

## RESEARCH ARTICLE

# The role of mothers' self-compassion on mother–infant bonding during the COVID-19 pandemic: A longitudinal study exploring the mediating role of mindful parenting and parenting stress in the postpartum period

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## Abstract

The current COVID-19 pandemic is a challenging time for postpartum mothers, and associated challenges may have a negative impact on their parenting and, consequently, on mother–infant bonding. This study aimed to longitudinally explore whether mothers' self-compassion was associated with mother–infant bonding and whether this relationship was mediated by mindful parenting and parenting stress. A total of 125 Portuguese mothers of infants aged between 0 and 12 months completed an online survey at two assessment points during the first wave of the COVID-19 pandemic (T1: April–May 2020; T2: June–July 2020). The survey included several questionnaires assessing sociodemographic, clinical, and COVID-19 information; self-compassion; mindful parenting; parenting stress; and mother–infant bonding. Mothers presented significantly higher levels of self-compassion, less impaired mother–infant bonding, and lower levels of depressive symptoms at T2 than T1. Higher levels of self-compassion at T1 predicted less impaired mother–infant bonding at T2, and this relationship was mediated by higher levels of mindful parenting and lower levels of parenting stress (both assessed at T1). These results highlight the relevance of mothers' self-compassion to establishing mother–infant bonding in the postpartum period, particularly during the COVID-19 pandemic, and the important role of mindful parenting and parenting stress in determining this relationship.

## KEYWORDS

COVID-19, postpartum period, self-compassion, mother–infant bonding, mindful parenting, parenting stress

## 1 | INTRODUCTION

Although the postpartum period is usually characterized as a happy and joyous period, it is also a challenging time for mothers. Several psychological studies have considered the first year after the birth of a child as a crucial period to the mother's adjustment to their new role and

infant-related tasks (e.g., Javadifar et al., 2016; Machado et al., 2020). Indeed, after the birth of a child, mothers face multiple physiological and psychological challenges, such as new responsibilities and routines associated with infant care, sleep deprivation and fatigue (Coates et al., 2014), that may have a negative impact on their psychological adjustment and parenting practices (King et al., 2020).

Currently, in addition to common challenges of the postpartum period, mothers have to deal with a novel and unexpected pandemic (Werner et al., 2020).

At the end of December 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a new and highly contagious virus that causes COVID-19 (coronavirus disease 2019), was detected. On March 11, the World Health Organization (WHO) declared the spread of the virus a pandemic (Kavakli et al., 2020). Since the transmission of COVID-19 occurs via close contact between persons and there was no treatment or cure for this disease, social distancing and strict quarantine and isolation measures were implemented by several nations worldwide to control the spread of the virus (Werner et al., 2020) and to alleviate the pressure on healthcare systems (Pakenham et al., 2020). In Portugal, different phases of pandemic-related restrictions were applied. A state of national emergency was declared on March 18 and lasted until May 2; it consisted of several restrictive measures, including a national lockdown characterized by home confinement and telework, limitations on people's movements (e.g., people were only allowed leave home for the acquisition of essential items and specific services), the temporary closure of schools and nonessential businesses (e.g., leisure and entertainment activities; restaurants and bars), and establishment of specific hygiene rules for institutions that were open (DGS, 2020c). After that period, the Portuguese government applied a three-phase plan for lifting lockdown measures, with restriction measures being reviewed every 15 days by the Government of the Portuguese Republic (GOV) (GOV, 2020b). Gradually, several activities were allowed, and less restrictive measures were implemented (e.g., nurseries, kindergartens, and preschools as well as cinemas and theatres opened, and telework was no longer required) (GOV, 2020a).

The profound changes caused by the COVID-19 pandemic and lockdown have influenced everyday lives and family routines around the world (Gambin et al., 2020). Parents, particularly those in the postpartum period, had to face unprecedented challenges. For instance, several delivery units restricted all visitors, including support persons and birthing partners, due to the scarcity of personal protective equipment and rising incidence of asymptomatic cases of COVID-19 in obstetric patients (Werner et al., 2020). In addition, when mothers returned home, they might not have had adequate social support to care for the baby, such as family members or close friends, or external help with domestic tasks due to the restrictions that were implemented (Morgan, 2020). Therefore, having a child during this pandemic may have had a negative impact on mothers' psychological adjustment, as suggested by recent studies. For instance, Cameron et al. (2020) found that 33.16% and 36.27% of mothers of children aged between

### **Key Findings and their Implications for Practice/Policy**

#### **Key Finding 1**

In the current study, mothers presented significantly higher levels of self-compassion, less impaired mother-infant bonding and lower levels of depressive symptoms after lifting lockdown measures related to COVID-19 pandemic than at a period of major pandemic restrictions.

#### **Key Finding 2**

Self-compassion was significantly and positively correlated with mindful parenting and negatively correlated with a more impaired mother-infant bonding, parenting stress, anxious symptoms and depressive symptoms.

#### **Key Finding 3**

Mothers' self-compassion has an effect on mother-infant bonding through mindful parenting and parenting stress. It may be relevant to combine interventions aimed at promoting mothers' self-compassion that can contribute to promoting a mindful approach to parenting and, consequently, to reducing parenting stress so that mother-infant bonding can be promoted.

### **Statement of Relevance to the field of Infant and Early Childhood Mental Health**

Associated challenges of the COVID-19 pandemic may have a negative impact on parenting and, consequently, on mother-infant bonding, particularly for postpartum mothers. Self-compassion is an inner psychological resource that can help parents feel less stress in parenting and adopt a mindful approach to parenting. The present study provides an innovative contribution to better understanding specific mechanisms (i.e., mindful parenting and parenting stress) through which mothers' self-compassion may exert an effect on mother-infant bonding.

0 and 18 months presented clinically relevant symptoms of depression and anxiety, respectively, which are higher than nonpandemic rates of depression and anxiety (Cameron et al., 2020). Another study performed by Ahlers-Schmidt et al. (2020) found that 82.5% of pregnant and postpartum women reported changes in their mental health related to the COVID-19 pandemic, such as increased stress, anxious thoughts, and a depressed mood (Ahlers-Schmidt et al., 2020). These maternal mental health problems, induced by stressful circumstances, such as a pandemic context, may have negative consequences for the mother–infant relationship (Perry et al., 2021) and mother–infant bonding (Hoffman et al., 2017).

### 1.1 | Parenting stress and mother–infant bonding

Mother–infant bonding, the process through which a mother forms an affectionate attachment to her infant (Myers, 1984), has a strong impact on both the socioemotional development of the child and the long-term mother–child relationship, as shown in previous studies (e.g., Lehnig et al., 2019). Also, an impaired mother–infant bonding seems to negatively affect the quality of parenting (de Cock et al., 2017). Indeed, a deterioration of the quality of parenting has been highlighted as an important risk factor for adult and child psychopathology (e.g., the child's emotional and behavioral problems) (Fredriksen et al., 2019), and has been associated with higher levels of parenting stress (Mason et al., 2011). Specifically, during the postpartum period, higher levels of parenting stress, (i.e., perceiving that the demands faced in parenting exceed available coping resources to deal with them (Lazarus & Folkman, 1986) were found to be associated with lower maternal sensitivity (Dau et al., 2019), lower maternal responsiveness (Mills-Koonce et al., 2011), and more impaired mother–infant bonding (Khoramirad et al., 2020). Although a few studies have found high levels of parenting stress during the COVID-19 pandemic (e.g., Chung, Lanier, & Wong, 2020), no studies have been performed to date that focus on the postpartum period, so the impact of parenting stress on mother–infant bonding during this pandemic period remains to be explored.

### 1.2 | Self-compassion and parenting

The identification of modifiable factors that can reduce parenting stress and promote more adaptive parenting and a stronger bond between the mother and child in the postpartum period is particularly important during

the current COVID-19 pandemic, as parents are experiencing enormous challenges. Recent studies have highlighted the important role of self-compassion in the promotion of parental well-being and of a more positive relationship with children during this pandemic (e.g., Coyne et al., 2020). Self-compassion can be defined as an adaptive way of relating to oneself characterized by an attitude of kindness toward one's difficult experiences with the desire to relieve one's own suffering (Neff, 2009). It encompasses six key components organized into three bipolar dimensions, namely, self-kindness versus self-judgment (i.e., a tendency to be accepting, kind and noncritical toward oneself when suffering, failing, or feeling inadequate rather than ignoring the pain or adopting a self-judgmental and self-critical attitude), common humanity versus isolation (i.e., seeing one's experiences as part of the larger human experience rather than seeing them as separate and isolating), and mindfulness versus overidentification (i.e., holding one's painful thoughts and feelings in balanced awareness rather than overidentifying with them) (Neff, 2003).

Previous studies have shown that self-compassion can play an important role in parenting. For instance, a study focused on mothers and fathers of children aged between 3 and 5 years old showed that parents with higher levels of self-compassion showed more responsiveness, warmth, and an increased ability to respond in a more sensitive and resilient manner to the challenges of parenting (Psychoyiou et al., 2016). Self-compassion has also been shown to be negatively associated with parenting stress among mothers of school-aged children and adolescents from the general community (Moreira et al., 2015) and parents of children with an autism spectrum disorder (Torbet et al., 2019). Although the literature on self-compassion in the postpartum period is limited, it has been suggested that self-compassion can influence the way mothers interact with their infants and the quality of the attachment that they establish (Cree, 2010). In addition, self-compassion was shown to be a protective emotional regulation strategy during the postpartum period (Pedro et al., 2019) and to increase the likelihood of postpartum mothers having higher levels of positive mental health (Monteiro, Fonseca et al., 2020; Monteiro, Pereira et al., 2020).

### 1.3 | Mindful parenting

Self-compassion was also shown to be positively associated with mindful parenting (e.g., Moreira et al., 2015), a parental approach that has been identified as a useful way to decrease levels of parenting stress (Moreira et al., 2019) and to promote more positive parent-child

relationships (Bögels & Restifo, 2014). Mindful parenting can be defined as a set of parenting skills or practices that extends the concept of mindfulness to the context of parent–child relationships (Duncan et al., 2009) and is characterized as a more accepting, emotionally attuned, and compassionate way of parenting (Coatsworth et al., 2018). These parenting practices aim to promote responsive and sensitive care to the child's needs (Medeiros et al., 2016), through the promotion of mindful parenting skills such as *listening with full attention to the child*, *emotional awareness of the child*, *self-regulation in the parenting relationship*, *a nonjudgmental acceptance of parental functioning* and *compassion for the child* (Duncan et al., 2009).

Several studies among parents of school-aged children have demonstrated that adopting a mindful parenting approach is associated with more positive parenting styles and practices (Bögels & Restifo, 2014), more positive interactions and higher quality relationships between parents and children (Duncan et al., 2009), and a secure parent–child attachment relationship (Zhang et al., 2019). Mindful parenting has also been associated with lower levels of parenting stress (Bögels & Restifo, 2014; Gouveia et al., 2016). Despite the benefits related to mindful parenting, the study of mindful parenting in the postpartum period is still in its infancy. The few studies that have focused on this period have shown that postpartum mothers who engage in more mindful parenting practices tend to experience lower levels of parenting stress (Fernandes et al., 2020a). It has also been suggested that mindful parenting training can reduce postpartum mothers' psychopathological symptoms and promote a more positive mother–infant relationship through the promotion of mindful parenting skills (Potharst et al., 2017).

#### 1.4 | The current study

Despite the evidence of the positive role of self-compassion in the psychological adjustment of parents and in the mother–child relationship, few studies have focused on the postpartum period, and no study has yet been conducted in the context of the current pandemic. Therefore, this study aimed to longitudinally analyze the association between self-compassion and mother–infant bonding and explore the mediating role of mindful parenting and parenting stress in this relationship. A better understanding of the role of maternal self-compassion on parenting and on mother–infant bonding may be particularly relevant in the context of the pandemic, especially if more waves occur and lockdown restrictions are strengthened again (Vazquez-Vazquez et al., 2021). In addition, since the context of the pandemic shares several characteristics with

other risk and stressful contexts, that have a potential negative impact on mother–infant relationships and parenting, this knowledge may provide important insights that could be applied outside of the COVID-19 pandemic. Based on a previously available investigation, we expected higher levels of self-compassion to be associated with less impaired mother–infant bonding through higher levels of mindful parenting (Nguyen et al., 2020) and lower levels of parenting stress (Moreira et al., 2019).

## 2 | METHODS

### 2.1 | Participants

The sample included 125 Portuguese mothers of infants aged between 0 and 12 months ( $M(SD) = 5 (3.23)$  (T1);  $6.57 (3.31)$  (T2)). As presented in Table 1, 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 currently on maternity leave. Most mothers reported not being infected by COVID-19 and not belonging to a COVID-19 risk group (i.e., having a cardiac disease, diabetes, or pulmonary disease; DGS (Directorate-General of Health) (DGS, 2020c). The complete sociodemographic, clinical, and COVID-19-related information is presented in Table 1.

### 2.2 | Procedure

This study was a longitudinal study conducted during the first wave of the COVID-19 pandemic. The first assessment (T1) took place between April 30 and May 21, which corresponded to a period of major restrictions in Portugal (state of national emergency and the first phase of the plan for lifting lockdown measures). The second assessment (T2) took place 2 months after T1, between June 24 and July 22, a period that corresponded to the return to the "new normal" (after lifting lockdown measures). Participants were eligible for the study if they fulfilled the following inclusion criteria: (i) being Portuguese; (ii) being over 18 years old; and (iii) having at least one child between 0 and 12 months.

The sample was recruited online through a data collection website (LimeSurvey). The survey link was shared through email, unpaid cross-posting, and paid boosting campaigns. Several advertisements explaining the main goals of the study and presenting the inclusion criteria and the web link to the survey were posted on a Facebook page about parenting and mental health that was previously created by the research team as well as on social

**TABLE 1** Sociodemographic, clinical, and COVID-19-related information of the sample [T1]

<b>Mothers' sociodemographic information</b>	<b>N = 125 [T1]</b>
Mothers' age (years) <i>M (SD)</i> ; range	33.69 (4.68); 23–46; missing: 22
<i>Current employment status n (%)</i>	
Working in the workplace, full-time	11 (8.9%)
Working from home	16 (12.9%)
License for helping children (<12 years old) after the closure of schools	4 (3.2%)
Laid off	5 (4%)
Unemployed, housewives, full-time mothers, students	18 (14.5%)
Sick leave	2 (1.6%)
Maternity leave	68 (54.8%)
<i>Marital status n (%)</i>	
Living with a partner	116 (92.8%)
Not living with a partner	9 (7.2%)
<i>Type of family n (%)</i>	
Single parent	2 (1.6%)
Nuclear	104 (83.2%)
Extended	19 (15.2%)
<i>Education n (%)</i>	
Basic or secondary education	30 (24%)
Higher education	95 (76%)
<i>Household monthly income n (%)</i>	
Less than 2000€	88 (70.4%)
2000€ or above	37 (29.6%)
<i>Area of residence n (%)</i>	
Urban	89 (71.2%)
Rural	36 (28.8%)
<b>Babies' information</b>	
Age (months) <i>M (SD)</i> ; range	5 (3.23); 0–12
<i>Sex n (%)</i>	
Girls	65 (52.0%)
Boys	60 (48.0%)
<b>Mothers' clinical information</b>	
<i>Parity n (%)</i>	
Primiparous	83 (66.4%)
Multiparous	42 (33.6%)
<i>Current diagnosis of a psychological and/or psychiatric problem n (%)</i>	
Yes	9 (7.2%)
No	116 (92.8%)
<i>Current psychological treatment n (%)</i>	
Yes	10 (8%)
No	115 (92%)

(Continues)

**TABLE 1** (Continued)

<b>Mothers' sociodemographic information</b>	<b>N = 125 [T1]</b>
<i>Obstetric complications n (%)</i>	
In mothers	42 (33.6%)
In babies	7 (5.6%)
<b>COVID-19-related information</b>	
<i>Mother's COVID-19 diagnosis n (%)</i>	
Healthy	122 (97.6%)
Suspected contact with someone infected	1 (.8%)
Infected with COVID-19	1 (.8%)
Recovered	1 (.8%)
<i>Baby was infected with COVID-19 n (%)</i>	
No	125 (100.0%)
<i>COVID-19 contagion risk group n (%)</i>	
Yes	18 (14.4%)
No	107 (85.6%)

<sup>a</sup>The Portuguese minimum wage in 2020 was 635€.

networks, including Facebook pages about parenting issues after the birth of a child and parenting forums. Participants who clicked on the link were then given detailed information about the study, namely, a description of the objectives, inclusion criteria, and ethical statement of the study. Participants were informed that their participation was voluntary and anonymous. Only those who agreed to the study conditions and who provided their informed consent by clicking on the option “I understand and accept the conditions of the study” completed the assessment protocol. After completing all measures, participants who were interested in participating at T2 provided their email address. Two months later, an email containing the link to the online survey was sent to these participants. Of the 567 mothers who participated at T1, 250 (44.09%) provided their email address to participate at T2. Of these individuals, only 130 participants completed the survey at T2. Five women were excluded because one or more of the study questionnaires were not completed. Therefore, 125 participants completed all questionnaires and were included in the present study.

Mothers who responded to the T2 survey ( $n = 130$ ) had a higher level of education ( $\chi^2 = 21.60, p < .001, Cramer's V = .195$ ) and a higher household monthly income ( $\chi^2 = 4.77, p = .029, Cramer's V = .092$ ) than those who did not respond to the T2 survey ( $n = 437$ ). They also presented lower levels of self-compassion ( $F_{(1, 566)} = 5.62, p = .018, \eta^2_p = .010$ ) and more impaired mother–infant bonding ( $F_{(1, 566)} = 7.44, p = .007, \eta^2_p = .010$ ) than mothers who did not respond to T2.



## 2.3 | Measures

### 2.3.1 | Sociodemographic, clinical and COVID-19-related information

The first part of the online survey was specifically developed for this study by the research team and included questions on standard sociodemographic information (e.g., participants' age, education, type of family, and current employment status) and clinical data (e.g., obstetric information and prior history of psychopathological problems). It also included questions to assess several COVID-19-related aspects that were developed based on the DGS national guidelines (DGS, 2020a, 2020b, 2020c, 2020d). Specifically, participants were asked about (1) COVID-19 diagnoses (healthy vs. suspected contact with someone infected vs. infected with COVID-19 vs. recovered); (2) if their baby was infected with COVID-19 ("Has your baby been infected with COVID-19?" [yes or no]); and (3) their COVID-19 contagion risk group ("Do you belong to a COVID-19 risk group according to the DGS [i.e., having a cardiac disease, diabetes, or pulmonary disease]?" [yes or no]).

### 2.3.2 | Self-compassion

The short version of the Portuguese version of the Self-Compassion Scale (SCS-SF) (Castilho et al., 2015; Raes et al., 2011) was used to measure mothers' self-compassion. The SCS-SF comprises 12 items (e.g., "When I'm going through a very hard time, I give myself the caring and tenderness I need") answered on a 5-point response scale, ranging from 1 (*almost never*) to 5 (*almost always*). After negative items are reverse coded, it is possible to obtain a global measure of self-compassion by estimating the mean of the 12 items, with higher scores indicating more self-compassion. In the present sample, the Cronbach's alpha coefficients were .92 (T1) and .93 (T2).

### 2.3.3 | Mindful parenting

To assess mindful parenting among parents of infants, the Portuguese Interpersonal Mindfulness in Parenting Scale (IM-P - Infant version) (Caiado et al., 2020; Duncan, 2007) was used. 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 four was deleted ("I listen carefully to my child's ideas, even when I disagree with them"). Therefore, the final Por-

tuguese IM-P - Infant version contains 28 items scored on a 5-point response scale, ranging from 1 (*never true*) to 5 (*always true*). The total score is the sum of the items, and higher scores indicate higher levels of mindful parenting. In the current sample, Cronbach's alpha coefficients were .89 (T1 and T2).

### 2.3.4 | Parenting stress

The Portuguese version of the Parental Stress Scale (PSS) (Berry & Jones, 1995; Mixão et al., 2010) was used to assess parenting stress. 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 response 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 more parenting stress. In the current sample, Cronbach's alpha coefficients were .88 (T1) and .88 (T2).

### 2.3.5 | Mother-infant bonding

To assess mother-infant bonding, the Portuguese version of the Postpartum Bonding Questionnaire (PBQ) (Brockington et al., 2006; Nazaré et al., 2012) was used. The PBQ is a self-report questionnaire designed to provide an early indication of mother-infant bonding disorders, though the frequency of mother's cognitive and emotional responses to their infant. Specifically, in the Portuguese version of the PBQ these responses are evaluated through several indicators, such as emotional distancing (which refers to the mother's absence or low positive feelings and closeness with the baby), frustration (which refers to mother's irritability in the mother-infant interaction and feelings of lack of confidence in providing care to the baby), rejection (which refers to the mother's regret of the birth and the desire to assign baby care tasks to someone else) and aggressiveness (expressed through a desire or impulse to harm the baby) (Nazaré et al., 2012). The Portuguese version of the PBQ has 12 items (e.g., "I feel close to my baby") rated on a 5-point response scale, ranging from 0 (*never*) to 5 (*always*). The total score is calculated as the sum of the items, with higher scores indicating more impaired mother-infant bonding. In the present sample, Cronbach's alpha coefficients were .80 (T1) and .75 (T2).

### 2.3.6 | Anxious and depressive symptomatology

The Portuguese version of the Hospital Anxiety and Depression Scale (HADS) (Pais-Ribeiro et al., 2007; Snaith

& Zigmond, 1994) 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”) distributed to assess two factors (anxiety and depression) and uses a 4-point response scale, ranging from 0 (*not at all/only occasionally*) to 3 (*most of the time/a great deal of the time*). The factor scores are the sum of the items, 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. In this sample, Cronbach’s alpha coefficients were .87 (T1) and .86 (T2) for anxiety and .81 (T1) and .85 (T2) for depression.

## 2.4 | Data analyses

Data analyses were conducted using the Statistical Package for the Social Sciences (IBM SPSS, version 25.0). Descriptive statistics were computed for all sociodemographic and study variables. Cronbach’s alpha coefficient measured the internal consistency of the instruments at T1 and T2. Pearson correlations between study variables were computed. Cohen’s guidelines (1988) were used to describe and interpret effect sizes of correlations (i.e., a small effect size for correlations close to .10, medium for those near .30, and strong for correlations .50 or higher). Repeated-measures ANOVAs were used to compare self-compassion, mindful parenting, parenting stress and mother–infant bonding, considering time (i.e., T1 and T2) as a within-subjects factor, with anxious symptoms and depressive symptoms as covariates. Effect sizes are presented for all analyses as eta-squared (small:  $\eta^2_p \geq .01$ ; medium:  $\eta^2_p \geq .06$ , and large:  $\eta^2_p \geq .14$ ).

A serial mediation model (Model 6; Hayes, 2013) was estimated using PROCESS (Hayes, 2013). In this model, self-compassion at T1 was the independent variable, mindful parenting at T1 and parenting stress at T1 were the mediators, and mother–infant bonding at T2 was the dependent variable. To identify possible covariates that should be introduced into the mediation model, Pearson’s and point-biserial correlations between the mediators and dependent variable and sociodemographic, clinical, and COVID-19-related information were also computed. A bootstrapping procedure using 10,000 resamples was used to assess the indirect effect. This procedure creates 95% bias-corrected and accelerated confidence intervals (95% BCaCIs) of indirect effects, which are considered significant when zero is not contained within the lower and upper CIs.

## 3 | RESULTS

### 3.1 | Comparative analyses of study variables between T1 and T2 and correlations among study variables

Most mothers reported normal or mild levels of anxious and/or depressive symptomatology at T1 ( $n = 88$ , 70.4%) and T2 ( $n = 91$ , 72.8%). Only 29.6% at T1 ( $n = 37$ ) and 27.2% at T2 ( $n = 34$ ) reported clinically significant levels of symptoms (i.e., scored  $\geq 11$  on one or both of the HADS subscales).

Significant differences were found between T1 and T2 in self-compassion ( $F_{(1,124)} = 5.88$ ,  $p = .017$ ,  $\eta^2_p = .05$ ), mother–infant bonding ( $F_{(1,124)} = 8.75$ ,  $p = .004$ ,  $\eta^2_p = .07$ ), and depressive symptoms ( $F_{(1,124)} = 4.83$ ,  $p = .030$ ,  $\eta^2_p = .04$ ), with mothers presenting higher levels of self-compassion, less impaired mother–infant bonding and lower levels of depressive symptoms at T2 (see Table 2). When anxious symptoms and depressive symptoms were controlled as covariates, no differences between T1 and T2 were found in any variable (see Table 2).

Correlations between study variables are presented in Table 2. At both assessment points, self-compassion was significantly and positively correlated with mindful parenting and negatively correlated with impaired mother–infant bonding, parenting stress, anxious symptoms and depressive symptoms; mindful parenting was significantly and negatively correlated with parenting stress, impaired mother–infant bonding, anxious symptoms and depressive symptoms; and parenting stress was significantly and positively correlated with impaired mother–infant bonding, anxious symptoms and depressive symptoms. Anxious symptoms and depressive symptoms were positively and significantly correlated with impaired mother–infant bonding. All correlations were strong.

### 3.2 | The indirect effect of mothers’ self-compassion on mother–infant bonding through mindful parenting and parenting stress

Prior to mediation analyses, Pearson’s and point-biserial correlations between sociodemographic, clinical, and COVID-19 variables (T1) and mindful parenting (T1), parenting stress (T1) and mother–infant bonding (T2) were analyzed to determine whether any variable should be introduced in the model as a covariate. A significant positive correlation was found between mothers’ education (0 = basic and secondary education and 1 = higher education) and impaired mother–infant bonding ( $r_{pb} = .19$ ,  $p = .035$ ), and parenting stress ( $r_{pb} = .31$ ,  $p = .001$ ), and a

TABLE 2 Correlations, descriptive statistics and comparative analyses of self-compassion, mindful parenting, parenting stress, mother–infant bonding, anxious symptoms, and depressive symptoms at T1 and T2

Study variables	Comparative analyses																	
	1	2	3	4	5	6	7	8	9	10	11	M (SD)	F	P	$\eta^2_p$	F	P	$\eta^2_p$
1 Self-compassion (T1)	-											39.26 (10.19)	5.88	.017	.05	.02	.898	.00
2 Self-compassion (T2)	.83*	-										40.56 (10.40)						
3 Mindful parenting (T1)	.74*	.66*	-									115.33 (13.55)	2.07	.153	.02	.27	.602	.00
4 Mindful parenting (T2)	.66*	.70*	.78*	-								116.46 (13.22)						
5 Parenting stress (T1)	-.61*	-.61*	-.72*	-.64*	-							37.62 (9.87)	1.70	.195	.01	2.30	.132	.02
6 Parenting stress (T2)	-.55*	-.62*	-.62*	-.75*	.84*	-						36.98 (9.49)						
7 Mother–infant bonding <sup>a</sup> (T1)	-.41*	-.42*	-.53*	-.44*	.74*	.64*	-					5.02 (4.57)	8.75	.004	.07	.28	.598	.00
8 Mother–infant bonding (T2)	-.37*	-.47*	-.46*	-.59*	.71*	.79*	.78*	-				4.26 (3.78)						
9 Anxious symptoms (T1)	-.67*	-.58*	-.55*	-.49*	.49*	.40*	.24*	.27*	-			7.83 (4.49)	3.74	.055	.03			Covariate
10 Anxious symptoms (T2)	-.61*	-.64*	-.50*	-.58*	.47*	.49*	.29*	.36*	.77*	-		7.31 (4.44)						
11 Depressive symptoms (T1)	-.59*	-.56*	-.60*	-.53*	.66*	.56*	.48*	.44*	.67*	.60*	-	6.33 (4.05)	4.83	.030	.04			Covariate
12 Depressive symptoms (T2)	-.54*	-.63*	-.49*	-.58*	.58*	.63*	.40*	.53*	.57*	.75*	.72*	5.71 (4.35)						

Note. <sup>a</sup> Higher score in indicating more impaired mother–infant bonding.

\* $p < .001$

significant and negative correlation was found between mothers' education and mindful parenting ( $r_{pb} = -.22$ ,  $p = .012$ ). Additionally, a significant positive correlation was found between parity (0 = primiparous and 1 = multiparous) and impaired mother–infant bonding ( $r_{pb} = .18$ ,  $p = .044$ ). Therefore, mothers' education and parity (T1) were introduced as covariates into the regression model. Baseline levels of mother–infant bonding (T1), anxious symptoms (T1) and depressive symptoms (T1) were also controlled in mediation analyses.

As presented in Figure 1, self-compassion was significantly and positively associated with mindful parenting ( $b = .69$ ,  $p < .001$ ) and, along with the covariates, explained 65.18% of its variance. Self-compassion ( $b = -.08$ ,  $p = .273$ ) was negatively associated with parenting stress and mindful parenting ( $b = -.16$ ,  $p < .001$ ) were significantly and negatively associated with parenting stress, with self-compassion and mindful parenting, along with the covariates, explained 75.98% of its variance. The model explained 61.6% of the mother–infant bonding; while self-compassion ( $b = .02$ ,  $p = .562$ ) and mindful parenting ( $b = .02$ ,  $p = .365$ ) were not significantly associated with this outcome, higher levels of parenting stress significantly predicted more impaired mother–infant bonding ( $b = .16$ ,  $p < .001$ ). All paths for the full process model, as well as unstandardized regression coefficients, are illustrated in Figure 1.

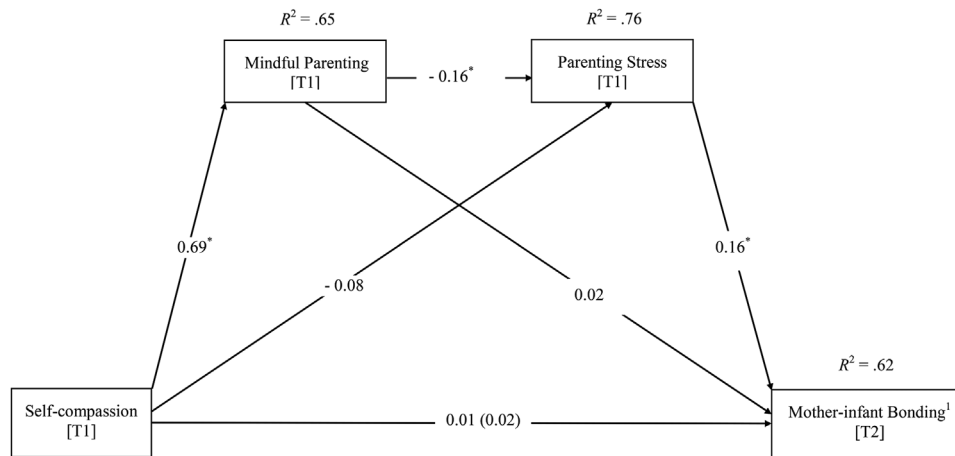
Although the total effect (.01; 95% BCaCIs =  $-.05/.07$ ) and direct effect (.02; 95% BcaCIs =  $-.05/.09$ ) of self-compassion on mother–infant bonding were not significant, a significant indirect effect was found, as presented in Table 3. Specifically, self-compassion was found to be indirectly associated with mother–infant bonding through the two mediators sequentially (mindful parenting and parenting stress), with an estimated value of  $-.02$  (95% BcaCIs =  $-.04/-.01$ ) (see Table 3).

## 4 | DISCUSSION

In the present study, we aimed to longitudinally investigate whether mothers' self-compassion predicted mother–infant bonding during the postpartum period in the first wave of the current COVID-19 pandemic and whether this relationship was explained in part by the mindful parenting and parenting stress of mothers. Our results corroborated our hypotheses by showing that higher levels of self-compassion predicted less impaired mother–infant bonding through the two mediators sequentially (i.e., mindful parenting and parenting stress).

Regarding differences between the two assessment points, our results showed a significant increase in mothers' self-compassion and a significant decrease in mother–infant bonding impairment and depressive symptoms





**FIGURE 1** Statistical diagram of the serial mediation model for the presumed influence of mindful parenting and parenting stress on the association between self-compassion and mother–infant bonding. *Note.* Path values represent unstandardized regression coefficients. In the arrow linking self-compassion and mother–infant bonding, the value outside the parentheses represents the total effect model of self-compassion on mother–infant bonding after the inclusion of the mediators. The value in parentheses represents the direct effect from the bootstrapping analysis of self-compassion on mother–infant bonding after the inclusion of the mediators. Mothers’ education, parity, anxious symptoms (T1), depressive symptoms (T2), and mother–infant bonding (T1) were introduced as covariates into the regression model. For simplicity, these covariates are not shown in the figure. <sup>1</sup> Higher score indicating more impaired mother–infant bonding. \**p* < .001

**TABLE 3** Indirect effects of self-compassion on mother–infant bonding through mindful parenting and parenting stress

Indirect effects	Point estimate	SE	95% BCaCI lower/upper
Self-compassion → Mindful parenting → Mother–infant bonding	.02	.02	-.02/.06
Self-compassion → Mindful parenting → Parenting stress → Mother–infant bonding	-.02	.01	-.04/-.01
Self-compassion → Parenting stress → Mother–infant bonding	-.01	.01	-.04/.01

at T2. Interestingly, differences in self-compassion and mother–infant bonding were not significant when anxious symptoms and depressive symptoms were controlled in analyses.

With regard to higher levels of depressive symptoms at T1, this result is in accordance with previous studies conducted with postpartum mothers during the COVID-19 pandemic, showing that lockdown and pandemic-related restrictions had a negative impact on maternal mental health, specifically on depressive symptoms (Zanardo et al., 2020). Gradually, the lifting of lockdown measures allowed mothers to return to a “new normal” and resume their daily routines, which may have increased their in-person contact with their significant others and other mothers. In addition, the opening of educational and social services (e.g., nurseries) may have supported mothers with infant care. These changes may have had a positive impact on maternal mental health, specifically, on depressive symptoms and may have led mothers to feel less isolated, more able to be compassionate with themselves,

and more emotionally available to provide care to their infant.

Our results also suggest that mothers had more difficulty engaging in a more compassionate attitude toward themselves at T1, a period of major and severe pandemic-related restrictions. Several explanations may account for this result. For instance, it is possible that during this period, mothers were more worried and felt more fear of contracting COVID-19, which may have led them to focus more on the future (Vieira et al., 2020) and be less mindful of the present moment. In addition, the need for social isolation during this pandemic phase and the consequent lack of instrumental support (e.g., assistance in domestic tasks and with infant care) may have left mothers feeling overwhelmed in their role as a mother and dealing with the baby’s demands, reducing their ability to accept their mistakes and failures in parenting situations. We also hypothesize that lower levels of self-compassion at T1 may have been associated with higher levels of depressive symptoms at this time, which is corroborated by the

finding that after controlling for depressive and anxious symptoms, differences in self-compassion were no longer significant. These results are in line with previous research that has consistently shown that postpartum mothers with depressive symptoms tend to report lower levels of self-compassion (e.g., Monteiro et al., 2019). In fact, mothers who experience depressive symptoms tend to experience higher levels of self-criticism (Vliegen & Luyten, 2009), more frequent negative automatic thoughts, and more dysfunctional motherhood-related attitudes (Fonseca & Canavarro, 2019), and they tend to experience more negative affect (Campbell et al., 2008). This may prevent them from adopting a nonjudgmental attitude toward themselves when they notice those negative feelings, cognitions, or experiences and from accepting those feelings and experiences as a part of the common and shared experience of parenting (Neff, 2003), possibly explaining lower levels of self-compassion.

We also found that mothers presented more impaired mother–infant bonding at T1, and we hypothesize that during this period, mothers may have not obtained the expected level of support and care during the postpartum period (Thapa et al., 2020), which may have had a negative impact on their emotional availability to provide care for their infant. This result may also be strongly associated with mothers' psychopathological symptoms, as depression was higher at T1, and differences in mother–infant bonding were no longer significant when symptoms were controlled in analyses. Previous research has shown that mothers with poorer mental health have more difficulty in their role as a mother, respond less to the infant's cues (Missler et al., 2018), are less sensitive (Lilja et al., 2012) and establish lower quality mother–infant interactions (Horowitz et al., 2019). Specifically, previous studies have shown that mothers with depressive symptoms presented lower levels of emotional availability (Vliegen et al., 2013) and more impaired mother–infant bonding (Radoš et al., 2020).

With regard to the mediation model, in line with our expectations, the indirect effect of self-compassion on mother–infant bonding through mindful parenting and parenting stress suggests that mothers who adopt a kind and compassionate attitude toward themselves are more likely to adopt a mindful attitude in their parenting, which in turn leads them to experience lower levels of parenting stress and, consequently, to provide healthier emotional and cognitive responses to their infant. It is also important to note that the total and direct effects of self-compassion on mother–infant bonding were not significant, which emphasizes the relevance of considering the role of the mediators (i.e., mindful parenting and parenting stress).

According to our expectations, mothers' self-compassion was shown to be significantly and positively associated with mindful parenting, which is in line with previous research (Nguyen et al., 2020). Mothers who are more self-compassionate tend to hold their painful thoughts and feelings in balanced awareness (Neff, 2003), and tend to blame themselves less often for their parenting behaviors because they have a greater sense of common humanity (Moreira et al., 2016). This seems to increase their ability to decenter and not overidentify with negative thoughts about their infants and their role as a mother (Gouveia et al., 2016). Specifically, in a pandemic environment, the greater capacity to nonjudgmentally accept their limitations and imperfections as mothers seems to increase the likelihood of adopting the same mindful approach toward their infants.

In addition, our results also suggested that mothers who were more self-compassionate and adopted a mindful approach to parenting seemed to experience lower levels of parenting stress. Across multiple studies, mindful parenting has been linked to lower levels of parenting stress, suggesting that a mindful parenting style may help parents to better cope with demands and stresses of parenting (e.g., Gouveia et al., 2016), including in the postpartum period (e.g., Potharst et al., 2017). Mindful mothers seem to be more able to pause before responding to a situation and shift their awareness to view their present-moment parenting experience (Duncan et al., 2009). This may allow them to better assess infant signals and to react sensitively to them (Mills-Koonce et al., 2011), which may decrease parenting stress. The adoption of a self-compassionate attitude and a consequent adoption of a mindful approach to parenting may be particularly relevant during a pandemic, which seems to be a major stressor for postpartum mothers (Thapa et al., 2020).

Finally, mindful parenting, which seems to be promoted by greater self-compassion, seems to contribute to less impaired mother–infant bonding in the postpartum period by interrupting the negative effect of parenting stress. This novel result suggests an interrelationship among these constructs (i.e., mindful parenting and parenting stress) and a sequence of mechanisms through which mother–infant bonding may be promoted. However, it is important to acknowledge that the inverse relationship is also possible. Future longitudinal studies with more assessment points should focus on understanding the direction of this relationship (i.e., if mindful parenting leads to lower levels of parenting stress or if parenting stress leads to lower levels of mindful parenting).

Although there have been no studies specifically exploring the relationship among mindful parenting, parenting stress and mother–infant bonding, it is well established

that mindful parents are more able to self-regulate during parent–child interactions, that is, to pause and purposely choose parenting practices that are in accordance with the parent’s values and goals, instead of automatically reacting to the child’s behavior (Duncan et al., 2009). Additionally, mindful parents tend to exhibit greater warmth and support in the relationship with their children (Gouveia et al., 2016), being sensitive and responsive to the child’s needs (Bögels & Restifo, 2014). In addition, previous studies have demonstrated the association between parenting stress and mother–infant bonding, suggesting that lower levels of parenting stress are associated with mothers’ feelings of high competence in their role as a mother and emotional closeness to the child (de Cock et al., 2017). Therefore, it is expected that the adoption of a mindful approach to parenting leads to lower levels of parenting stress, and both may facilitate the establishment of less impaired mother–infant bonding.

#### 4.1 | Limitations, future research and clinical directions

Some limitations of this study should be mentioned. First, this was a longitudinal study with only two points of assessment; therefore, causal relationships cannot be inferred, and alternative models may be possible. Future longitudinal studies with more points of assessment are needed to better understand the directionality and associations between variables explored in the current study. Second, the sample was collected online, which could lead to self-selection bias because people who participated in this study were likely to be more motivated and interested in the subject than those in the general population. Third, the sample was entirely composed of mothers, which limits the generalization of these results to fathers. Future studies should attempt to include both mothers and fathers to assess sex differences in associations presented in the model. Fourth, most mothers in this study had completed higher education and lived in urban areas, which may limit the generalization of the results to mothers with different sociodemographic characteristics. Future studies should include more heterogeneous and representative samples. Fifth, mothers who responded to the second assessment had a higher level of education, higher household monthly income, lower levels of self-compassion and more impaired mother–infant bonding than those who did not respond, which may limit the generalization of the results. Sixth, only self-reported instruments were used to assess the study variables, which can be influenced by social desirability and do not reliably reflect participants’ feelings or thoughts, potentially compromising the validity of the results. Finally, several birth and infant-related

variables were not considered, such as gestational age, twin pregnancy, infant temperament, which may have had influence in the results of this study. Future studies should consider these variables and evaluate differences between different groups of mothers and infants, in order to draw more robust conclusions.

The current study also has important strengths, research, and clinical implications. It provides an innovative contribution to better understanding specific mechanisms (i.e., mindful parenting and parenting stress) through which mothers’ self-compassion may exert an effect on mother–infant bonding. This study innovatively suggests that mother’s self-compassion plays an important role in the adoption of a mindful approach to parenting, protecting the mothers against experiencing higher levels of parenting stress, and promoting a healthy mother–infant bonding.

Self-compassion and mindful parenting are conceptualized as important adaptive psychological processes that can be enhanced with training. In addition, mindfulness is a pre-requisite to self-compassion, and it is one of its components, so it is expected that learning to be mindful of negative thoughts and emotions also increases one’s ability to be self-compassionate (Neff & Davidson, 2016). Thus, and according to the results of this study, it may be relevant such an intervention which could combine self-compassion training, for instance through specific exercises of compassionate mind training (Cree, 2010), and a mindful parenting-based intervention, for instance through meditations focused on mother–infant interaction (Potharst et al., 2017), that can contribute to reduce parenting stress, so that mother–infant bonding can be promoted.

Moreover, in a preventive perspective, this study emphasizes the need of identifying mothers who present a higher risk of developing parenting stress by, for instance, screening for parenting stress symptoms in health care services and by referring mothers who could benefit from psychological care, especially a self-compassion and a mindful parenting intervention. It is also relevant to stop to idealize the motherhood in order to prevent negative consequences for maternal mental health and mother–infant relationship (e.g., Slomian et al., 2017).

However, it is important to keep in mind that, in addition to well-known practical, attitudinal, and structural barriers that keep postpartum mothers from seeking traditional face-to-face professional help (Dennis & Chung-Lee, 2006; Fernandes et al., 2020b), the current risk of contagion in face-to-face interventions created the need to develop web-based psychological interventions. These interventions seem to be useful in reducing the spread of COVID-19 disease during the pandemic (Thapa et al., 2020) and have been shown to be easily accessible, safe and cost-effective compared to face-to-face interventions

(Preuss et al., 2021). Previous e-health interventions designed for mothers in the postpartum period showed promising results. For instance, an online intervention focused on promoting self-compassion was shown to promote mothers' well-being (Mitchell et al., 2018); an online acceptance- and compassion-based intervention was shown to promote mother's self-compassion, adaptive emotion regulation skills (Fonseca et al., 2019) and positive mental health (Monteiro, Fonseca et al., 2020; Monteiro, Pereira et al., 2020); and an online mindful parenting training for mothers of toddlers was shown to effectively promote mothers' self-compassion and it seemed an easily accessible and valuable intervention for mothers with high levels of parenting stress (Potharst et al., 2019). Future studies with more robust methodologies are needed, as well as future empirically validated e-health interventions that combine self-compassion training, mindful parenting training and parenting stress management, to promote mother–infant bonding.


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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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