraumatic Growth in Women with a Traumatic Childbirth Experience

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4 **Post-Traumatic Stress Symptoms, Rumination, and Posttraumatic Growth in**  
5 **Women with a Traumatic Childbirth Experience**  
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7  
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9  
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11

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13  
14 during the meeting in Amsterdam, the Netherlands, on January 29, 2020.  
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### 21 **Authors' contributions**

22 All authors were responsible for the study conception and design and were responsible  
23  
24 for drafting the manuscript. Wilson Abreu, Ana Paula Prata, Sónia Brandão and Rosa  
25  
26 Silva were responsible for data collection and analysis. All authors have critically  
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28 reviewed and edited the manuscript for intellectual content.  
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4 **Post-Traumatic Stress Symptoms, Rumination, and Posttraumatic Growth in**  
5 **Women with a Traumatic Childbirth Experience**  
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11 **Abstract**

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14 *Background:* Rumination can either prolong distress or foster growth following traumatic  
15 experiences like childbirth. This study investigates the association between post-  
16 traumatic stress symptoms and post-traumatic growth in women who underwent  
17 traumatic childbirth, examining the potential mediating role of two types of rumination -  
18 intrusive and deliberate.  
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26 *Methods:* A cross-sectional study in Northern Portugal from January 2020 to December  
27 2021 surveyed 202 women with infants under 12 months, self-reporting traumatic  
28 childbirth experiences. Instruments included the City Birth Trauma Scale, Event-Related  
29 Rumination Inventory, and Post-traumatic Growth Inventory.  
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35 *Results:* Women experienced various childbirth-related traumatic events, with most  
36 showing post-traumatic stress symptoms for over three months. Approximately 60% met  
37 post-traumatic stress disorder criteria.  
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42 The results indicate that post-traumatic stress symptoms were positively correlated with  
43 post-traumatic growth, and both (PTSD and PTG) showed positive associations with  
44 intrusive rumination and deliberate rumination.  
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Mediation analysis revealed deliberate rumination significantly mediated post-traumatic  
stress symptoms and post-traumatic growth, highlighting its role in trauma outcomes.

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*Conclusions:* This study illuminated the pathway through which post-traumatic stress can  
lead to posttraumatic growth, highlighting the pivotal role of deliberate rumination in this

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4 association. This finding is essential for tailoring therapeutic interventions that effectively  
5  
6 foster post-traumatic recovery and resilience, underscoring the importance of promoting  
7  
8 deliberate rumination.  
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11 **Keywords:** Traumatic Birth; Post-Traumatic Stress Symptoms; Rumination; Post-  
12  
13 Traumatic Growth; Women's Health  
14

## 15 16 17 18 **Introduction** 19

20  
21 Childbirth is an intense physical and emotional experience in the life of any women. It is  
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23 a normative and predictable event, and it is expected to be a positive experience for the  
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25 mothers (Brandão et al., 2020). The World Health Organization underscores the  
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27 significance of a favourable childbirth experience, given that adverse encounters can  
28  
29 precipitate enduring and severe mental health complications (WHO, 2018). Nevertheless,  
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31 adverse situations may arise that are interpreted by women as traumatic. A traumatic  
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33 childbirth experience refers to a parent's experience of interactions and/or events directly  
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35 related to childbirth that caused overwhelming distressing emotions and reactions,  
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37 leading to short- and/or long-term negative impacts on health and well-being (Leinweber  
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39 et al., 2022; Shorey & Wong, 2022; Watson et al., 2021).  
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44 It has been suggested that between 20% and 48% of women experience a traumatic birth  
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46 (McKelvin et al., 2021). A traumatic birth can lead to post-traumatic stress symptoms or  
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48 post-traumatic stress disorder (PTSD) (Ayers et al., 2023; Ertan et al., 2021; Pop-  
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50 Jordanova, 2022).  
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53 Post-traumatic stress disorder (PTSD) affects women differently in different societies,  
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55 with rates being elevated in high-risk populations (Caparros-Gonzalez et al., 2021;  
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57 Khoramroudi, 2018; Ketley et al., 2024). There is some evidence which suggests that risk  
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4 factors for childbirth trauma include unexpected medical problems such as emergency  
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6 caesarean section, forceps delivery, vacuum extraction, epidural analgesia, episiotomy,  
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8 and poor perceived control in labour. These factors are likely to contribute to the  
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10 development of PTSD symptoms (Dekel et al., 2020; Hernández-Martínez et al., 2020;  
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12 Martínez-Vázquez et al., 2021).

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15 A positive legacy of trauma is post-traumatic growth (PTG). Tedeschi and Calhoun  
16  
17 (2004) developed the post-traumatic growth model, which includes elements of post-  
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19 traumatic stress, core beliefs disruption, and PTG. PTG refers to positive psychological  
20  
21 changes that can occur in individuals following experiences of trauma or adversity  
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23 (Henson et al., 2021; Ketley et al., 2024; Malhotra & Chebiyan, 2016). Tedeschi and  
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25 Calhoun (1996) conceptualised PTG as a process and an outcome of the struggle with a  
26  
27 traumatic event. In the process of coming to terms with the negative event, the potential  
28  
29 for growth and renewal can occur, as the trauma does not disappear but co-exists with the  
30  
31 growth. These authors identified five dimensions of PTG: appreciation of life, relating to  
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33 others, personal strength, new possibilities, and spiritual change (Tedeschi & Calhoun,  
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35 1996). Although individuals do not necessarily have to experience positive changes in all  
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37 five dimensions.  
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41 Rumination is a form of cognitive processing and is a pre-requisite for growth to occur  
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43 (Taku et al., 2009). Rumination refers to the tendency to repetitively dwell on negative  
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45 thoughts and feelings, often related to a traumatic experience. Intrusive thoughts about  
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47 the traumatic event are likely to be associated with continued distress and persistent  
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49 suffering, while deliberate rumination, aimed at understanding and problem-solving, can  
50  
51 enable growth and change to occur (Cann et al., 2011). Rumination is therefore a  
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53 deliberate process, in which an individual actively chooses to think about the traumatic  
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4 event, or it can be an intrusive process, in which thoughts and feelings about the trauma  
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6 arise involuntarily.  
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9 Deliberate rumination is therefore identified as a helpful tool in promoting PTG, as it  
10 allows individuals to process and make sense of their experience, as found in previous  
11 studies (Lindstrom et al., 2013; Triplett et al., 2012; Zhou et al., 2015; Miethe et al., 2023).  
12  
13 However, intrusive rumination can be detrimental since it can lead to increased distress  
14 and impaired functioning. Thus, in some studies no associations have been found between  
15 intrusive rumination and post-traumatic growth (e.g., Cordova et al., 2007; Morris and  
16 Shakespeare-Finch, 2011). However, as of yet, there are no insights to explore this  
17 association among women who have had traumatic childbirth.  
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26 This study aims to investigate the correlation between post-traumatic stress symptoms  
27 and post-traumatic growth in women who have experienced traumatic childbirth, as well  
28 as the potential mediating role of rumination, both intrusive and deliberate, in this  
29 association.  
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## 38 **Methods**

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40 This study adhered to the stringent reporting criteria delineated in the Strengthening the  
41 Reporting of Observational Studies in Epidemiology (STROBE) guideline for cohort  
42 studies. It constitutes one of five sub-studies conducted within a broader project  
43 conducted under the auspices of an EU COST Action.  
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### 52 *Study Design*

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4 A cross-sectional study was carried out in the North of Portugal from April 2020 to  
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6 December 2021.  
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### 11 *Ethical considerations*

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14 The study received approval from the Research Ethics Committee of Escola Superior de  
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16 Enfermagem do Porto (Reference 2019-530, from 2019.12.17). All procedures were  
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18 authorized by this institutional review board in accordance with ethical and data  
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20 protection standards. Written informed consent was obtained from individuals for the  
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22 publication of any potentially identifiable images or data included in this article. Women  
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24 whose participation in the study could potentially interfere with their clinical situation  
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26 were excluded. Participants were informed of their right to withdraw from the study at  
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28 any time without any adverse consequences.  
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### 34 *Participants*

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37 Women who had delivered in hospitals in the North of Portugal were recruited using a  
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39 snowball method. Inclusion criteria for women under the study were: (1) self-reported  
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41 traumatic childbirth event; (2) having a new-born living at least one month after birth; (3)  
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43 time period after traumatic birth event was 12 months. Women whose new-born died  
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45 during one month after birth and those who had health status restrictions (such as  
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47 cognitive problems) to participate in a survey were excluded.  
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51 The survey began by asking participants if they had undergone a distressing or traumatic  
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53 event during childbirth. Those who answered in the affirmative were eligible to proceed  
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4 with the study, those who responded negatively were redirected to a 'thank you' page and  
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6 did not proceed further.  
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9 The final number of participants who completed the survey was 202.  
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## 11 12 13 14 **Measures**

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17 The survey consisted of four sections: (a) participants' demographic and clinical  
18 information form; (b) The City Birth Trauma Scale (CBS), the Event-Related Rumination  
19 Inventory (ERRI), the Post-traumatic Growth Inventory (PTGI), detailed as follows:  
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24 **Participants' demographic and clinical information** included age, place of residence,  
25 education, job status, marital status, number of children, income, significant previous  
26 illnesses, parity (primiparous or multiparous), pregnancy planning, pregnancy  
27 surveillance, type of childbirth, place of childbirth, problems during childbirth (for the  
28 mother or the child), significant negative events that took place in the last five years,  
29 identification of the lived trauma, how long the psychological reactions to the trauma  
30 lasted, if there was any impairment on daily activities, support from health professionals  
31 during the period in which the symptoms lasted, level of stress felt after the traumatic  
32 event occurred during childbirth (trauma-related self-report).  
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44 **The City Birth Trauma Scale (CBS)** (Ayers et al., 2018) has 29 questions that measure  
45 PTSD symptoms according to the diagnostic criteria of the DSM-5 published by the  
46 American Psychiatric Association (2013). Items are rated on a four-point Likert scale  
47 from 0 (never) to 3 (5 or more times) to produce a sum score ranging from 0 to 60, with  
48 higher scores indicating elevated levels of PTSD symptoms. The scale was translated to  
49 Portuguese and validated in Portugal and Brazil (Osório et al., 2022), with a calculated  
50 Cronbach's alpha of 0.91. In the present study, the scale's internal consistency was high  
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4 (Cronbach alpha was 0.95). Regarding the subscales, we obtained Cronbach alpha values  
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6 of 0.92 for Re-experiencing, 0.88 for Avoidance, 0.92 for Negative mood and 0.92 for  
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8 Hyperarousal.  
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11 **Event-Related Rumination Inventory (ERRI)** (Cann et al., 2011) is an instrument that  
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13 allows tracking cognitive processing after a highly significant life event. It is used to  
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15 assess the levels of the two rumination styles (intrusive and deliberate rumination) in  
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17 individuals who have experienced a highly stressful event. Comparing the values in both  
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19 styles, it is possible to determine the individual's dominant cognitive processing style  
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21 (Cann et al., 2011). The ERRI includes two subscales that contain ten statements relevant  
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23 to either intrusive rumination or deliberate rumination. Subscale scores are calculated by  
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25 summing up the scores of all the items in each subscale, resulting in separate scores for  
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27 intrusive and deliberate rumination. The instrument was translated and validated in  
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29 Portuguese (Ramos et al., 2015), with a calculated Cronbach's alpha of 0.96. In the current  
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31 study, the internal consistency of subscales was quite high. Cronbach's alpha was 0.96 for  
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33 intrusive rumination and 0.91 for deliberate rumination.  
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37 **Post-traumatic Growth Inventory (PTGI)** (Tedeschi and Calhoun 1996) is an  
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39 instrument for assessing positive outcomes following traumatic events. The 21-item scale  
40  
41 includes factors to measure New Possibilities, Relating to Others, Personal Strength,  
42  
43 Spiritual Change, and Appreciation of Life. The instrument was translated and validated  
44  
45 in Portuguese by Silva and Canavarro (2009). The analysis of the internal consistency of  
46  
47 the version validated for the Portuguese population using Cronbach's alpha coefficient  
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49 showed a value of 0.95 for the total scale. In the current study, Cronbach alpha was 0.92  
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51 for relating to others, 0.82 for personal strength, 0.83 for new possibilities, 0.54 for  
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53 spiritual change, and 0.82 for appreciation of life.  
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### *Data analysis*

SPSS (version 28) was used to analyse the data. First, descriptive statistics were computed to provide an overview of participants' sociodemographic and clinical variables as well as the study variables. Then, Pearson correlation between the main study variables was examined to assess the strength and direction of the associations.

In addition, ANOVA analyses were performed to examine differences in PTSD (in terms of re-experiencing, avoidance, negative cognitions and mood, and hyperarousal), according to the type of childbirth (i.e., vaginal, vaginal with forceps/vacuum, and caesarean section).

Finally, a mediation analysis using Model 4 of the PROCESS macro (version 4.1) developed by Hayes (2013) for SPSS was conducted. This model assessed the mediating role of rumination (both intrusive and deliberate) in the relationship between PTS symptoms and PTG. To evaluate the significance of the indirect effects, 95% confidence intervals (CI) were computed using bootstrapping. Indirect effects were deemed significant at the 0.05 level if the lower and upper bounds of the CI did not include zero (Hayes, 2013).

## **RESULTS**

### *Sample characteristics*

Participants' sociodemographic and childbirth related characteristics are shown in Table 1. The mean age of women was  $33.7 \pm 4.82$  years. Most women had completed a bachelor (44.6%) or master's degree (27.7%). Half of women reported being married (56.4%), and 84.2% were employed.

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4 Most women reported not having significant previous illnesses (84.2%), had a planned  
5 pregnancy (76.2%) and 66.3% were primiparous. Regarding the type of childbirth, there  
6 were a variety of situations: vaginal birth (11.4%), vaginal with forceps or vacuum  
7 (51.5%), and caesarean section (37.1%).  
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12 The situations indicated as traumatic were (in order of reported frequency): perineal  
13 trauma (27.7%), the unexpected change in the type of childbirth (22.8%), baby's health  
14 problems (including preterm) (13.9%), use of forceps/vacuum (13.4 %), lack of pain  
15 control during childbirth (11.4 %), and lack of birth companion presence (8.9 %). The  
16 women were also asked to indicate the level of stress that the experience of the trauma  
17 caused: 70.8% indicated "Extremely stressful" and 14,4% "Very stressful". Most of the  
18 women had PTSD symptoms for more than three months (56.9%). Concerning possible  
19 fears at childbirth, 56.4% reported fear about their own health and 50.5% about the baby's  
20 health.  
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25 [Table 1]  
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30 The means of PTS symptoms calculated for all symptoms were higher than those in the  
31 validation study for the Portuguese population and those in the original study (Osório et  
32 al., 2022). In this sample, 60.4% of women met the criteria for a PTSD diagnosis  
33 following a traumatic childbirth. The assessment of the rumination processes revealed  
34 that the dominant style for women under the study was intrusive (73.3%).  
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39 [Table 2]  
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52 *Assessment of post-traumatic stress symptoms, post-traumatic growth and the rumination*  
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4 The results indicate that women who underwent instrumental delivery (forceps/vacuum)  
5 reported the highest prevalence of PTSD, with 46.7% (57 out of 122) affected (Table 3).  
6  
7 ANOVA analysis revealed significant differences in the means for the Avoidance  
8 (p=0.004) and Hyperarousal (p=0.03) dimensions.  
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13 [Table 3]  
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18 *The associations between rumination and symptoms of post-traumatic stress and post-*  
19 *traumatic growth*  
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23 The results indicate that PTS symptoms were positively correlated with PTG (r=0.157,  
24 p<0.05), and both PTSD and PTG showed positive associations with intrusive rumination  
25 (r=0.623, p<0.001; r=0.202, p<0.05) and deliberate rumination (r=0.400, p<0.001;  
26 r=0.335, p<0.001) (Table 4).  
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32 [Table 4]  
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38 *Mediational model*  
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41 The results of the mediational analysis are presented in Figure 1 and Table 5. The direct  
42 effect of PTS symptoms on PTG was not statistically significant ( $\beta = -0.005$ , SE = 0.11,  
43 p = 0.956). However, PTS symptoms exhibited significant positive associations with both  
44 intrusive rumination ( $\beta = 0.623$ , SE = 0.02, p < 0.001) and deliberate rumination ( $\beta =$   
45 0.40, SE = 0.03, p < 0.001). The path between intrusive rumination and PTG was not  
46 significant ( $\beta = 0.061$ , SE = 0.29, p = 0.498), whereas the path between deliberate  
47 rumination and PTG was significant ( $\beta = 0.309$ , SE = 0.23, p < 0.001).  
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4 Indirect effects revealed that deliberate rumination ( $\beta = 0.17$ ,  $SE = 0.05$ , 95% CI [0.073,  
5 0.285]) rather than intrusive rumination ( $\beta = 0.038$ ,  $SE = 0.06$ , 95% CI [-0.0858, 0.1637])  
6 mediated the association between PTS symptoms and PTG. This indicates that as the  
7 number of PTSD symptoms increases, women are more likely to engage in deliberate  
8 rumination, and higher engagement in deliberate rumination is associated with greater  
9 PTG. Table 5 highlights the significance of rumination in the relationship between PTS  
10 symptoms and PTG.  
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18 [Figure 1]  
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21 [Table 5]  
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## 27 DISCUSSION

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29 The aim of this study was to investigate the association between post-traumatic stress  
30 symptoms and post-traumatic growth in women who underwent traumatic childbirth,  
31 examining the potential mediating role of both intrusive and deliberate rumination.  
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36 Findings revealed that the women in this study suffered from a significant level of  
37 postpartum PTS symptoms and 60.4% met the DSM-5 criteria for PTSD (Friedman et al.,  
38 2021; Kranenburg, et al., 2023; Nakić Radoš et al., 2020).  
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43 We observed higher rates of PTSD among women who underwent instrumental childbirth  
44 (forceps or vacuum) and those who had a caesarean section. The choice of childbirth  
45 method can be influenced by a woman's preference or clinical necessity, irrespective of  
46 her informed consent. Instrumental childbirth or the use of episiotomy can evoke fear in  
47 women, often leading to diminished respect for their dignity (Jiang et al., 2017). Pop-  
48 Jordanova (2022) examines various factors contributing to PTSD during the perinatal  
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4 period, including instrumental childbirth (forceps or vacuum), as well as other contextual  
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6 variables such as hospitalization, history of psychiatric disorders, and subjective distress  
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8 during labour and obstetrical emergencies.  
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11 Women identified perineal trauma and unexpected changes in the type of childbirth as  
12  
13 the most traumatic experiences. These findings underscore the significance of women's  
14  
15 inability to realize their preferred birthing experience and the occurrence of postnatal  
16  
17 complications in determining a traumatic childbirth.  
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19  
20 Intrusive and deliberate rumination can predict post-traumatic growth differently, with  
21  
22 intrusive rumination generally viewed as a negative predictor of growth (Lafarge et al.,  
23  
24 2020). Our findings align with prior research indicating no correlations between intrusive  
25  
26 rumination and post-traumatic growth (e.g., Cordova et al., 2007; Morris and  
27  
28 Shakespeare-Finch, 2011), and that deliberate rumination can foster growth (Lindstrom  
29  
30 et al., 2013; Triplett et al., 2012; Zhou et al., 2015). Deliberate rumination allows  
31  
32 individuals to process and engage in cognitive work to understand their experiences  
33  
34 (Calhoun et al., 2011). Hence, a more intentional and reflective form of rumination, where  
35  
36 individuals purposefully seek to comprehend events and related changes (Cann et al.,  
37  
38 2011), may be more effective in promoting post-traumatic growth within this context.  
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40 While some suggest intrusive rumination is crucial for processing traumatic events and  
41  
42 engaging in deliberate rumination (Cann et al., 2011), further research is needed to  
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44 evaluate this hypothesis.  
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47  
48 Women who have experienced traumatic childbirth, regardless of the type of delivery,  
49  
50 may be prone to ruminating about the experience (Lafarge et al., 2020). This may involve  
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52 replaying the events mentally, persistently contemplating what could have been done  
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54 differently, or dwelling on negative emotions associated with the childbirth experience.  
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4 Regarding the association of rumination and post-traumatic stress symptoms, our study  
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6 findings demonstrate a robust correlation between post-traumatic stress symptoms and  
7  
8 rumination (whether intrusive or deliberate). However, in examining the relationship  
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10 between post-traumatic stress symptoms and post-traumatic growth, we only observed a  
11  
12 moderate effect size for the correlation between post-traumatic growth and rumination  
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14 (whether intrusive or deliberate).  
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17 While it is imperative for healthcare providers to take preventive measures to mitigate  
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19 birth trauma whenever feasible (Leinweber et al., 2022; Watson et al., 2021), for those  
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21 who undergo traumatic childbirth, healthcare providers should remain attentive to  
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23 potential impacts and offer appropriate support and resources to help women process their  
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25 birth experiences (Isbir et al., 2022; Stevens et al., 2021). Given the positive association  
26  
27 between deliberate rumination and post-traumatic growth, interventions promoting  
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29 reflective thinking and narrative construction would be beneficial for women  
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31 experiencing birth trauma, particularly those facing high levels of distress and/or at risk  
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33 of complicated grief (Lafarge et al., 2020).  
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## 40 CONCLUSIONS AND CLINICAL IMPLICATIONS

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42 The examination of the association between post-traumatic stress symptoms (PTSS) and  
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44 post-traumatic growth (PTG) in women following traumatic childbirth, alongside the  
45  
46 investigation of intrusive and deliberate rumination as potential mediators, offers nuanced  
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48 insights with pertinent implications for healthcare practice. Our findings revealed a high  
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50 prevalence of postpartum PTSS among women, with a substantial proportion meeting  
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52 diagnostic criteria for PTSD. Particularly, instrumental childbirth and caesarean sections  
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54 were correlated with elevated rates of PTSD, highlighting the significance of informed  
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4 decision-making and respectful maternity care practices to mitigate potential traumatic  
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6 birth experiences. These results underscore the necessity for healthcare professionals to  
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8 prioritize women's autonomy and well-being throughout the childbirth process, striving  
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10 to minimize unnecessary interventions and cultivate environments conducive to positive  
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12 birth experiences.

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15 Furthermore, our study elucidated the distinct impacts of intrusive and deliberate  
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17 rumination on PTG, indicating that deliberate rumination may act as a facilitator for  
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19 growth following traumatic childbirth experiences. Interventions focusing on promoting  
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21 reflective thinking and narrative construction hold promise in facilitating PTG among  
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23 women experiencing birth trauma, particularly those confronting distress and complicated  
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25 grief. Healthcare providers, encompassing midwives, psychologists, obstetricians, nurses,  
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27 and mental health specialists, play a pivotal role in delivering empathetic support and  
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29 tailored interventions to assist women in processing their birth experiences and fostering  
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31 resilience in the aftermath of trauma.

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35 In summary, our study underscores the multifaceted nature of traumatic childbirth  
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37 experiences and their implications for maternal mental health and well-being. By  
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39 integrating insights from diverse healthcare disciplines, practitioners can implement  
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41 comprehensive approaches to support women throughout the perinatal period, from  
42  
43 informed decision-making during childbirth to postpartum care emphasizing trauma-  
44  
45 informed practices and psychological resilience-building interventions. Embracing a  
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47 holistic, woman-centered approach is essential in promoting positive birth experiences  
48  
49 and mitigating the adverse psychological sequelae of traumatic childbirth.

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**Table 1**  
*Sociodemographic and Childbirth related Characteristics (N = 202)*

| <b>Characteristics</b>                   |   | <b>(n)</b> | <b>(%)</b> |
|--|---|------------|------------|
| <i>Sociodemographic</i>                  |   |            |            |
| Education                                | Complete basic school                                   | 7          | 3.5%       |
|  | Complete secondary school                               | 33         | 16.3%      |
|  | Bachelor's degree or more                               | 162        | 80.2%      |
| Marital status                           | Single  | 10         | 5%         |
|  | Married/non-marital partnership                         | 188        | 93%        |
|  | Divorced  | 4          | 2%         |
| Occupation status                        | Employed  | 170        | 84.2%      |
|  | Unemployed  | 32         | 15.8%      |
| <i>Previous Medical History</i>          |   |            |            |
| Significant prior illness                | No  | 170        | 84.2%      |
|  | Yes   | 32         | 15.8%      |
| <i>Obstetric</i>                         |   |            |            |
| Parity                                   | Primiparous   | 134        | 66.3%      |
|  | Multiparous   | 68         | 33.7%      |
| Pregnancy planning                       | Planned   | 154        | 76.2%      |
|  | Not planned   | 48         | 23.8%      |
| Childbirth Type                          | Vaginal   | 23         | 11.4%      |
|  | Vaginal with forceps or vacuum                          | 104        | 51.5%      |
|  | Caesarean   | 75         | 37.1%      |
| <i>Childbirth Trauma Events</i>          |   |            |            |
| Related to infant conditions             | Health problems (including prematurity)                 | 28         | 13.9%      |
| Related to delivery problems             | Perineal trauma   | 56         | 27.7%      |
|  | Change in type of delivery                              | 46         | 22.8%      |
|  | Use of forceps  | 27         | 13.4%      |
| Related to loss of control during labor  | Lack of pain control during labor                       | 23         | 11.4%      |
|  | Interdiction of partners' presence in the delivery room | 18         | 8.9%       |
|  | Parturient unexpected health problem                    | 4          | 2%         |
| Self-perceived stress during childbirth  | Not stressful   | 13         | 6.4%       |
|  | Little stressful  | 13         | 6.4%       |
|  | Quite stressful   | 4          | 2%         |
|  | Very stressful  | 29         | 14.4%      |
|  | Extremely stressful                                     | 143        | 70.8%      |
| Duration of stress symptoms              | Less than a month                                       | 51         | 25.2%      |
|  | One to three months                                     | 36         | 17.8%      |
|  | More than three months                                  | 115        | 56.9%      |
| Fear for own health during childbirth    | Yes   | 51         | 25.2%      |
|  | No  | 36         | 17.8%      |
| Fear for baby's health during childbirth | Yes   | 51         | 25.2%      |
|  | No  | 36         | 17.8%      |

**Table 2**  
 Descriptive statistics of the main variables (N = 202)

|  | (n) | Minimum | Maximum | Mean                      |
|--|-----|---------|---------|---------------------------|
| <i>PTDS Symptoms</i>                       |     |         |         |                           |
| Re-experiencing                            | 202 | 0       | 15      | 9.79 (2.37) <sup>a</sup>  |
| Avoidance                                  | 202 | 0       | 6       | 3.39 (1.30) <sup>a</sup>  |
| Negative mood and cognition                | 202 | 0       | 21      | 12.47 (3.71) <sup>a</sup> |
| Hiperarousal                               | 202 | 0       | 18      | 3.39 (1.10) <sup>a</sup>  |
| Total PTDS symptoms                        | 202 | 0       | 60      | 36.34                     |
| <i>PTSD (DSM-5)</i>                        |     |         |         |                           |
|  | (n) | %       |         |                           |
| No   | 80  | 39.6    |         |                           |
| Yes  | 122 | 60.4    |         |                           |
| <i>Post-traumatic growth</i>               |     |         |         |                           |
|  | (n) | Minimum | Maximum | Mean                      |
| Relating to others                         | 202 | 0.00    | 30.00   | 13.48                     |
| New-possibilities                          | 202 | 3.00    | 25.00   | 11.98                     |
| Personal-strength                          | 202 | 1.00    | 20.00   | 10.27                     |
| Spiritual change                           | 202 | 1.00    | 10.00   | 4.17                      |
| Appreciation of life                       | 202 | 3.00    | 15.00   | 8.64                      |
| <i>Rumination styles</i>                   |     |         |         |                           |
|  | (n) | %       |         |                           |
| Intrusive rumination                       | 148 | 73.3    |         |                           |
| Deliberate rumination                      | 54  | 26.7    |         |                           |
| <i>Rumination and styles of rumination</i> |     |         |         |                           |
|  | (n) | Minimum | Maximum | Mean                      |
| Intrusive rumination                       | 202 | 0       | 30      | 22.56                     |
| Deliberate rumination                      | 202 | 0       | 30      | 16.22                     |

Note: a) values calculated in validation to the Portuguese context by Gonçalves (2020)

**Table 3**  
PTSD symptoms and type of childbirth

| PTSD symptoms               | Type of childbirth       | M (SD)       | F      |
|-----------------------------|--------------------------|--------------|--------|
| Re-experiencing             | Vaginal                  | 9.21 (5.83)  | 1.985  |
|                             | Vaginal (forceps/vacuum) | 9.26 (5.12)  |        |
|                             | Caesarean                | 10.69 (4.35) |        |
| Avoidance                   | Vaginal                  | 2.82 (2.63)  | 3.218* |
|                             | Vaginal (forceps/vacuum) | 3.12 (2.43)  |        |
|                             | Caesarean                | 3.94 (2.34)  |        |
| Negative mood and cognition | Vaginal                  | 10.86 (7.42) | 1.888  |
|                             | Vaginal (forceps/vacuum) | 12.00 (7.32) |        |
|                             | Caesarean                | 13.61 (5.46) |        |
| Hiperarousal                | Vaginal                  | 10.26 (6.53) | 3.510* |
|                             | Vaginal (forceps/vacuum) | 9.79 (6.22)  |        |
|                             | Caesarean                | 12.07 (4.69) |        |
| Total PTSD symptoms         | Vaginal                  | 33.17        | 2.781  |
|                             |                          | (21.23)      |        |
|                             | Vaginal (forceps/vacuum) | 34.18        |        |
|                             |                          | (19.74)      |        |
|                             | Caesarean                | 40.32        |        |
|                             |                          | (15.58)      |        |

Note. M = mean; SD = standard deviation; \*  $p < .05$

| PTSD Diagnosys | Type of childbirth       | N=122/202 (60.4%) |
|----------------|--------------------------|-------------------|
|                | Vaginal                  | 15 (12.3%)        |
|                | Vaginal (forceps/vacuum) | 57 (46.7%)        |
|                | Caesarean                | 50 (41.7%)        |
| <b>Total</b>   |                          | 122 (100%)        |

**Table 4***Associations between posttraumatic stress symptoms, posttraumatic growth and rumination*

|                          | 1      | 2      | 3      |
|--------------------------|--------|--------|--------|
| 1. PTSD symptoms         | 1      |        |        |
| 2. Posttraumatic growth  | .157*  | 1      |        |
| 3. Intrusive rumination  | .623** | .202*  | 1      |
| 4. Deliberate rumination | .400** | .335** | .466** |

*Note:* \*\*  $p < .001$ ; \*  $p < .05$

**Table 5**

*The importance of rumination for the relationship between post-traumatic stress symptoms and post-traumatic growth*

| Predictors                   | B      | $\beta$ | Est./S.E. | t       | 95% CI          | p value |
|------------------------------|--------|---------|-----------|---------|-----------------|---------|
| <i>Intrusive rumination</i>  |        |         |           |         |                 |         |
| PTSD symptoms                | 0.266  | 0.623   | 0.024     | 11.263  | [0.219;0.312]   | <0.001  |
| F                            |        |         |           | 126.856 |                 |         |
| R <sup>2</sup>               |        |         |           | 0.388   |                 |         |
| <i>Deliberate rumination</i> |        |         |           |         |                 |         |
| PTSD symptoms                | 0.185  | 0.400   | 0.030     | 6.179   | [0.126;0.244]   | <0.001  |
| F                            |        |         |           | 38.183  |                 |         |
| R <sup>2</sup>               |        |         |           | 0.160   |                 |         |
| <i>Post-traumatic growth</i> |        |         |           |         |                 |         |
| PTSD symptoms                | -0.007 | -0.005  | 0.1193    | -0.056  | [-0.242; 0.229] | 0.956   |
| Intrusive rumination         | 0.197  | 0.061   | 0.289     | 0.679   | [-0.375; 0.768] | 0.498   |
| Deliberate rumination        | 0.922  | 0.309   | 0.229     | 4.032   | [0.471; 1.373]  | <0.001  |
| F                            |        |         |           | 8.568   |                 |         |
| R <sup>2</sup>               |        |         |           | 0.115   |                 |         |

Notes: B – unstandardised coefficients;  $\beta$  – standardised coefficients; CI—Confidence Interval; 95% CI also presented for unstandardised coefficients.

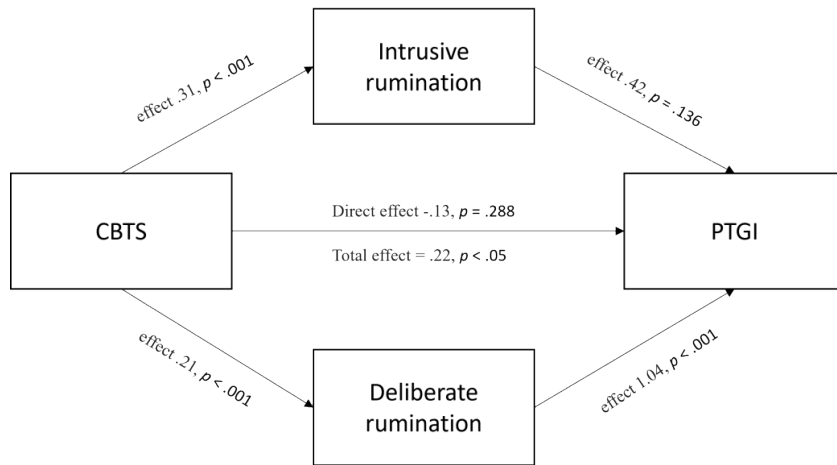


Figure 1 - Mediating Role of Rumination in the Association between Post-Traumatic Stress Symptoms and Post Traumatic Growth

Figure 1 Alt Text: Mediation Model Scheme