



The Mediating Role of Parenting Stress in the Relationship Between Anxious and Depressive Symptomatology, Mothers' Perception of Infant Temperament, and Mindful Parenting During the Postpartum Period

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Abstract

Objectives To investigate whether mindful parenting differs according to maternal anxious and/or depressive symptomatology and mothers' perception of infant temperament and to explore the potential mediating role of parenting stress in the relationship between anxious and depressive symptomatology, perception of infant temperament, and mindful parenting.

Methods The sample comprised 560 mothers (18–46 years) with a child 12 months old or younger, who completed the Hospital Anxiety and Depression Scale, the Parental Stress Scale and the Interpersonal Mindfulness in Parenting Scale—Infant version.

Results Approximately 22.1% of the mothers presented clinically significant anxious and depressive symptomatology levels. Those mothers had significantly higher levels of parenting stress and lower levels of mindful parenting than mothers with normal levels of anxious and depressive symptomatology. Mothers who perceived their infant temperament as difficult had significantly higher levels of parenting stress and lower levels of mindful parenting than those who perceived their infant temperament as easier. A path model was tested through structural equation modeling. Parenting stress mediated the relationship between anxious and depressive symptomatology and mothers' perception of infant temperament and mindful parenting.

Conclusions Parenting stress seems to be an important mechanism explaining the associations between maternal anxious and depressive symptomatology, the perception of infant temperament, and mindful parenting. During the postpartum period, it is important to identify mothers with anxious/depressive symptomatology, as they appear to contribute to parenting stress and to be related to parenting skills. Psychological interventions may focus on reducing that symptomatology and parenting stress and promoting mindful parenting skills.

Keywords Mindful parenting · Parenting stress · Anxious and/or depressive symptomatology · Postpartum

The transition to parenthood encompasses several changes at a personal and interpersonal level (Akiki et al. 2016), such as the acquisition of a new role and new care tasks (Caroli and Sagone 2014). Even if being a parent is one of the most significant and gratifying experiences in an individual's life, the emotional, behavioral, and cognitive readjustments that occur in the early parental period can increase one's vulnerability to

developing psychopathology (e.g., Czarnocka and Slade 2000; Epifanio et al. 2015; Goodman 2004) and can generate stress (Razurel et al. 2011), particularly parenting stress (Epifanio et al. 2015).

Some studies have demonstrated that parental psychopathology or psychopathological symptoms in the postpartum period, including postpartum depression (Carter et al. 2001; Kleinman and Reizer 2018) and anxious symptomatology (Seymour et al. 2015), as well as parenting stress (Moe et al. 2018) and other variables such as a negative perception of the infant temperament (Mäntymaa et al. 2006), are risk factors for negative parenting behaviors, such as hostility, lower sensitivity, and dysfunctional interactions in the first 12 months after birth (Goodman et al. 2017). Therefore, it is plausible that these factors can also negatively influence the parents'

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ability to adopt a mindful parenting approach in their relationship with their baby. Nevertheless, the role of these parental variables in mindful parenting in the postpartum period has not yet been investigated. Considering that the quality of the early parent-child relationship has long-term consequences for the well-being (Shaddix and Duncan 2016) and the development of the child at several levels (Miller et al. 2011), it is of utmost importance to understand which factors can influence parenting behaviors and styles, including a mindful parenting style, in this early parenting period.

Mindful parenting is the application of mindfulness to the parenting context, and it can be defined as a way of parenting that involves bringing mindful awareness to parent-child interactions (Bögels and Restifo 2014). Therefore, mindful parenting reflects the parents' capacity to interact with the child in a more accepting, emotionally attuned, and compassionate way (Coatsworth et al. 2018). Mindful parenting is a parenting style that encompasses several aspects, such as *listening with full attention* (i.e., directing complete attention to the child and being fully present during parent-child interactions), *self-regulation in the parenting relationship* (i.e., being able to pause before reacting in order to choose parenting behaviors that are in accordance with values and goals), *emotional awareness of the child* (i.e., noticing and correctly identifying child's emotions), *compassion for the child* (i.e., being kind to and supportive of the child, sensitive, and responsive to the child's needs), and a *non-judgmental acceptance of parental functioning* (i.e., accepting the characteristics and behaviors of the child, the self as a parent and the challenges of parenting) (de Bruin et al. 2014; Duncan et al. 2009; Moreira and Canavarro 2017). The quality of the parent-child relationship can be improved through the promotion of these dimensions, which allow parents to develop a non-reactive, calm, and consistent stance towards their children that is in accordance with their parenting values and goals. In addition, mindful parents might also be more able to interrupt a judgmental attitude when interacting with their child and to objectively assess in the present moment the child's behavior and the parent-child interaction, which in turn can improve the parent-child relationship (Duncan et al. 2009).

Several studies have demonstrated positive associations between mindful parenting and positive outcomes for the parent, child, and their relationship. For instance, higher levels of mindful parenting were found to be associated with more positive parental practices (Coatsworth et al. 2010, 2018; Gouveia et al. 2016; Han et al. 2019; Williams and Wahler 2010) and more positive parent-child relationships (Coatsworth et al. 2010, 2018; Medeiros et al. 2016). Nevertheless, these studies were conducted among parents of children and adolescents, and research on mindful parenting in the postpartum period is virtually nonexistent. Some exceptions are the study of Laurent et al. (2017) that explored the effects of mindful parenting on mothers' and their infants' cortisol levels during the

first 6 months postpartum; the study developed by Potharst et al. (2017) that demonstrated the efficacy of a mindful parenting training for parents of babies up to 18 months in reducing parenting stress, maternal psychopathology and hostility towards the baby, and promoting mindful parenting, mindfulness, self-compassion, well-being, confidence in parenting, parental affection, and responsivity; and also the studies developed by Short et al. (2017), Gannon et al. (2017), and Gannon et al. (2019) that developed a mindfulness-based parenting intervention for mothers with opioid use disorder and demonstrated its efficacy in improving the quality of parenting behaviors and dyadic attachment.

In fact, there is ample evidence that mindful parenting can predict several parent and child outcomes; nevertheless, the research on the variables that can facilitate or hinder the adoption of this parental approach, particularly in the postpartum period, is still very scarce. According to Belsky's (1984) process model of the determinants of parenting, parental functioning (e.g., parenting styles, parenting stress) is directly influenced by variables related to the parent (e.g., personality and psychopathology), the child (e.g., the child's characteristics such as temperament), and the broader social context in which the parent-child relationship is embedded (e.g., marital relations, social networks, and occupational experiences of parents). Several studies, including longitudinal studies, have consistently supported this model among parents in the postpartum period (e.g., Goodman et al. 2017; Letourneau et al. 2013; Zheng et al. 2018), demonstrating that parenting behaviors are strongly influenced by a myriad of intrapersonal, interpersonal, and contextual factors.

For instance, experiencing psychopathological symptoms, such as anxious and depressive symptoms, has consistently been shown to constitute a risk for the mother-infant dyad (Carter et al. 2001; Hipwell et al. 2000; Milgrom and Holt 2014). In fact, mothers with psychopathology or experiencing psychopathological symptoms during the postpartum period have greater difficulties in their parenting role, tend to respond less to their infant's cues (Missler et al. 2018; Warnock et al. 2016), and their interactions with their infants tend to be of lower quality (Aoyagi et al. 2019; Carter et al. 2001; Goodman et al. 2017; Horowitz et al. 2019; Jones et al. 2019; Ngai et al. 2010; Tietz et al. 2014). Some recent literature reviews suggested that postpartum depression has a long-term negative effect on children's social, emotional, cognitive, and physical development (Slomian et al. 2019) and that experiencing anxiety in the postpartum period negatively affects breastfeeding, early interactions, temperament, sleep, and the cognitive development of the child (Field 2018).

Studies with parents of older children have also suggested that mothers' psychopathological symptoms, particularly anxious and depressive symptoms, negatively interfere with their ability to adopt a mindful stance in parenting. For instance, in a study that included a community sample of parents of

school-aged children and adolescents, higher levels of parental anxious and depressive symptomatology and higher levels of parenting stress were found to predict lower levels of mindful parenting dimensions (Moreira et al. 2019). Similarly, another study that included 685 mother-adolescent dyads from the general community demonstrated that mothers with clinically significant levels of anxious and/or depressive symptomatology (i.e., mothers who scored above the cut-off of the Hospital Anxiety and Depression Scale) presented significantly lower levels of mindful parenting than those in the normal range of symptomatology (Moreira and Canavarro 2018b).

With regard to the child's variables, infant temperament has been shown to be particularly important to the parental functioning in the postpartum period. Infant temperament has been defined as the infant's ability to adapt comfortably to the demands or requirements of each situation and to adjust behavior in a flexible way (DelCarmen-Wiggins and Carter 2004) and can explain infants' individual differences in emotional and behavioral responses to internal and external stimuli (Stifter and Wiggins 2004). A difficult infant temperament, characterized, for instance, by fussing, crying, or requiring a long time to regulate negative affect, has been shown to negatively affect family interactions (Stifter and Wiggins 2004), increase mothers' difficulty in providing care for the baby (Zheng et al. 2018), and increase mothers' parenting stress. In fact, a more irritable, demanding, or withdrawn child can elicit parental irritation and withdrawal of contact or stimulation (Putnam et al. 2002). According to Putnam et al. (2002), mothers who negatively perceive their infant temperament seem to be less sensitive in mother-child interactions. There is also some longitudinal (e.g., Porter and Hsu 2003) and cross-sectional (Mäntymaa et al. 2006) studies, conducted among parents in the postpartum period, showing that mothers who negatively perceive their infant temperament have poor maternal behavior and less sense of self-efficacy in parenting.

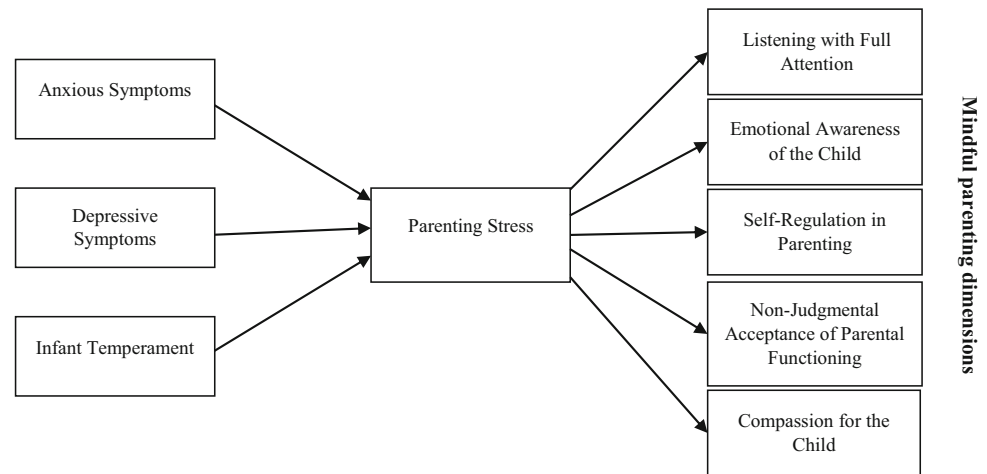
Both parental anxious and depressive symptomatology (Crugnola et al. 2016) and a negative perception of infant temperament (Kwon et al. 2006; McBride et al. 2002; Oddi et al. 2013) can generate high levels of parenting stress. This result is problematic because parenting stress is a factor that has an important impact on early mother-infant interactions and later child development (Booth et al. 2018; Dau et al. 2019; Deater-Deckard 1998; Vismara et al. 2016). Parenting stress has been associated with the development of dysfunctional parent-child relationships, and it is an important risk factor for child psychopathology (e.g., emotional and behavioral problems in children) (Deater-Deckard 1998; Fredriksen et al. 2019; Kennedy 2012). Furthermore, parenting stress constitutes a risk factor for negative parenting behaviors, as shown in several longitudinal studies with parents of babies (Dau et al. 2019; Le et al. 2017; Oxford and Lee 2011) and preschool and elementary school children (Rafferty and Griffin 2010; Respler-Herman et al. 2012). For instance, a

longitudinal study developed by Dau et al. (2019) showed that higher levels of parenting stress were associated with lower maternal sensitivity and lower positive regard for the child.

There is also evidence that parenting stress decreases parents' capacity to adopt a mindful approach in parenting (Beer et al. 2013; Bögels and Restifo 2014; Corthorn 2018; Corthorn and Milicic 2016; Gouveia et al. 2016; Moreira and Canavarro 2018a). For instance, in a study that included mothers of children and adolescents from the general community, Moreira and Canavarro (2018a) demonstrated that parenting stress was significantly and negatively associated with all dimensions of mindful parenting. Similarly, Gouveia et al. (2016) demonstrated that the parenting stress of fathers and mothers of children aged 8 to 18 years was negatively associated with both mindful parenting and an authoritative parenting style and was positively associated with permissive and authoritarian parenting styles. Although there is growing evidence that parenting stress has a detrimental effect on the ability of parents of children and adolescents to adopt a mindful parenting style, far less attention has been devoted to examining this association in the postpartum period.

Considering that parental functioning is determined by multiple factors (Belsky 1984) and that the postpartum period marks the beginning of mutual interactions that are crucial to the mother-baby relationship (Nagata et al. 2003), it is very important to identify and better understand which variables and mechanisms can be related to parental behaviors and facilitate or hinder the adoption of adaptive parenting styles, such as a mindful parenting style. There is evidence that parental psychopathological symptoms (particularly, anxious and depressive symptoms), a negative perception of the infant temperament, and parenting stress in the postpartum period represent risk factors for negative parental behaviors (Epifanio et al. 2015; Micalizzi et al. 2017). The current study intends to investigate whether levels of mindful parenting dimensions differ according to mothers' levels of anxious and/or depressive symptomatology and according to the mothers' perception of their infant temperament. Based on previous studies, we hypothesize that mothers who report clinically significant levels of anxious and/or depressive symptomatology and who have a more negative perception of their infant temperament will exhibit lower levels of mindful parenting. We also intend to examine whether parenting stress mediates the relationship between three important parent or child variables (i.e., anxious symptoms, depressive symptoms and infant temperament) and mindful parenting dimensions. We hypothesize that parenting stress will mediate the relationship between anxious and depressive symptomatology and mindful parenting, as well as the relationship between the mother's perception of their infant temperament and mindful parenting. The conceptual model of the current study is presented in Fig. 1.

Fig. 1 Conceptual model of the current study



Method

Participants

The sample included 560 Portuguese mothers of babies aged between 0 and 12 months old. Most mothers were living in a nuclear family type (i.e., a family with two parents and their children), had completed higher education, and were employed. The sociodemographic and clinical characteristics of the mothers and their children are presented in Table 1.

Procedure

The sample was recruited online through a data collection website (LimeSurvey®). The participants were invited to participate in a study through social networks, including parenting forums and Facebook pages, about parenting issues after the birth of a child. A Facebook page about parenting and mental health during the postpartum period was specifically created for the study, and several advertisements were posted on that page, as well as on other Facebook pages and social networks, explaining the main goals of the study, presenting the study's inclusion criteria, and containing the web link to the survey hosted in LimeSurvey®. The page was shared through unpaid cross-posting, through paid boosting campaigns and through e-mail. Participants' enrollment in the study occurred between December 2018 and February 2019. The inclusion criteria were (i) being Portuguese, (ii) being over 18 years old, and (iii) having at least one child between 0 and 12 months old.

The first page of the online protocol provided a description of the study objectives, the inclusion criteria, and the ethical statement of the study. The participants were informed that their participation in the study was voluntary and anonymous and that no identifying information would be collected. Only those who agreed to the study conditions and provided their informed consent completed the assessment protocol. Of the

632 completed questionnaires, 17 mothers were excluded because of their nationality (they were not Portuguese), 13 mothers were excluded because their babies were more than 12 months old, and 42 mothers were excluded because of missing information on one or more important sociodemographic variables.

Measures

Sociodemographic and Clinical Information The first part of the web survey started with standard sociodemographic information (e.g., age, marital status, educational level, employment status, and average monthly income) and clinical data (e.g., obstetric information and prior history of psychopathological problems). The diagnosis of a psychological or psychiatric disorder was assessed through the following question: "Are you currently diagnosed with a psychological or psychiatric problem (e.g., anxiety, depression)?"

Anxious and Depressive Symptomatology The Portuguese version of the Hospital Anxiety and Depression Scale (HADS; Snaith and Zigmond 1994; Pais-Ribeiro et al. 2007) was used to assess levels of anxious and depressive symptomatology in the previous week. This questionnaire contains 14 items (e.g., "I feel tense or wound up"; "I still enjoy the things I used to enjoy") and uses a 4-point Likert scale, ranging from 0 (*not at all/only occasionally*) to 3 (*most of the time/a great deal of the time*), with higher scores indicating higher levels of symptomatology. Scores between 0 and 7 are considered "normal"; between 8 and 10, "mild"; between 11 and 14, "moderate"; and between 15 and 21, "severe". According to Snaith (2003), scores of 11 or higher indicate the possible presence (i.e., "caseness") of a mood disorder. This instrument has been demonstrated to be a good screening instrument in different clinical populations and has shown robust psychometric properties across a wide range of populations and cultures, including in the Portuguese population, in which the questionnaire

Table 1 Sociodemographic and clinical characteristics of the sample

	N = 560
Parents' characteristics	
Mothers' age (years) M(SD); range	32.81 (4.65); 18–46
Marital status n (%)	
Living with a partner	535 (95.5%)
Not living with a partner	25 (4.5%)
Type of family n (%)	
Single-parent	14 (2.5%)
Nuclear	488 (87.1%)
Reconstituted	8 (1.4%)
Extended	50 (8.9%)
Number of children M(SD); range	1.39 (0.64); 1–5
Education n (%)	
Basic or secondary education	151 (27%)
Higher education	409 (73%)
Employment status n (%)	
Employed	467 (83.4%)
Unemployed, housewives, full-time mothers, students	93 (16.6%)
Household monthly income^a n (%)	
Less than 2000€	408 (72.9%)
2000€ or above	152 (27.1%)
Area of residence n (%)	
Urban	411 (73.4%)
Rural	149 (26.6%)
Babies' characteristics	
Age (months) M(SD); range	5.29 (3.14); 0–12
Sex n (%)	
Girls	266 (47.5%)
Boys	294 (52.5%)
Mothers' clinical characteristics	
Desired pregnancy	
Yes	546 (97.5%)
No	14 (2.5%)
Planned pregnancy	
Yes	426 (76.1%)
No	134 (23.9%)
Current diagnosis of a psychological and/or psychiatric problem	
Yes	34 (6.1%)
No	526 (93.9%)
Current psychological treatment	
Yes	33 (5.9%)
No	527 (94.1%)
Method of conception	
Spontaneous	524 (93.6%)
Medically assisted	36 (6.4%)
Obstetric complications	
In mothers	167 (29.8%)
In babies	36 (6.4%)

^a The Portuguese minimum wage in 2019 was 600€

presented adequate reliability and construct validity (Pais-Ribeiro et al. 2007). In this sample, Cronbach's alpha coefficients were 0.83 for anxiety and 0.78 for depression.

Infant Temperament A self-report item was developed by the authors to assess the mothers' perception of their infant temperament (“In general, I consider that my infant temperament is...”), which was answered on a 4-point Likert scale (1—*very difficult*; 2—*difficult*; 3—*easy*; 4—*very easy*). Therefore,

higher scores on this variable suggested that the mother perceived an easier temperament.

Parenting Stress The Portuguese version of the Parental Stress Scale (PSS; Berry and Jones 1995; Mixão et al. 2010) was used to assess the distress associated with the parental role. The questionnaire has 18 items (e.g., “Caring for my child(ren) sometimes takes more time and energy than I have to give”) answered on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The total score is calculated as the sum of the items, with higher scores indicating higher parenting stress. Both the original and the Portuguese versions present adequate psychometric properties, including adequate reliability ($\alpha > .80$) and construct validity. In this sample, Cronbach's alpha coefficient was 0.86.

Mindful Parenting An adaptation of the Portuguese Interpersonal Mindfulness in Parenting Scale (IM-P - Infant version) (Duncan 2007; Moreira and Canavarro 2017) was used to assess mindful parenting among parents of infants. The infant version is similar to the original Portuguese IM-P, but items were adapted for parents of infants. For instance, the item “I often react too quickly to what my child says or does” was modified to “I often react too quickly when my baby gets agitated or cries”. Item 4 was deleted (“I listen carefully to my child's ideas, even when I disagree with them”). Therefore, the final Portuguese IM-P—infant version contains 28 items scored on a 5-point response scale, ranging from 1 (*never true*) to 5 (*always true*). The items are distributed across five subscales, following the structure of the Portuguese IM-P version (Moreira and Canavarro 2017): (1) listening with full attention (LFA) (e.g., “I find myself paying little attention to my baby because I am busy doing or thinking about something else at the same time”); (2) compassion for the Child (CC) (e.g., “I am kind to my baby when he/she is tearful, restless or upset with something”), (3) non-judgmental acceptance of parental functioning (NJAPF) (e.g., “I tend to criticize myself for not being the kind of parent I want to be”), (4) self-regulation in parenting (SR) (e.g., “I am upset with my baby, I notice how I am feeling before I take action”), and (5) emotional awareness of the child (EAC) (e.g., “It is hard for me to tell what my baby is feeling”). The subscale scores are the sum of the items, and higher scores indicate higher levels of the mindful parenting dimensions. If the parents had more than one child, they were instructed to focus on their baby aged between 0 and 12 months old.

The IM-P scores have shown reliability and construct validity in American and Dutch samples (de Bruin et al. 2014; Duncan 2007). The Portuguese IM-P has also shown adequate psychometric properties, including reliability and construct validity (Moreira and Canavarro 2017). As this is an adapted version of the original IM-P, a confirmatory factor analysis (CFA) was conducted in the present sample to confirm

whether the IM-P five-factor structure would fit the data. A correlated five-factor model exhibited an adequate fit to the data, $\chi^2(337) = 884.14$, $p < .001$; comparative fit index (CFI) = 0.903; standardized root mean square residual (SMSR) = 0.053; and root mean square error of approximation (RMSEA) = 0.054, with 90% bias-corrected confidence interval, BC90%CI = [0.05, 0.06]. In this sample, Cronbach's alpha coefficients were 0.84 for listening with full attention, 0.76 for Compassion for the child, 0.77 for non-judgmental acceptance of parental functioning, 0.75 for self-regulation in parenting, and 0.68 for emotional awareness of the child.

Data Analyses

Data analyses were conducted using the Statistical Package for the Social Sciences (SPSS, version 22.0; IBM SPSS, Chicago, IL) and the AMOS 22 (IBM® SPSS® AMOS™ Version 22.0).

Descriptive statistics were computed for all sociodemographic and study variables. Differences in mindful parenting dimensions and parenting stress were analyzed as a function of the mothers' symptoms of anxiety and depression and their perception of their infant temperament through MANOVAs (for mindful parenting dimensions) and ANOVAs (for parenting stress). Based on HADS cut-off scores, two groups were created: (1) a group with normal/mild anxious and depressive symptomatology (HADS scores < 11 in both subscales; normal symptomatology group) and (2) a group with clinically significant levels of anxious and/or depressive symptomatology (HADS anxious and/or depressive scores ≥ 11 ; clinically significant symptomatology group). Regarding the perception of the infant temperament, two groups were also created: (1) easy temperament (mothers who rated their infant temperament as "easy" or "very easy") and (2) difficult temperament (corresponding to mothers who rated their infant temperament as "difficult" or "very difficult"). Pearson correlations between study variables were computed. Cohen's guidelines (1988) were used to describe and interpret the effect sizes of correlations (i.e., small effect size for correlations close to 0.10, medium for those near 0.30, and large for correlations 0.50 or higher).

To examine whether mothers' anxious and depressive symptomatology and their perception of their infant temperament were associated with mindful parenting dimensions through parenting stress, a path model was tested using the maximum likelihood estimation method. In the path model, continuous scores previous comparison analyses. The criteria for a good model fit were used rather than the categories used for the were a non-significant χ^2 ($p > .05$), CFI ≥ 0.95 , RMSEA ≤ 0.06 , and SRMR ≤ 0.08 (Hu and Bentler 1999). The statistical significance of the indirect effects was estimated using bootstrap resampling procedures with 5000 samples and a 95% bias-corrected confidence interval (BC95%CI).

Results

Mindful Parenting Dimensions and Parenting Stress: Comparative Analyses

Anxious and Depressive Symptomatology Most mothers reported normal or mild levels of anxious and/or depressive symptomatology ($n = 436$, 77.9%) and 22.1% ($n = 124$) reported clinically significant levels of those symptoms (i.e., scored ≥ 11 on one or both HADS subscales). These groups (normal symptomatology versus clinically significant symptomatology) were compared in terms of levels of mindful parenting. The multivariate effect was significant, Wilk's Lambda = 0.824, $F(5, 554) = 23.73$, $p < .001$, $\eta^2_p = 0.176$. As presented in Table 2, significant differences were found in all mindful parenting dimensions, with mothers who had clinically significant levels of anxious and/or depressive symptomatology reporting lower levels of all mindful parenting dimensions than mothers who had normal levels of anxious and/or depressive symptomatology.

The two groups were also compared in terms of levels of parenting stress. As presented in Table 2, significant differences were found in levels of parenting stress, with mothers who had clinically significant levels of anxious and/or depressive symptomatology presenting higher levels of parenting stress than mothers who had normal levels of those symptoms.

Infant Temperament Most mothers rated their infant temperament as being easy/very easy ($n = 444$; 79.3%), and 20.7% ($n = 116$) rated their infant temperament as being difficult/very difficult. These two groups were compared in terms of levels of mindful parenting dimensions. The multivariate effect was significant, Wilk's Lambda = 0.942, $F(5, 554) = 6.81$, $p < .001$, $\eta^2_p = 0.058$. As presented in Table 2, significant differences were found in almost all mindful parenting dimensions, with mothers who perceived their infant temperament as being difficult/very difficult presenting lower levels of all mindful parenting dimensions, with the exception of the dimension listening with full attention.

Significant differences were also found in parenting stress levels, with mothers who perceived their infant temperament as being difficult/very difficult presenting higher levels of parenting stress than mothers who perceived their infant temperament as being easy/very easy.

Correlations Between Variables

Correlations between study variables are presented in Table 3. All correlations were significant ($p < .01$), except for the correlation between temperament and listening with the full attention. Anxiety and depression were positively correlated with parenting stress and negatively correlated with mothers' perception of infant temperament and all mindful parenting

Table 2 Comparison analyses according to symptoms of anxiety and depression and infant’s temperament

	Symptoms of Anxiety and Depression					Perception of Infant Temperament				
	No symptoms group <i>M (SD)</i> <i>n</i> = 436	Clinically significant symptoms of anxiety and depression group <i>M (SD)</i> <i>n</i> = 124	Comparison analyses			Easy perceived temperament <i>M (SD)</i> <i>n</i> = 444	Difficult perceived temperament <i>M (SD)</i> <i>n</i> = 116	Comparison analyses		
			<i>F</i>	η^2_p	<i>p</i> values			<i>F</i>	η^2_p	<i>p</i> values
LFA	21.10 (2.85)	19.77 (3.36)	19.31	0.033	< .001	20.89 (2.93)	20.49 (3.32)	1.61	0.003	.205
EAC	11.69 (1.84)	10.73 (2.12)	24.33	0.042	< .001	11.68 (1.85)	10.72 (2.11)	23.43	0.040	< .001
SR	30.92 (4.23)	27.60 (4.81)	55.97	0.091	< .001	30.59 (4.31)	28.65 (5.21)	17.00	0.030	< .001
NJAPF	25.74 (4.49)	20.92 (4.40)	112.21	0.167	< .001	25.11 (4.78)	23.01 (5)	17.40	0.030	< .001
CC	22.33 (2.21)	21.39 (2.73)	15.85	0.028	< .001	22.28 (2.22)	21.53 (2.78)	9.21	0.016	.003
PSS	36.39 (7.72)	45.62 (8.66)	130.48		< .001	37.29 (8.33)	42.82 (9.24)	38.66		< .001

LFA listening with full attention, EAC emotional awareness of the child, SR self-regulation in parenting, NJAPF non-judgmental acceptance of parental functioning, CC compassion for the child, PSS parenting stress

dimensions. Mothers’ perception of infant temperament was negatively correlated with parenting stress and positively correlated with all mindful parenting dimensions, and parenting stress was negatively correlated with all mindful parenting dimensions.

Correlations between sociodemographic, clinical, and study variables were also analyzed to identify potential covariates that should be included in the path model. Listening with full attention was significantly associated with mothers’ age ($r = -.12, p = .005$), parental education level (0 = basic or secondary education, 1 = higher education; $r = -.15, p < .001$), household monthly income (0 = less than 2000€; 1 = 2000€ or above; $r = -.12, p = .004$), and number of children ($r = -.12, p = .005$). Emotional awareness of the child was significantly associated with parental education level ($r = -.09, p = .036$) and baby’s age ($r = .16, p < .001$). Non-judgmental acceptance of parental functioning was significantly associated with mothers’ age ($r = .11, p = .013$), employment status (0 = unemployed; 1 = employed, housewives, full-time mothers, students; $r = .10, p = .015$), and current

psychological treatment (0 = no; 1 = yes; $r = -.13, p = .002$). Therefore, mothers’ age, education level, household monthly income, number of children, employment status, current psychological treatment, and baby’s age were introduced as covariates in the model.

Mediation Analyses

The initial model failed to present an adequate fit to the data, $\chi^2(85) = 837.46, p < .001$; CFI = 0.697; SRMR = 0.098; RMSEA = 0.126, $p < .001$; 90% CI = [.12, .13]. Therefore, modification indices were examined, suggesting that the residuals of some mindful parenting dimensions might be correlated (Listening with Full Attention with Emotional Awareness of the Child, Self-Regulation in Parenting and Compassion for the Child; Emotional Awareness of the Child with Self-Regulation in Parenting and Compassion for the Child; Self-Regulation in Parenting with Non-Judgmental Acceptance of Parental Functioning and Compassion for the Child) and that some covariables might

Table 3 Correlations between study variables

	1	2	3	4	5	6	7	8
1 Anxiety	–							
2 Depression	0.71**	–						
3 Infant temperament	–0.26**	–0.28**	–					
4 Parenting stress	0.58**	0.62**	–0.29**	–				
5 Listening with full attention	–0.25**	–0.27**	0.06	–0.46**	–			
6 Emotional awareness of the child	–0.29**	–0.35**	0.23**	–0.50**	0.45**	–		
7 Self-regulation in parenting	–0.41**	–0.39**	0.21**	–0.54**	0.52**	0.51**	–	
8 Non-judgmental acceptance of parental functioning	–0.55**	–0.51**	0.21**	–0.59**	0.35**	0.43**	0.57**	–
9 Compassion for the child	–0.23**	–0.28**	0.14**	–0.46**	0.53**	0.49**	0.61**	0.37**

* $p < .05$; ** $p < .01$

be correlated (mothers' age with number of children, employment status, and education level; employment status with education level and household monthly income; and education level with household monthly income). The re-specified path model had a good fit to the data, $\chi^2(72) = 178.72, p < .001$; CFI = 0.957; SRMR = 0.054; RMSEA = 0.051, $p = .383$; 90% CI = [0.042, 0.061] and explained 43% of parenting stress, 25.3% of listening with full attention, 29.3% of emotional awareness of the child, 31.8% of self-regulation in parenting, 41.5% of non-judgmental acceptance of parental functioning, and 21.6% of compassion for the child variances (see Fig. 2).

Direct and total effects are presented in Fig. 2, and indirect effects are presented in Table 4. With regard to depression, although the total effects of depression on mindful parenting dimensions were all significant, none of the direct effects were significant. In fact, as presented in Table 4, depression was indirectly associated with all mindful parenting dimensions through parenting stress. Regarding anxiety, there was a significant total effect on listening with full attention and a significant total and direct effect on self-regulation in parenting and non-judgmental acceptance of parental functioning, as presented in Fig. 2. All indirect effects of anxiety on mindful parenting were significant through parenting stress. Finally,

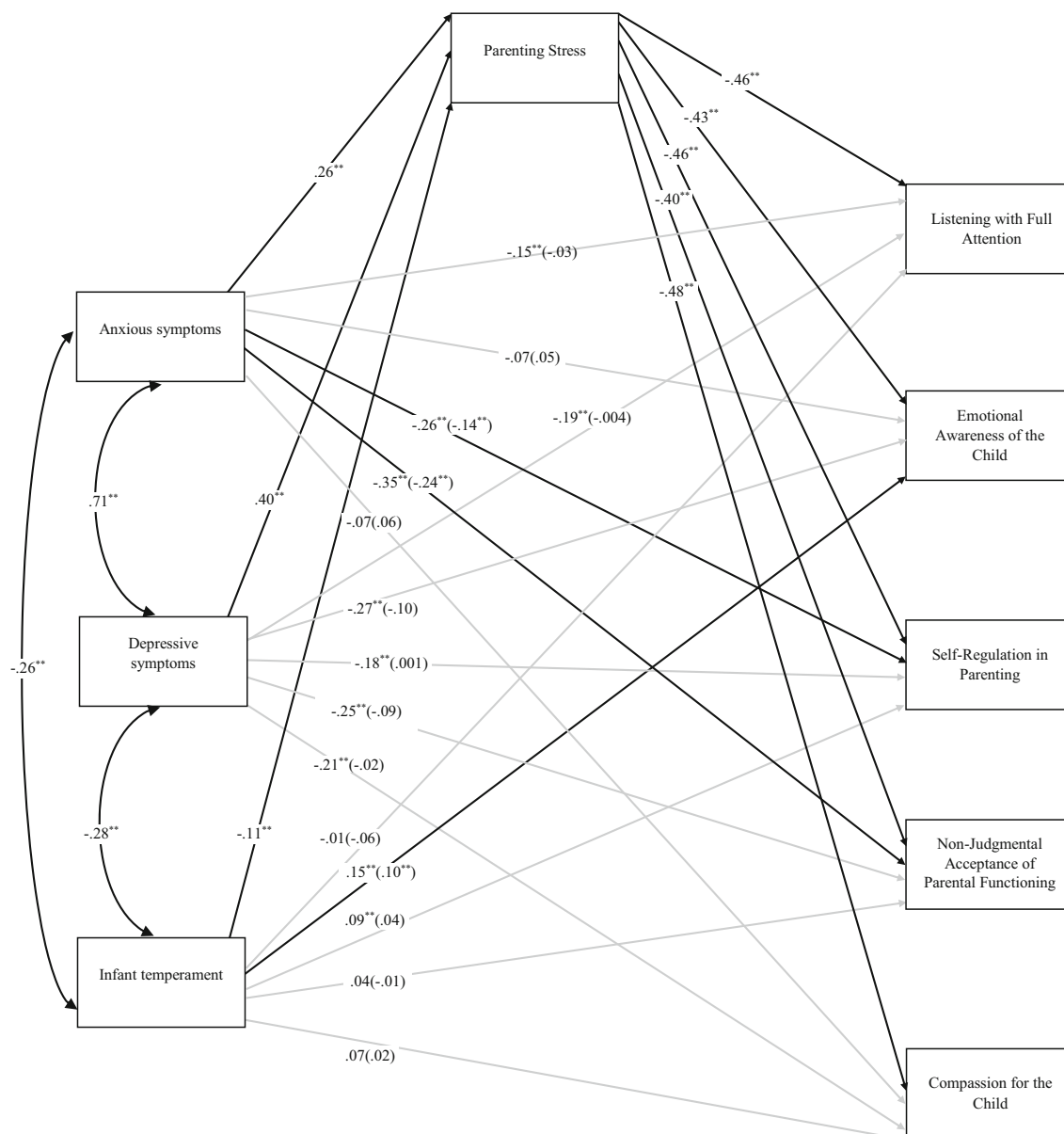


Fig. 2 Path model examining the associations between mothers' anxious symptoms, depressive symptoms, infant temperament, and mindful parenting through parenting stress. Path values represent standardized

regression coefficients of total effects and direct effects (inside parentheses). For simplicity, covariates and measurement error terms are not shown. ** $p < .01$; *** $p < .001$

Table 4 Indirect effects of anxiety, depression and perception of temperament on dimensions of mindful parenting through parenting stress

Indirect effects	Standardized coefficients	<i>p</i> value	BC90%CI Lower/Upper
Anxiety → PSS → LFA	− 0.120	< .001	− 0.173/− 0.075
Anxiety → PSS → EAC	− .113	< .001	− 0.164/− 0.069
Anxiety → PSS → SR	− 0.119	< .001	− 0.174/− 0.073
Anxiety → PSS → NJAPF	− 0.104	< .001	− 0.155/− 0.062
Anxiety → PSS → CC	− 0.127	< .001	− 0.180/− 0.079
Depression → PSS → LFA	− 0.185	< .001	− 0.252/− 0.130
Depression → PSS → EAC	− 0.174	< .001	− 0.238/− 0.121
Depression → PSS → SR	− 0.183	< .001	− 0.251/− 0.126
Depression → PSS → NJAPF	− 0.160	< .001	− 0.220/− 0.110
Depression → PSS → CC	− 0.195	< .001	− 0.268/− 0.137
Infant's temperament → PSS → LFA	0.049	0.001	0.019/0.085
Infant's temperament → PSS → EAC	0.046	0.001	0.019/0.079
Infant's temperament → PSS → SR	0.049	0.001	0.019/0.083
Infant's temperament → PSS → NJAPF	0.043	0.001	0.017/0.072
Infant's temperament → PSS → CC	0.052	0.001	0.021/0.087

the perception of temperament had a significant total effect on self-regulation in parenting and a significant total and direct effect on emotional awareness of the child. Regarding indirect effects, perception of temperament was also indirectly associated with all mindful parenting dimensions through parenting stress.

Discussion

In this study, we aimed to investigate whether mindful parenting differed according to some important parent and child-related factors in the postpartum period (mothers' anxious and/or depressive symptomatology and their perception of infant temperament) and to understand whether the association between these variables and mindful parenting was mediated by parenting stress. Overall, our hypotheses were corroborated. Our findings were consistent with previous studies suggesting that mothers who have higher levels of anxious and depressive symptomatology (e.g., Crugnola et al. 2016) and a more negative perception of their infant's temperament (e.g., Oddi et al. 2013) are at a higher risk of experiencing parenting stress and, consequently, of adopting a less mindful approach in their relationship with their child (e.g., Bögels and Restifo 2014).

Mindful Parenting Dimensions and Parenting Stress

In our sample, 22.1% of the mothers presented with clinically significant levels of anxious and/or depressive symptomatology. These mothers had significantly higher levels of parenting stress and significantly lower levels of mindful parenting than mothers with normal levels of anxious and/or depressive

symptomatology. These findings are consistent with previous studies that have shown that more depressed and anxious mothers feel more parenting stress (Crugnola et al. 2016; Forman et al. 2007; Yamamoto et al. 2017) and have more difficulty engaging in a mindful parenting style (Moreira and Canavarro 2018b). These results may be explained by several factors. First, mothers presenting high levels of depressive symptoms may experience increased rumination and negative thinking, feelings, and body sensations (American Psychiatric Association 2013), which can interfere with a mindful mode of response. This cycle of negative thinking and repetitive thoughts can cause difficulty in decentering or distancing oneself from negative thoughts and can give mothers less space to focus their attention on their child during their interactions, probably making mothers less sensitive and synchronized with their infants (Bögels et al. 2010), which is in line with results of other studies (e.g., Berryhill 2015; Feldman et al. 2004; Pereira et al. 2012; Swain and Ho 2017). Similarly, it has been shown that high levels of anxiety symptoms predispose individuals to selectively attending to threat, requiring the utilization of limited processing resources (Walsh et al. 2009). Moreover, mothers with higher levels of anxiety symptoms excessively focus attention on themselves and on their own symptoms, which can interfere with their capacity to direct their attention to their child (Moreira and Canavarro 2018a), to correctly read their child's behavioral cues, to have an accurate perception of their child's verbal and nonverbal communication, and undermine the mothers' capacity to be responsive to the child's needs and emotions (Duncan et al. 2009). Therefore, we can hypothesize that mothers with higher levels of anxious and/or depressive symptoms have fewer resources available for being openly attentive to and

aware of current experiences, and to maintain focus on the present, particularly when interacting with their infants.

Likewise, our findings have shown that mothers who perceived their infant temperament as difficult presented significantly higher levels of parenting stress and lower levels of mindful parenting than those who assessed their infant temperament as easier, which is in accordance with previous literature (e.g., Oddi et al. 2013). In fact, it is expected that a more irritable, demanding, or withdrawn child would elicit parental irritation and withdrawal of contact or stimulation (Putnam et al. 2002) and generate parenting stress (Mäntymaa et al. 2006). In addition, parents of a child who is difficult to soothe are more likely to respond to this child, particularly in a stressful situation, in a relatively more hostile and punitive way, instead of responding with positive affection (Cha 2018; Putnam et al. 2002). These parents may be more likely to focus on satisfying the immediate needs of the baby (e.g., sleep or feeding) to soothe the baby than to be mindful when interacting with him/her. Therefore, we can hypothesize that having a baby with a difficult temperament can fuel parents' "doing mode" rather than their "being mode" (i.e., the mindful mode) (Williams 2008), consequently hindering parents' ability to adopt a mindful approach in their relationship with their infant.

Parenting Stress Mediation

With regard to the path model, we found that parenting stress mediated the associations between depressive symptoms, anxious symptoms, and infant temperament and all dimensions of mindful parenting. Interestingly, whereas depressive symptoms were only indirectly associated with mindful parenting through parenting stress, anxious symptoms were also directly associated with self-regulation in parenting and with non-judgmental acceptance of parenting functioning; infant temperament was also directly associated with Emotional Awareness of the Child.

Each path of the model can be examined individually. First, we can observe that symptoms of both depression and anxiety were significantly and positively associated with parenting stress. Ruminative and self-critical thoughts in parents with depressive symptoms may lead them to have more difficulty understanding their baby's needs and to perceive themselves as incapable of adjusting to the parental role, consequently leading to higher levels of parenting stress (Leigh and Milgrom 2008). Likewise, parents who experience anxious symptoms may also find it difficult to accept their own limitations as new parents and may feel that they do not meet their self-defined standards in their parental role (Moreira et al. 2019). They might be more likely to involve themselves in behaviors such as seeking reassurance or expressing self-doubt (Ginsburg et al. 2005), which can increase their perception that parenting demands exceed their personal resources to

respond to those demands. Therefore, parents with higher levels of depressive and/or anxious symptomatology may feel less capable of responding to the demands of being a parent (Deater-Deckard 1998), which can greatly increase levels of parenting stress.

We can also observe in the path model that perceiving the infant temperament as being more difficult was associated with higher levels of parenting stress. A baby with a difficult temperament may require a long time to regulate negative affect and may cry or fuss more often than a baby with an easier temperament, which can increase levels of parenting stress. In addition, parents who perceive their baby as having a difficult temperament may find it difficult to have a harder time understanding and responding to the baby's needs, which can reduce their sense of competence in their parent role and may lead them to experience higher levels of stress (Gordo et al. 2018; McBride et al. 2002; Oddi et al. 2013).

In turn, parenting stress was found to be negatively associated with all dimensions of mindful parenting, which is in accordance with previous studies (e.g., Emerson et al. 2019; Gouveia et al. 2016; Moreira and Canavarro 2018a; Zeegers et al. 2019). In general, parenting stress seems to lead to dysfunctional parenting (Abidin 1992), emerging as an important mechanism explaining the associations between the three hypothesized predictors and all dimensions of mindful parenting. Parents who experience high levels of parenting stress tend to react automatically in parenting situations (Bögels et al. 2014) and tend to have more difficulty self-regulating, which can make it difficult for them to adopt a mindful and compassionate way of parenting. These parents may also feel less competent as parents and, consequently, may be more critical of their parenting role. Their threat system may be activated more often (Siegel and Hartzell 2013), which may leave them more reactive, less sensitive, and warm during parent-child interactions and, thus, less mindful in their parenting style.

Anxious and Depressive Symptomatology and Mindful Parenting Dimensions

In addition to the indirect associations between anxious symptoms and all mindful parenting dimensions through parenting stress, two direct effects were found between anxious symptoms and two mindful parenting dimensions: self-regulation in parenting and non-judgmental acceptance of parenting functioning.

Mothers with higher levels of anxious symptoms seem to have more difficulty in regulating their emotions and behaviors in parenting situations, regardless of whether or not they experience parenting stress. These results are consistent with some previous research that although conducted with samples of parents of children and adolescents have shown that mothers with anxious symptomatology have more difficulty regulating their emotions and behaviors in parenting situations

(e.g., Moreira et al. 2019; Moreira and Canavarro 2018b). Because anxious mothers are more focused on the threatening and negative aspects of the situations, they may also be more focused on the negative aspects of the relationship with their child, which may lead them to be more impulsive and reactive to their baby's behavior and less able to pause before acting.

With regard to the link between anxious symptoms and non-judgmental acceptance of parenting functioning, we can suppose that mothers with higher levels of anxious symptoms may have their threat system more frequently and more intensely activated, which may lead them to criticize themselves and to remember and pay more attention to negative events more easily (Baumeister and Leary 1995; Gilbert 2014, 2017). Thus, anxious mothers may have more self-critical thoughts and may become more judgmental of their parenting ability and less able to adopt a mindful and compassionate stance towards themselves as parents.

In contrast, the relationship between anxious symptoms and the other dimensions of mindful parenting seems to exist through the experience of parenting stress, which emphasizes the relevance of considering the role of that mediator. When parents experience anxious symptomatology and parenting stress they may find it difficult to accept perceived limitations as parents and feel that they do not meet their self-defined standards in their relationship with their children (Moreira et al. 2019), so they are less able to direct their attention to their child during mother-infant interactions (listening with full attention) and, therefore, fail to notice and correctly identify the child's emotions (emotional awareness of the child). In addition, the experience of parenting stress may explain the mechanism through the negative model of self and increased focus on personal flaws and self-critical rumination, characteristics of anxious individuals, probably impede them from being self-compassionate (Neff and McGehee 2010) and having an attitude of kindness, sensitivity, and responsiveness in parent-child interactions (Compassion for the Child).

Regarding the association between depressive symptoms and mindful parenting, including self-regulation in parenting and non-judgmental acceptance of parenting functioning, it was not direct but mediated by parenting stress. It seems that experiencing depressive symptoms only exerts a role on mindful parenting, because it is associated with increased levels of parenting stress. In fact, while experiencing high anxiety symptoms may make parents more reactive and, therefore, less able to regulate their emotions and behaviors in their relationship with the baby and be compassionate towards themselves as parents, experiencing symptoms of depression may have another effect on mothers. Our results suggest that it is not because they feel more depressed that mothers are automatically less able to adopt a mindful approach to parenting. For this to happen, that is, for depression to play a role in parenting, mothers must experience higher levels of parenting stress, which, in turn, seem to play a detrimental role on

mindful parenting. In fact, mothers who experience depressive symptoms tend to experience more negative affect and to interpret parenting situations in a more negative way (Campbell et al. 2008). Therefore, they may find their infants more demanding and they may experience more parenting stress than mothers who do not experience depressive symptomatology (Leigh and Milgrom 2008; Milgrom et al. 2004). This could lead them less able to regulate their emotions, less sensitive, and responsive in mother-infant relationship (Field 2010). Similarly, that experience of parenting stress by mothers with depressive symptoms could lead them less able to cope with demanding in their mother's role and potentiate a sense of incompetence (Thomason et al. 2014) making them feel more critical and judgmental of their parenting ability instead of adopting an accepting mindful approach in parenting situations and a compassionate stance towards themselves as parents.

Infant Temperament and Mindful Parenting Dimensions

Regarding infant temperament, we found that perceiving the infant temperament as more difficult was indirectly associated with lower levels of all dimensions of mindful parenting through higher levels of parenting stress. In addition to the indirect associations, we also found that infant temperament was directly associated with the dimension emotional awareness of the child. We hypothesize that a negative perception of the infant's temperament most likely leads to a more negative view of the infant's traits, attributes, and behaviors (Duncan et al. 2009) and a greater focus on the negative aspects of the baby (e.g., fussing and crying). In addition, mothers of more difficult babies can direct their attention on meeting the baby's immediate needs (e.g., feeding, comfort) so that the baby can regulate more quickly. If mothers' attention is occupied with infants' needs and how to address them, less awareness is available for infants' emotions and for synchronizing and attuning with them. In fact, some studies have shown that mothers of fussier babies were less responsive (Denham and Moser 1994), and the negative emotionality of infants was negatively related to mother-child synchrony (Feldman 2003; Feldman et al. 1999) compared to mothers of babies with an easier temperament. According to Leclère et al. (2014), synchrony encompasses both the mother's and the child's responsiveness and their emotional capacity to respond to each other. If that capacity is compromised, mothers will likely be less able to be aware of their child's emotions or to engage in a mindful style of parenting.

In contrast, the relationship between a negative perception of infant temperament and the other dimensions of mindful parenting seems to exist through the experience of parenting stress. Parents with a negative perception of infant temperament may have a harder time understanding and responding to

the baby's needs; nevertheless, it is that association with their reduced sense of competence in their parent role (McBride et al. 2002; Oddi et al. 2013) and the excessive attentional focus on competing demands (Wahler and Dumas 1989) that may bring difficulty in focus full attention to the baby and be aware of the present moment in parent-child interactions (Listening with Full Attention) (Gouveia et al. 2019). Besides that, the sense of lack of competence to deal with infant-related demands, characteristics of parenting stress, brings more easily self-judgment for being non-competent, making it more difficult to accept the experience and challenges inherent in parenting (non-judgmental acceptance of parental functioning) and to engage in a kind, sensitive, and responsive attitude to the child's needs (Compassion for the Child). Furthermore, in addition to the negative perception of infant temperament, when parents feel overwhelmed with demands and difficulties that arise within the baby, may become reactive and automatically show hostility or negative effect, which hinders their ability to stop before acting according to their values and goals, and therefore exerting self-regulation in parent-child interactions (Self-Regulation in Parenting).

Limitations and Future Research Directions

This study has some limitations that should be mentioned. First, this is a cross-sectional study, and therefore, causal relationships cannot be inferred. Given the cross-sectional design of this study, it is also possible that higher levels of mindful parenting lead to lower levels of parenting stress and of anxious and depressive symptoms and to a more positive perception of the baby's temperament. Parents who are usually more mindful in the relationship with their baby may feel better able to cope with all the challenges that postpartum parenting entails (Potharst et al. 2017). By bringing mindful awareness into interactions with the baby, parents may feel calmer and less disturbed or stressed even when they encounter more challenging parenting situations. The non-judgmental and present-centered awareness that characterizes mindful parenting can support parents in becoming aware of increasing levels of stress, helping them make more conscious decisions instead of having impulsive reactions that are driven by stress (e.g., Zeegers et al. 2019). In addition, when mothers have their awareness more present-centered, it is more likely that they are able to create more distance of negative and ruminative thoughts, which may help them in interpreting challenging parenting situations with more openness and acceptance. That is, mothers who are more mindful and better in self-regulating their emotions in parenting situations can also be more likely to experience lower levels of anxious or depressive symptomatology (Potharst et al. 2017; van den Heuvel et al. 2015). Moreover, by focusing their attention in present mother-child interactions, mothers may be more able to effectively read the baby's cues and may feel more capable of

responding to the baby's needs. In addition, they may become more open and accepting of infant's behavior and more able to understand them in a non-judgmental way, which can lead mothers to perceive their babies' temperament as easier (Bush et al. 2017; van den Heuvel et al. 2015). Future longitudinal studies are needed to better understand the directionality and associations between the variables explored in the current study.

Second, the sample was collected online, which could lead to self-selection bias, since people who participated in this study were likely to be more motivated and interested in the subject than people in the general population. Third, the sample was entirely composed of mothers, which limits the generalization of these results to fathers. Fourth, most of the mothers in this study were married or living with a partner, had completed higher education, and lived in urban areas, which may compromise the generalization of the results to mothers with different sociodemographic characteristics. Fifth, only self-reported instruments were used to assess study variables, which could compromise the results, since self-report instruments can be influenced by social desirability. In addition, the mothers' perception of infant temperament was assessed by a single subjective and self-reported item, which could limit the conclusions that can be made about infant temperament. Nevertheless, it is important to note that some authors have suggested that parent reports are the most utilized method for assessing infant temperament (Stifter and Wiggins 2004).

Despite these limitations, this study provides a novel contribution to the study of mindful parenting in research in the applied context of the postpartum period. In addition, this study also highlights for some directions for clinical practice. In the postpartum period, a sensitive time for the development of the relationship between the parents and the child (Johansson et al. 2017), it is important to identify mothers who present higher levels of anxious and depressive symptomatology and/or parenting stress and who perceive their infant temperament as difficult. This study emphasizes the need to screen for anxious and depressive symptoms and parenting stress and to evaluate mothers' perception of their infant temperament in health care services and to refer mothers who could benefit from psychological care. Mindful parenting training, particularly the training that is specifically adapted for parents of infants (Mindful with Your Baby; Potharst et al. 2017), could be an effective way to help mothers who are experiencing higher levels of anxious and depressive symptomatology, parenting stress, or difficulties in their relationship with their baby (for instance, due to difficult temperament) to develop mindful parenting skills and to reduce symptoms of anxiety and depression and parenting stress (Potharst et al. 2017). To conclude, the present study suggests evidence to the scarce existing literature aimed at understanding the mechanisms underlying the association between

psychopathological symptoms and perception of infant temperament and mindful parenting outcomes, namely parenting stress. However, other variables can also play important roles in these associations, and therefore, further studies are necessary to continue to explore how to improve the mother's ability to be sensitive and responsive to their child, especially by reducing parenting stress and maternal anxious and depressive symptomatology and by promoting a more positive perception of their infant temperament.

Author Contributions DVF designed and executed the study, conducted the data analyses, and wrote the paper. MCC collaborated in editing the final manuscript. HM collaborated with the design and writing of the study and assisted with the data analyses. All the authors approved the final version of the manuscript for submission.

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Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The Ethics Committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra approved the study.

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

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

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