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# Examining the relationship between maternal childhood abuse history and mother-infant bonding: The mediating roles of postpartum depression and maternal self-efficacy

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## ABSTRACT

**Background:** The detrimental effects of childhood abuse on long-term outcomes are well-known, however few studies have examined these effects in the context of postpartum psychopathology, maternal self-efficacy, and mother-infant bonding quality.

**Objective:** This study aimed to examine the relationship between a maternal childhood abuse experience (i.e., physical, psychological, and sexual) and mother-infant bonding disturbances, and whether this relationship was mediated by postnatal depression symptomatology and maternal self-efficacy.

**Method:** A sample of 191 postpartum women ( $M_{age} = 32.88$ ,  $SD = 4.20$ ) recruited online from the general population completed self-report measures of the constructs of interest.

**Results:** Postnatal depression symptomatology and maternal self-efficacy were found to fully mediate the relationship between psychological child abuse experience and mother-infant bonding disturbances ( $\beta = 0.06$ ,  $SE = 0.03$ , 95% CI: 0.01, 0.12). Postnatal depression symptomatology (but not maternal self-efficacy) was an independent mediator between psychological child abuse experience and mother-infant bonding ( $\beta = 0.07$ ,  $SE = 0.03$ , 95% CI: 0.01, 0.13). After inclusion of other abuse types as covariates in the analyses, the findings for maternal child physical abuse attenuated to non-significance. Child sexual abuse was not associated with the mediating or outcome variables, highlighting the issue of disclosure despite the anonymous online environment.

**Conclusion:** This study highlights the negative impact of psychological childhood abuse experience on the quality of the mother-infant bond during the postpartum period and potential pathways that underlie this relationship. This study also draws attention to the need to recognize comorbidity of abuse types in research.

## 1. Introduction

The mother-infant bond (MIB) refers to the quality of the emotional connection between the mother and her infant (Milne, Johnson, Waters, & Small, 2018). This relationship is highly influenced by the mother's sensitivity to the needs of the infant and establishes the basis for a nurturing relationship, which in turn facilitates the child's development (Ainsworth, Blehar, Waters, & Wall, 2015; Johnson,

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2013). While some mothers experience little difficulty developing a strong bond with their infants, others report feelings of hostility, rejection, and/or emotional withdrawal towards their infants (Edhborg, Nasreen, & Kabir, 2011). Disturbances to the MIB have been found to be predictive of maladaptive outcomes which include child maltreatment and a greater risk of adult psychopathology in the child (Gladstone & Parker, 2005; Kitamura, Ohashi, Kita, Haruna, & Kubo, 2013). Moreover, MIB impairments have been proposed to contribute to insecure attachment styles, socio-emotional problems, and developmental delays in children (Murray, Stanley, Hooper, King, & Fiori-Cowley, 1996; Stein et al., 2014). Given the potential negative impact of MIB disturbances on mother-infant relational and health outcomes, examination of factors that may contribute to these disturbances is important.

A factor that is increasingly recognized as influential in the mother-child relationship is the mother's past experience of child abuse (Tambelli, Cimino, Cerniglia, & Ballarotto, 2015). Child abuse refers to any behavior that harms a child and the most widely recognized forms of abuse include physical, sexual and psychological abuse. Physical abuse refers to the deliberate act of causing or potentially causing physical injury to a child. Sexual abuse can be contact, non-contact or an attempted act of sexual interaction with a child beyond their understanding. Psychological abuse is the cognitive appraisal of certain acts such as a caregiver's verbal or non-verbal attempts to corrupt, humiliate, reject, or deprive a child of their basic emotional/physical needs (Moran, Bifulco, Ball, Jacobs, & Benaim, 2002). Psychological abuse is often inherent in other forms of abuse and increasingly recognized as a distinct form of abuse with unique and severe consequences (Infurna et al., 2016; Spinazzola et al., 2014). Moreover, this abuse type may be a stronger predictor of adverse outcomes than physical and sexual abuse (e.g., Brunton, Wood, & Dryer, 2020) but has been less studied in the literature than physical and sexual abuse likely due to it being less 'tangible' than other abuse types (O'Hagan, 1995). In Australia, the prevalence estimates for the different forms of child abuse are as follows: 32 % for physical abuse, 28.5 % for sexual abuse, and 30.9 % for emotional abuse, with larger proportions of women (in comparison to men) experiencing child sexual and emotional abuse (Mathews et al., 2023). These prevalence estimates suggest that experiences of child abuse are common in Australia, thereby necessitating further research on the potential adverse outcomes.

Social learning and attachment theorists have posited that individuals who mature into adults without adequate parental care and protection during childhood will have greater difficulties in adopting the parenting role themselves (Bert et al., 2009; Main & Goldwyn, 1984). A number of studies have reported that mothers with higher rates of childhood abuse experiences have an increased risk for maltreating their child and show tendencies to engage in avoidant or atypical parental behaviors (e.g., Gara, Allen, Herzog, & Woolfolk, 2000; Yang, Font, Ketchum, & Kim, 2018). These include, for example, more impulsive, intrusive, or hostile parenting behaviors (see Savage, Tarabulsky, Pearson, Collin-Vézina, & Gagné, 2019 for a review).

One developmental window in which outcomes of child abuse history may be intergenerationally transmitted is the postpartum period. Although the deleterious impact of a maternal history of child abuse on parenting outcomes has been well-researched (Savage, Tarabulsky, Pearson, Collin-Vézina, and Gagné, 2019), few studies have examined the impact of these experiences on MIB during the postpartum period (Farré-Sender et al., 2017; Tambelli et al., 2015). Moreover, existing studies have either focused on only one type of child abuse or utilized composite measures of childhood maltreatment. However, this approach is limited as it fails to recognize that abuse rarely happens in isolation, and experiencing one type of abuse is usually associated with another type (Higgins & McCabe, 2001). Moreover, when individual abuse types are analyzed without controlling for other abuse types (i.e., partitioning individual effects) or abuse is analyzed as a composite variable, these approaches fail to provide an accurate picture of the impacts of childhood abuse. For example, individual findings can be masked by composite measures or overestimated without control of other abuses (Higgins & McCabe, 2001).

There are also inconsistencies in the reported findings. For example, Farré-Sender et al. (2017) examined maternal emotional childhood trauma in a clinical sample of pregnant mothers ( $N = 251$ ) and found that it was significantly associated with MIB disturbances during the postpartum period. In contrast, Lehnig, Nagl, Stepan, Wagner, and Kersting (2019) examined the individual effects of maternal experiences of emotional, physical, and sexual abuse on MIB disturbances and found that child abuse experiences were not significantly associated with the quality of MIB. Instead, severe emotional neglect was associated with more impaired MIB whereas severe physical neglect was related to less MIB impairment. However, these disparate findings may be due to limitations in that they did not consider infant characteristics as potential confounding variables.

A further limitation of extant studies is the tendency to examine the *occurrence* of maternal childhood abuse and not the *frequency* of such experiences. Indeed, researchers have highlighted that many measures assessing adverse childhood experiences simply assess for the presence or absence of childhood maltreatment (e.g., using dichotomous scales of yes/no; see review by Brunton & Dryer, 2021). One could argue that assessing for only a single occurrence of childhood abuse does not adequately capture the interrelatedness or range of abuse experiences (Dong et al., 2004). However, examining the frequency of child abuse experiences would indicate abuse severity, which is important given that an increase in abuse frequency has been generally known to increase the risks of poor emotional and psychological outcomes (Brunton & Dryer, 2021; Glover et al., 2010). To address these limitations in the published literature, the current study examined the frequency of maternal childhood experiences of physical, sexual, and psychological abuse and MIB impairment during the postpartum period. Accounting for multiple types of abuse is in line with research showing that children experiencing one type of abuse are more likely to have been exposed to other forms of abuse (Dong, Anda, Dube, Giles, & Felitti, 2003).

While some studies argue a direct association between maternal child abuse history and MIB impairment, others have suggested that this link is mediated through psychological conditions such as postpartum psychopathology (Choi et al., 2017). It has been theorized that child abuse is an ontogenetic factor that has an ongoing impact on future behaviors and thus, can impact parenting outcomes either directly or indirectly through other factors (Belsky, 1984). A systematic review on the effects of maternal abuse history on caregiving has found consistent evidence that maternal childhood abuse history impacts mother-infant outcomes through sequelae such as postnatal depression (PND, Vaillancourt, Pawlby, & Fearon, 2017). PND affects between 10 to 20 % of women within the first postpartum year and 25 % beyond the first year (Falana & Carrington, 2019), and maternal history of childhood abuse has been

demonstrated to be associated with PND in both cross-sectional and longitudinal studies (Buist & Janson, 2001; Mahenge, Stöckl, Mizinduko, Mazalale, & Jahn, 2018). Indeed, these mothers with past child abuse experiences report higher levels of PND symptoms (Buist & Janson, 2001). Similarly, individuals with experiences of emotional and psychological child abuse are at a greater risk of developing mood disorders, which in itself is a risk factor for PND (Beck, 2001; Wright, Crawford, & Del Castillo, 2009) with these women identified as having a more chronic vulnerability to ongoing depression (Nanni, Uher, & Danese, 2012). A recent longitudinal study (N = 83,109) found that PND symptomatology in mothers at one month and six months after childbirth significantly predicted greater MIB disturbances one year after childbirth (Kasamatsu, Matsumura, Shima, Hamazaki, & Inadera, 2020). The MIB disturbances are likely a consequence of mothers with PND experiencing greater levels of irritability, withdrawn behavior, difficulty in recognizing their infant's affective states, and engaging in less mother-infant play (Field, 2010; Slomian, Honvo, Emonts, Reginster, & Bruyère, 2019). Taken together, these findings suggest a serial pathway from maternal childhood abuse experience to PND symptomatology to MIB disturbances. To date, however, no study has directly examined this in regard to the different types of maternal abuse experiences.

In addition to PND symptomatology, another factor that may influence the relationship between maternal child abuse and MIB is parental self-efficacy (DiLillo & Damashek, 2003). Parental self-efficacy refers to a parent's perceived judgement of their ability to successfully perform in the parenting role (Jones & Prinz, 2005). Parental self-efficacy has been argued to mediate between parental knowledge and caregiving behavior and has therefore been posited to be a determinant to optimal parenting practices (Teti, O'Connell, & Reiner, 1996). These perceived judgements of one's parenting abilities influence the performance of parenting tasks, with greater levels of parental self-efficacy predicting increased parental warmth, caregiving responsiveness, and quality of parent-child interactions (Teti et al., 1996). Cross-sectional studies have shown that maternal child abuse is significantly associated with lower levels of maternal self-efficacy (Caldwell, Shaver, Li, & Minzenberg, 2011). Further, longitudinal studies have demonstrated that maternal child abuse histories predict lower levels of maternal self-efficacy indirectly through maternal depression (Schuetze & Eiden, 2005). These findings may be partly explained by mothers with PND having compromised cognitive and emotional states, which increases their tendency to judge their parenting more negatively than mothers without maternal depression symptoms (Kohlhoff & Barnett, 2013). However, to the authors' knowledge, no study has directly examined whether the relationship between maternal childhood abuse experience and MIB disturbances is mediated by PND and maternal-self efficacy.

The Current Study.

The co-occurrence and interrelatedness of multiple forms of abuse is widely recognized in the literature, such that neglect is often accompanied by physical and emotional abuse (Kim, Mennen, & Trickett, 2017). Moreover, the likelihood of experiencing adverse childhood experiences is significantly higher when domestic violence is also present in the home (Dong et al., 2004), and women with maternal child abuse experience (compared to women with no history of abuse) are at greater risk of experiencing intimate partner violence (i.e., re-victimization; Brunton & Dryer, 2021). However, the different forms of abuse can have differential outcomes, particularly for pregnant and postpartum women. For example, pregnant women with a history of child abuse or maltreatment (compared to women with no history of abuse/maltreatment) are at greater risk of miscarriage (Abajobir, Kisely, Williams, Strathearn, & Najman, 2018), preterm birth (Selk, Rich-Edwards, Koenen, & Kubzansky, 2016), and postpartum depression (Giallo et al., 2017), with the associations being stronger for certain types of abuse (e.g., sexual abuse but not physical abuse is associated with preterm birth; Selk et al., 2016). Women who have experienced abuse or maltreatment as children are at increased risk for postpartum depression, particularly those with child emotional or sexual abuse experiences (Choi et al., 2018). Therefore, it is important to

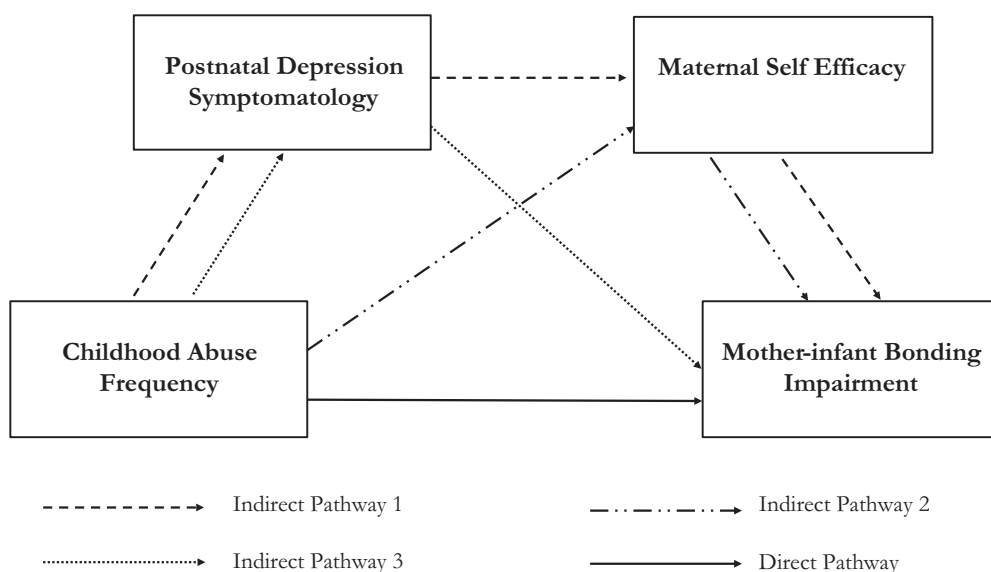


Fig. 1. Direct hypothesized serial mediation model of key variables.

examine the different types of abuse rather than examine child maltreatment in general. In the current study we specifically examined maternal experiences of child physical, sexual and psychological abuse. The aims of the current study were to examine whether maternal child abuse experience was associated with MIB disturbances and whether this relationship was mediated by both PND symptomatology and maternal self-efficacy (see Fig. 1). In this study, the double mediation model illustrated in Fig. 1 was examined separately for physical, sexual, and psychological maternal child abuse experience.

## 2. Method

### 2.1. Participants

Following institutional ethics approval, 306 women responded to Facebook boosted posts containing the link to the online questionnaire. Participation was limited to females residing in Australia, between the ages of 18 to 44 years, who had given birth within the last 12 months, and English was their primary spoken language. Women ( $N = 101$ ) who responded 'No' to the confirmation of consent statement or who did not meet the inclusion criteria of the study were excluded. A small incentive of a chance to win one of three AUD40.00 gift cards was used to encourage participation, and further 14 women were excluded due to providing no responses to the main measures of the study. A final sample of 191 women between the ages of 19 and 40 years ( $M_{age} = 32.88$ ,  $SD = 4.20$ ) were included in the main analyses. This sample was primarily comprised of Anglo-Saxon Australian women (85.86 %) with a large proportion (81.5 %) attaining a University qualification. Note that the small proportion of Indigenous Australian women who participated (1.50 %) is slightly lower than the proportion of Indigenous Australian mothers who gave birth in 2020 (Australian Institute of Health and Welfare, 2022). The mean age of the participants in this sample is consistent with reports that the average age of Australian mothers has risen over time, with approximately two-thirds of mothers aged between 25 and 34 years (Australian Institute of Health and Welfare, 2022). As shown in Table 1, 59.4 % of women reported that this was their first child.

### 2.2. Materials

The online questionnaire was comprised of the following questions and measures:

**Demographic characteristics.** Participants provided their age, ethnicity, education, employment, relationship status, infant birth order and infant age.

**The Edinburgh Postnatal Depression Scale (EPDS)** measured PND symptomatology (Cox, Holden, & Sagovsky, 1987). The EPDS has been widely validated (Boyce et al., 1993; Cox, 2019) and has sound internal consistency ( $\alpha = 0.80$ ) in Australian samples (Small, Lumley, Yelland, & Brown, 2007). The scale consists of 10 items, ranging from 0 to 3, with higher scores indicating greater levels of symptomatology. A score of 13 or above has been used to identify Australian women at risk of PND (Boyce, Stubbs, & Todd, 1993; Levis, Negeri, Sun, Benedetti, & Thombs, 2020). In the current study the internal consistency was also sound,  $\omega = 0.88$ . The overall total score was used in the main data analyses.

**Perceived Maternal Parenting Self-Efficacy Tool (PMPSE)** assessed participants' self-efficacy in caring for their infant (Barnes & Adamson-Macedo, 2007). This is a 20-item self-report inventory that examines caretaking procedures, eliciting temperaments,

**Table 1**  
Participant demographic information.

Measure	N (%)
Ethnicity <sup>a</sup>	
Anglo-Saxon Australian	164 (85.86)
Indigenous Australian	3 (1.50)
Asian	17 (8.90)
Other	7 (3.66)
Marital Status <sup>b</sup>	
Single	5 (2.60)
Partnered	183 (95.30)
Other	3 (1.50)
Education <sup>c</sup>	
High School	7 (3.60)
TAFE	29 (15.10)
University (Under/Postgraduate)	155 (81.15)
Employment <sup>d</sup>	
Employed	128 (67.02)
Homemaker	42 (21.90)
Unemployed	6 (3.10)
Other	15 (7.80)
Birth Order <sup>e</sup>	
1	113 (59.04)
2	57 (30.81)
3+	15 (8.10)
Infant Age	22.24(12.35)

Note: Missing data, a = 1, b = 1, c = 1, d = 1, e = 1, f = 3.

reading, and signaling behaviors and beliefs about parenting experiences. The items are scored using a four-point scale from 1 (*strong disagreement*) to 4 (*strong agreement*); higher scores indicate greater perceived maternal efficacy. Previously reported reliability estimates are sound ( $\alpha = 0.78$ ). The current study also obtained excellent internal consistency,  $\omega = 0.94$ . The total score was used in the data analyses.

**The Postpartum Bonding Questionnaire (PBQ)** measured MIB disturbances characterized by feelings of hostility and rejection directed at the infant (Brockington et al., 2001). The PBQ comprises 25 items rated on a scale from 0 (*never*) to 5 (*always*). This measure has four sub-scales, Impaired Bonding, Rejection and Anger, Infant-Focused Anxiety, and Incipient Abuse. In this study, total scores were used in the data analyses with higher total scores indicating greater levels of MIB disturbances. Previous studies have reported strong internal consistency,  $\alpha = 0.85$  (Reck et al., 2006) consistent with the current study,  $\omega = 0.94$ .

**Maternal Child Abuse Experience.** For a comprehensive assessment of childhood abuse history participants were assessed using the Adverse Childhood Experiences Questionnaire (ACE-Q; Felitti et al., 1998), the Childhood Experiences of Violence Questionnaire, Short Form (CEVQ-SF; Tanaka et al., 2012) and the Family Experiences Questionnaire's Psychological Child Abuse subscale (FEQ-A; Briere & Runtz, 1988). For all three scales frequency of abuse was assessed using a rating scale from 0 (*never*), 1 (*1–2 times*), 2 (*3–5 times*), 3 (*6–10 times*), 4 (*>10 times*) with higher scores indicating a higher frequency of abuse experienced.

To assess child physical and sexual abuse we used items from the ACE-Q and CEVQ-SF. The ACE-Q is a widely used scale of adverse childhood experiences and consists of 10 categories of experiences before the age of 18 years. Four items assess exposure to sexual abuse (e.g., *Did an adult ... touch or fondle you in a sexual way*) and two items assess physical abuse (e.g., *Did a parent ... push, grab, shove, or slap you?*). The physical and sexual abuse items have demonstrated convergent validity with other child abuse measures (Schmidt, Narayan, Atzl, Rivera, & Lieberman, 2020). The CEVQ-SF is a 4-item scale that also assesses child physical and sexual abuse. Three items assess physical abuse (e.g., *How many times ... did an adult kick, bite, punch, choke, burn you, or physically attack you in some way?*) and one item assesses sexual abuse. The CEVQ-SF has good construct validity and internal consistency ( $\alpha = 0.85$ , Tanaka et al., 2012). For this study, the child physical abuse items formed one scale and the child sexual abuse items another scale, both scales had excellent internal consistency,  $\omega = 0.86$ ,  $\omega = 0.94$ , respectively.

To assess psychological child abuse, the 7-item Psychological Child Abuse subscale of the FEQ-A and the two psychological items from the ACE-Q were utilized (i.e., total of 9 items). This measure assesses experiences of psychological maltreatment and includes items such as whether respondent was ridiculed, embarrassed, or humiliated by caregivers in childhood. The FEQ-A has adequate internal consistency for the psychological subscale ( $\alpha = 0.75–0.78$ , Briere & Runtz, 1988). The current study reported excellent internal consistency ( $\omega = 0.94$ ) for the 9-item measure.

### 2.3. Procedure

Facebook boosted postings of the study contained an invitation to mothers who have given birth in the last 12 months with a link to the online questionnaire. The survey took approximately 30 min to complete. Apart from the measure assessing child abuse experiences, all other measures were randomized to address possible order effects. The measure assessing childhood abuse experiences was presented last to minimize any potential impact the items in this measure may have on completing the other measures. As part of the human ethics requirements for this study, participants with an EPDS total scores  $\geq 13$  received a message recommending that they contact their general medical practitioner and were provided with details of support agencies.

### 2.4. Data analysis

McDonald's omega assessed internal consistency reliability as it produces a less biased estimate (Zinbarg, Revelle, Yovel, & Li, 2005). G\*Power (Faul, Erdfelder, Lang, & Buchner, 2007) confirmed that a minimum sample of 119 was required to achieve power of  $\beta = 0.95$ , with a 5 % probability of a type 1 error with a medium effect size. All statistical analyses were performed using SPSS Statistics software (version 29) and Hayes PROCESS macro version 4.0. Mediation analyses were conducted to test the mediation model illustrated in Fig. 1. Two serial mediation models examined the frequency (as an indication of severity) of each type of abuse (X: physical, sexual, and psychological) and its influence on postpartum MIB (Y) through PND symptomatology ( $M^1$ ) and maternal self-efficacy ( $M^2$ ). PND symptomatology and maternal self-efficacy were examined as independent mediators.

## 3. Results

### 3.1. Preliminary analyses

Data were first screened by visual inspection and also the time to complete variable. No spurious responses or unusual data was identified. Missing data was minimal (< 2 %) therefore analysis proceeded with pairwise deletion. The EPDS was generally normally distributed however the PMPSE had a negatively skewed distribution (skew =  $-1.08$ , SE = 0.18) and the PBQ showed a positively skewed distribution (skew = 1.19, SE = 0.18). To correct this skewness variables were transformed using square root and log transformation respectively, which resulted in more normal distributions (skew =  $-0.43$ , SE = 0.18; skew =  $-0.89$ , SE = 0.18 respectively). Child physical abuse and child sexual abuse were also positively skewed due to more respondents not endorsing these experiences of childhood abuse. To improve the predictability of the regression models, these variables were log transformed to correct this skewness. To further address any non-normality, bootstrapping procedure (5000 resamples) were used in all the mediation analyses.

**Table 2**  
Correlations for demographic and key variables.

	1	2	3	5	6	7	8	9	10	11	12	13	14
1. CPA	–												
2. CSA	<b>0.320**</b>	–											
3. CPY	<b>0.692**</b>	0.100	–										
5. PBQ	<b>0.181*</b>	0.029	<b>0.230**</b>	–									
6. EPDS	<b>0.251**</b>	0.127	<b>0.267**</b>	<b>0.510**</b>	–								
7. PMPSE	–0.075	0.003	–0.098	<b>–0.655**</b>	<b>–0.403**</b>	–							
8. Age	–0.094	<b>–0.149*</b>	–0.031	0.034	–0.105	–0.059	–						
9. Marital Status	–0.120	<b>–0.225**</b>	–0.029	0.083	0.045	–0.052	–0.019	–					
10. Birth order	–0.040	–0.140	0.018	–0.046	–0.048	0.080	<b>0.299**</b>	–0.001	–				
11. Employment	–0.073	0.006	–0.082	–0.004	–0.053	0.065	0.084	0.014	–0.134	–			
12. Education	<b>–0.203**</b>	<b>–0.159*</b>	–0.082	0.050	–0.047	–0.067	<b>0.175*</b>	0.018	0.029	<b>0.162*</b>	–		
13. Age of Infant	0.109	0.061	0.111	0.053	–0.031	<b>0.161*</b>	0.024	0.090	–0.061	–0.078	0.046	–	
14. Sex of baby	0.005	0.053	–0.066	0.069	–0.020	–0.130	0.085	0.050	–0.075	–0.001	0.002	0.058	–
15. # of children	–0.048	<b>–0.151*</b>	–0.024	–0.075	–0.086	0.102	<b>0.284**</b>	–0.048	<b>0.972**</b>	<b>–0.144*</b>	0.020	–0.055	–0.061

Note. \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ , (2-tailed). Significant correlations are bolded. CPA = child physical abuse, CSA = child sexual abuse, CPY = child psychological abuse, EPDS = Edinburgh Postnatal Depression Scale, PMPSE = Perceived Maternal Parenting Self-Efficacy, PBQ = The Postpartum Bonding Questionnaire. # of children = number of children used as an indicator of parity as a continuous variable. Age of infant measured in weeks. Transformed variables used.



Given the distributions of the data and ordinal nature of the measures, Spearman correlation analysis examined the relationships between the variables of interest to assess linearity and potential covariates. As shown in Table 2, participants' education level and age were identified as covariates and included in the main analyses. Table 3 reports the frequencies for the child abuse variables. As shown, 25.26 % of participants did not experience physical abuse, 78.42 % did not report sexual abuse experiences, and 5.26 % reported no psychological abuse. Descriptive statistics for the main variables of interest were: EPDS,  $M = 7.49$ ,  $SD = 5.31$ , PMPSE,  $M = 67.37$ ,  $SD = 7.97$ , and PBQ,  $M = 16.31$ ,  $SD = 11.58$ . Examination of EPDS scores indicated that 15.3 % of the participants obtained an EPDS  $\geq 13$ , a commonly used cut-off score on the EPDS to indicate postnatal depression in postpartum women (Levis et al., 2020).

Consistent with the co-morbidity of child abuse types, child physical abuse was positively correlated with both child sexual abuse and psychological abuse. Child sexual abuse, however did not significantly correlate with psychological abuse. The child sexual abuse composite score also did not significantly correlate with the two mediation variables of postnatal depression (EPDS) and maternal self-efficacy (PMPSE) nor the outcome variable of mother-infant bonding (PBQ). Given these findings, we did not proceed to test the mediation model for child sexual abuse. Both child physical and psychological abuse were significantly correlated with mother-infant bonding (PBQ). Maternal self-efficacy (PMPSE) was found to show significant negative correlations with postnatal depression (EPDS) and mother-infant bonding (PBQ); however, was not significantly correlated with the child physical and child psychological abuse variables in univariate analyses. Postnatal depression symptomatology (EPDS) had a significant negative correlation with maternal self-efficacy (PMPSE) and a significant positive correlation with mother-infant bonding (PBQ) disturbances. Given these findings, we proceeded to test the mediation model for both child physical and psychological abuse. Mahalanobis distance identified one extreme multivariate outlier (Mahalanobis  $>40$ ) for the child physical and psychological abuse models, which was deleted. The Mahalanobis distance after deletion did not exceed the critical value of 20.51 for either model.

### 3.2. Mediation analyses

Two mediation models were tested. Model one examined child physical abuse and model two examined psychological abuse. Mother's education level, age, and infant age were included as covariates in the analyses. For both models the other abuse types were also controlled to account for the high co-morbidity of abuse (i.e., in the child physical abuse model we controlled for psychological abuse and sexual abuse). Table 4 presents the indirect effects and effect sizes.

For model one there was no significant indirect effect of maternal child physical abuse experience on MIB disturbances (PBQ) through PND symptomatology (EPDS) and maternal self-efficacy (PMPSE),  $\beta = 0.01$ ,  $SE = 0.03$ , 95 % CI:  $-0.04, 0.06$  Furthermore, the direct effect of maternal child psychological abuse on MIB disturbances was not significant,  $B = -0.01$ ,  $SE = 0.07$ , 95 % CI:  $-0.13, 0.12$ , indicating that there is no serial mediation of PND and maternal self-efficacy on the relationship between maternal child physical abuse and MIB disturbances.

However, for model two, the results showed a significant indirect effect of maternal child psychological abuse experience on MIB disturbances (PBQ) through PND symptomatology (EPDS) and maternal self-efficacy (PMPSE),  $\beta = 0.06$ ,  $SE = 0.03$ , 95 % CI:  $0.01, 0.12$ . Furthermore, the direct effect of maternal child physical abuse on MIB disturbances was not significant,  $B = -0.011$ ,  $SE = 0.01$ , 95 % CI:  $0.31, -0.01$ , indicating that it is fully mediated by PND symptomatology and maternal self-efficacy. Moreover, PND symptomatology, but not maternal self-efficacy, independently mediated the relationship between child psychological abuse and MIB disturbance,  $\beta = 0.07$ ,  $SE = 0.03$ , 95 % CI:  $0.01, 0.13$ .

## 4. Discussion

Given the potential negative influence of maternal childhood abuse experience on the quality of postpartum MIB, as well as the negative child developmental outcomes associated with disturbances in MIB, this study examined two factors (i.e., PND symptomatology and maternal self-efficacy) that may mediate the relationship between maternal child abuse experience and MIB. To our knowledge, this is the first study to examine the mediating effects of both of these factors in one study.

The current study found that PND symptomatology and maternal self-efficacy fully mediated the relationship between psychological child abuse and MIB disturbances. This finding is in line with studies that have found that a developmental history of childhood abuse in mothers increases PND symptomatology and that PND predisposes a parent to a lower sense of efficacy when performing parenting tasks (Caldwell et al., 2011; Schuetz & Eiden, 2005). Furthermore, in the current study, the lower levels of maternal self-efficacy were associated with greater levels of MIB disturbances, which is consistent with research demonstrating that the negative thinking style

**Table 3**  
Child abuse frequency.

Frequency	CPA N (%)	CSA N (%)	CPY N (%)
0 (never)	48 (25.13)	150 (78.53)	10 (5.24)
1–2	96 (50.26)	29 (15.18)	64 (33.50)
3–5	24 (12.57)	4 (2.09)	30 (15.71)
6–10	13 (6.81)	3(1.57)	35 (18.32)
10+	10 (5.24)	5 (2.62)	52 (27.23)

Note. CPA = Child physical abuse, CSA = child sexual abuse, CPY = child psychological abuse.  $N = 191$ . Frequency is calculated on average as items are summated for a total score.

**Table 4**  
Effects of child abuse on postpartum mother-infant bonding through postpartum depressive symptomatology and maternal self-efficacy.

	IV → M [R <sup>2</sup> ]	M <sup>1</sup> → M <sup>2</sup>	M → DV	IV → DV (Direct effect)	IV → DV (Indirect effect: Pathway 3)	95 % CI (Pathway 3)
IV: CPA frequency				-0.004 SE = 0.066, P = 0.95	0.006 ns SE 0.022	-0.034, 0.052
M <sup>1</sup> : PPD symptoms	0.386 [0.104]–	-0.04***	0.017***			
M <sup>2</sup> : Maternal Self-efficacy	0.016 [0.228]		-0.412***			
Educa				B = 0.016, SE = 0.024, ns, CI = -0.032, 0.063		
Age				B = 0.005, SE = 0.005, ns, CI = -0.004, 0.014		
CSA				B = -0.071, SE = 0.062, ns, CI = -0.193, 0.052		
CPY				B = 0.003, SE = 0.003, ns, CI = -0.003, 0.008		
Inf Age				B = 0.003, SE = 0.002, ns, CI = -0.0003, 0.006		
IV: CPY frequency				0.008*	0.002** SE 0.001	0.0004–0.0044
M <sup>1</sup> : PPD symptoms	0.143[0.104]**–	-0.037**	0.017**			
M <sup>2</sup> : Maternal Self-efficacy	0.001 [0.228]		-0.412**			
Educa				B = 0.016, SE = 0.024, ns, CI = -0.0322, 0.063		
Age				B = 0.005, SE = 0.005, ns, CI = -0.004, 0.014		
CSA				B = -0.071, SE = 0.062, ns, CI = -0.193, 0.052		
CPA				B = -0.004, SE = 0.066, ns, CI = -0.134, 0.126		
Inf Age				B = 0.003, SE = 0.002, ns, CI = -0.0003, 0.006		

Note. CPA = Child physical abuse, CSA = child sexual abuse, CPY = child psychological abuse. Unstandardized regression coefficients are reported. CI = Confidence Intervals. CIs are for Indirect Pathway 3, and those not including zero indicate a statistically significant indirect effect. \**p* < 0.05, *p* < 0.01. PPD = Postpartum depressive symptomatology. Unstandardized regression coefficients are reported. 95CI = 95 % confidence intervals. All analyses included covariates.

Footnote:

<sup>1</sup> Supplementary analysis not reported.

characteristic of low maternal self-efficacy is related to perceived MIB (Challacombe, Nath, Trevillion, Pawlby, & Howard, 2021). These findings provide support for the proposition that childhood abuse, particularly psychological abuse is an ontogenetic factor that has an ongoing impact on future behaviors and thus, can influence parenting outcomes indirectly through other factors (Belsky, 1984).

This study also found that PND symptomatology independently mediated the relationship between maternal child psychological abuse experience and MIB impairment. This result suggests that PND may by itself represent a risk factor for MIB impairment especially among women with psychological abuse experience. This finding extends on previous studies that have demonstrated an association between a maternal history of child abuse and PND, and PND and MIB impairment by demonstrating the pathways from abuse to MIB impairment. That is, our findings support the proposition that a history of childhood abuse may predispose a mother to PND (Mahenge et al., 2018), which in turn may negatively impact her capacity to connect with her infant (Kasamatsu et al., 2020; Slomian et al., 2019). These findings are consistent with the findings of previous meta-analyses demonstrating a link between experiences of childhood psychological abuse and depression (Infurna et al., 2016).

Maternal self-efficacy did not independently mediate the individual relationship between child psychological abuse frequency and MIB impairment. This finding is inconsistent with research that has suggested that parental self-efficacy is a mediator between childhood maltreatment history and parenting attitudes and behaviors (Bailey, DeOliveira, Wolfe, Evans, & Hartwick, 2012; Caldwell et al., 2011). The current findings suggest that a mother's perceived self-capacity to successfully perform the parenting role is *only* impacted when there is a concurrent presence of PND—and it is through this pathway, that MIB quality is impacted. This is in line with longitudinal studies showing that childhood maltreatment histories in mothers predict lower levels of maternal self-efficacy via indirect pathways such as PND (Schuetze & Eiden, 2005). These results add to the primacy of PND, not only in understanding potential impact on MIB quality but also on maternal beliefs. Future studies are needed to investigate the longitudinal links among childhood abuse frequencies, PND, maternal self-efficacy, and MIB impairment to consolidate the current study's overall findings.

It should also be noted that with the inclusion of other abuse types as covariates in the analyses, the findings for child physical abuse attenuated to non-significance <sup>1</sup>. In other words, once the variance associated with psychological abuse was controlled for, we did not find a significant indirect effect of child physical abuse experience on MIB disturbances through PND symptomatology and maternal self-efficacy; nor did we find a significant direct effect of maternal child physical abuse on MIB disturbances. Given that abuse rarely happens in isolation and experiencing one type of abuse is usually associated with another type, this finding demonstrates the importance of controlling for other abuses as failure to do so can conflate findings (Higgins & McCabe, 2001).

An unexpected finding in the current study was that maternal child sexual abuse experiences were not associated with any of the mediating or outcome variables. This finding is inconsistent with research that has shown that a mother's experience of child sexual abuse is directly or indirectly associated with depressive symptoms, maternal self-efficacy, and parent-infant outcomes (Mahenge et al., 2018; Schuetze & Eiden, 2005). A closer examination of our data found that most women (78.5 %) reported not experiencing child sexual abuse, which is inconsistent with data that shows that the prevalence of child sexual abuse is similar to rates of physical child abuse in Australia (7.7 % and 8.5 % respectively) (Australian Bureau of Statistics, 2019). These findings suggest that despite the anonymous online environment, mothers in this study may still be reluctant to disclose child sexual abuse history (McElvaney, 2015). Despite the low endorsement for this type of abuse experience, this study found that child sexual abuse frequency was significantly associated with child physical abuse experience. This is in line with research that has shown that children experiencing child sexual



abuse are also likely to experience other forms of abuse (Dong et al., 2003; Dong et al., 2004). However, child sexual abuse was not significantly related to child psychological abuse, which is likely indicative of the negatively skewed data.

#### 4.1. Limitations and future directions

A limitation in this study is that we did not assess previous mental health diagnosis (e.g., depression, anxiety). However, we examined the EPDS scores which indicated that 15.1 % of the women met the cut-off of  $\geq 13$ . Note that this proportion is greater than pooled prevalence of 11 % for PND (based on the EPDS cutoff of  $\geq 13$ ) reported in a recent meta-analysis (Lyubenova et al., 2021). While scores on the EPDS do not equate to a depression diagnosis, they do suggest that the current sample may not be representative of postpartum women in the general community in regard to levels of depression. Unfortunately, due to the small sample size we were unable to examine the mediation models for only women who obtained an EDPS score  $\geq 13$ . Therefore, this limitation needs to also be considered in the generalizability of our findings. Moreover, our recruitment procedure is likely to have introduced self-selection bias, attracting women with PND concerns and thereby limiting the generalizability of the findings. Another limitation that needs to be noted was the reliance on self-report measures (i.e., the possibility of response bias). To minimize this risk, all but one of the measures were presented in a random order. The measure of maternal child abuse experience was presented last to minimize any potential impact of the completion of this measure on other measures. Despite this, we cannot completely rule out the possibility that the high self-reported symptoms of depression may have influenced their perceptions of maternal self-efficacy and the MIB quality. However, studies have found similarities between self-report measures of MIB and actual parenting behaviors, suggesting some validity to the use of self-report measures of MIB (Martinez-Torteya et al., 2014; Muzik et al., 2012). Future studies may attempt to address this limitation by obtaining information on actual behaviors indicative of MIB quality. The nature of the sample (i.e., primarily Anglo-Saxon Australian women with a tertiary education) would have also impacted on the generalizability of the findings particularly in regard to women from culturally and linguistically diverse backgrounds as well as women who have received less education. Another limitation of the current study is that we did not include a measure of social support (i.e., support from partner, family, friends and/or community). Social support is widely recognized as a component of resilience resources (Julian, Romney, Mahrer, & Dunkel Schetter, 2020). The findings from one of our previous studies indicate that social support is a mediator between maternal child abuse experience and pregnancy-related anxiety (Brunton et al., 2020). Therefore, controlling for the effects of social support could have potentially weakened the relationship between maternal child psychological abuse experience and PND in the current study. Finally, the cross-sectional nature of the current study limits the ability to determine the direction of the relationships between the variables. To consolidate the current findings, prospective and longitudinal studies need to be conducted to fully examine the causal relationships between the variables. It is also worth noting that while statistically significant, some of the effect sizes reported are in the small to medium range.

## 5. Conclusion

The healthy development of the MIB represents a critical process for the mother during the postpartum period. Differences in MIB quality may be due to maternal factors such as childhood experiences of abuse, PND symptomatology, and her perceived capacity to successfully perform parenting tasks. Our findings suggest the importance of screening for PND, particularly women with child abuse history in order to provide more targeted support as and potentially prevent MIB disturbances. Further, our findings also suggest a need to include psychological abuse when screening for child abuse experiences in expectant and new mothers. Ultimately, an assessment for child abuse history and psychopathology during the pre- and postnatal period would identify women at risk of MIB disturbances.

The data used for this study are available from the corresponding author upon request.

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### Author contribution

Vivian Chau and Rachel Dryer developed the research, recruited participants, conducted the data analyses, created the tables and figure, and wrote the first draft of the manuscript. Rachel Dryer and Robyn Brunton reviewed and revised the first draft to create the submitted version. All authors reviewed the final version of the manuscript.

### Declaration of competing interest

None.

### Data availability

Data will be made available on request.

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