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### Resistance to fear of child birth and stability of mother-child bond

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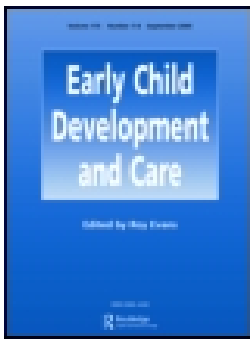
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## Resistance to fear of child birth and stability of mother-child bond

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### ABSTRACT

In order to examine (1) the stability of the mother-child-bond and (2) associations between mother-child-bonding and aspects of maternal-well-being, pregnant women ( $N=170$ ) completed measures on well-being and mother-child-bonding at two antepartum and two postpartum time points. We found relatively weak associations between mother-child-bonding at 20 weeks of gestation and mother-child-bonding at 6 months postpartum. Fear of childbirth was weakly, but statistically significantly associated with mother-child-bonding at 6 weeks (but not at 6 months) postpartum. Correlations between antepartum general well-being and social support, on the one hand, and mother-child-bonding, on the other, failed to reach statistical significance. Women with a partner had a better mother-child-bonding at 36 weeks of gestation and 6 months postpartum, than women without a partner, and older women had better mother-child-bonding at 20 weeks of gestation, than younger women. Our findings thus suggest that mother-child-bonding is not a very stable phenomenon, but it is quite robust against potential negative influences of poor maternal mental health.

**Abbreviations:** 4DSQ: four-dimensional symptom questionnaire; ANOVA: analysis of variance; DSM-IV: diagnostic and statistical manual of mental disorders IV; FOC: fear of childbirth; severe FOC: W-DEQ score  $\geq 85$ ; MCB: mother-child bonding; PRAM: pictorial representation of attachment measure; SSQ: social support questionnaire; T1: 20–24 weeks of gestation; T2: 36 weeks of gestation; (T3): 6 weeks postpartum; (T4): 6 months postpartum; W-DEQ: Wijma delivery expectance/experience questionnaire

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Pregnant women; mother-child bonding; fear of childbirth; correlations

## Background

Mother-child-bonding (MCB) refers to thoughts and feelings of the mother towards her child and has been found to be related to maternal well-being and positive child development outcomes (Ainsworth, 1982; Bowlby, 1969). This bond between mother and child is hypothesized to start to develop early during pregnancy and to continue its development during pregnancy and beyond (Brandon, Pitts, Denton, Stringer, & Evans, 2009). According to theories about antepartum

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bonding, the importance of positive thoughts and feelings about the relationship with the unborn baby is that they promote antepartum and postpartum maternal behaviour and caregiving (Brandon et al., 2009). Feelings of bonding occur in parallel with the physical development of the fetus and psychological adjustments accompanying the upcoming motherhood (Dubber, Reck, Müller, & Gawlik, 2015). Optimal MCB facilitates the mother's nurturing behaviour and supports her role to protect the child. MCB also positively influences maternal health practices during pregnancy and postpartum, such as choosing a healthy diet and drinking no alcohol (Ross, 2013). Research also found that a compromised antepartum MCB may be predictive of a future lack of MCB (Condon & Corkindale, 1997), and the development of psychopathology in the child (Svanberg, 1998).

Whereas previous studies showed that maternal *general* anxiety might affect MCB (De Cock et al., 2016), to our knowledge, no studies have examined mothers' feelings and thoughts about the unborn baby in women experiencing severe fear of childbirth (FOC).

Approximately ten percent of pregnant women suffer from severe FOC (Zar, K. Wijma, & Wijma, 2001), which means that the fear of giving birth is so intense that it makes the woman dysfunctional with severe consequences for her personal, social, and work life and for her willingness to become pregnant and/or ability to give birth. When the fear fulfils the criteria for a phobia according to DSM-5, women often may want to avoid delivery or the delivery is endured with intense anxiety (K. Wijma & Wijma, 2017). Studies have also demonstrated that women with high levels of antepartum childbirth anxiety are concerned about the well-being of themselves and their infants (K. Wijma, 2009), the labour process (pain, medical interventions, abnormal course of labour, death, re-experiencing a previous traumatic delivery) (Ryding, B. Wijma, Wijma, & Rydhström, 1998), personal conditions (lack of control, distrust in own abilities), and external conditions (interaction with or the assistance of the staff) (Sjögren, 1997). In addition, associations between FOC and several possible health indicators have been reported, such as hypertension and pre-eclampsia (Kurki, Hiilesmaa, Raitasalo, Matilla, & Ylikorkala, 1995), preterm birth (Feldman, Weller, Leckman, Kuit, & Eidelman, 1999; Mann, 1992), complications during delivery and emergency caesarean section (Robson & Kumar, 1980; Ryding, Wijma, Wijma, & Rydhström, 1998), more frequent use of analgesia during delivery (Alehagen, K. Wijma, Lundberg, & Wijma, 2005) and prolonged delivery and trauma anxiety (Söderquist, B. Wijma, Thorbert, & Wijma, 2009).

In a clinical observation, Klabbers, Wijma, Paarlberg, Emons, and Vingerhoets (2014) observed that high FOC women often touch their belly in an objectifying manner and speak about their unborn child in an objectifying way, which might be an indication of a compromised MCB. Previously, Hofberg and Ward (2003) suggested that bonding problems with the infant might be associated with FOC due to previous traumatic deliveries.

The present study has two principal objectives. The focus is, first, on the stability of MCB over time (both antepartum and postpartum) and, second, on associations between MCB and aspects of maternal well-being, i.e. maternal symptoms of distress, depression, general anxiety and somatization, as measured with the four-dimensional symptoms questionnaire (4DSQ) (Tebbe, Terluin, & Koelewijn, 2013; Terluin et al., 2006).

## Methods

### *Design and procedure*

Between April 2012 and June 2015, women with a singleton pregnancy, age 18 or older, were recruited in 35 Dutch community midwifery practices, by gynecologists at a department for Obstetrics and Gynaecology at a teaching hospital, or via the project's website (Klabbers et al., 2014). Women were invited to complete an informed consent form, after which they received a login code by email and were asked to digitally complete the project measures.

A secured Internet environment was designed for the project, facilitating the completion of the online questionnaires. The questionnaires were sent by e-mail at four time points: at 20 to 24 weeks of gestation (T1), when the movements of the baby can usually be felt for the first time; at 36 weeks of gestation (T2), i.e. a few weeks before delivery, when usually the upcoming birth is becoming actual for pregnant women; at 6 weeks postpartum, at the end of postpartum maternity leave (T3); and at 6 months postpartum, to measure longer-term psychological health outcomes (T4).

### **Study participants**

The study sample consisted of 555 pregnant women aged  $\geq 18$  who had filled out the questionnaires. Exclusion criteria were a multiple pregnancy and a history of psychotic episodes.

### **Ethical approval**

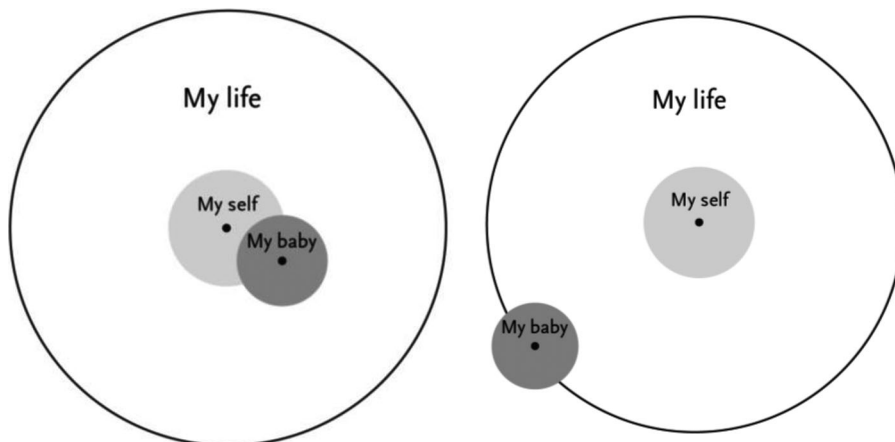
This study was approved by the Dutch Medical Ethics Review Committee and registered under number NL3490000811.

### **Measures**

#### **Pictorial representation of attachment measure**

MCB was measured using the Pictorial Representation of Attachment Measure (PRAM) (Van Bakel, Maas, Vreeswijk, & Vingerhoets, 2013). The PRAM was recently introduced as a potential valid, quick, and easy-to-administer instrument of parent-infant bonding (see Figure 1) which showed meaningful associations with validated questionnaires measuring mother and father bonding (De Cock et al., 2016; Pollmann & Hoffenaar, 2017; Van Bakel et al., 2013). The original paper version of the PRAM has been validated (Van Bakel et al., 2013). In the current study, a digital version was used, not yet validated in this form.

The measure is represented by a white screen with a big circle, which represents the pregnant mother's current life. A yellow circle in the centre of the big circle represents the woman's 'Self.' Next to the big circle, a green circle represents the fetus/infant at that very moment. The mother's task is to move the fetus/infant circle to a certain place in the circle representing her current life. The outcome measure is the Self-Baby-Distance (SBD), i.e. the distance (in millimetres) between the centres of the 'Baby' and 'Self' circles.



**Figure 1.** Two examples of the Pictorial Representation of Attachment Measure (PRAM).

### ***Wijma delivery expectancy/experience questionnaire***

FOC was measured using the 33-item Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) (K. Wijma, Wijma, & Zar, 1998), with a 6-point Likert scale ranging from 'not at all' (=0) to 'extremely' (=5), yielding total scores ranging from 0 to 165.

We used a cut-off score of 85, i.e. a W-DEQ score  $\geq 85$  indicating that the mother suffers from severe FOC, in agreement with recommendations of the author of the W-DEQ (K. Wijma, Wijma, & Zar, 1998; K. Wijma & Wijma, 2017). In the current study, at T1, the Cronbach's  $\alpha$  was .95.

### ***Four-dimensional symptom questionnaire***

Distress, anxiety, depression, and somatization were assessed using the Four-Dimensional Symptom Questionnaire (4DSQ) (Terluin et al., 2006). The 4DSQ comprises a list of 50 symptoms according to DSM-IV (American Psychiatric Association, 1994). The 4DSQ measures distress, depression, general anxiety and somatization as separate dimensions, with a 6-point Likert scale ranging from 'no' (=0) to 'very often or constantly' (=5). In the present study, at T1, the Cronbach's  $\alpha$  was .94.

### ***Social support questionnaire***

Social support was measured using the Social Support Questionnaire (SSQ) (I.G. Sarason, Sarason, ShearIn, & Pierce, 1987), in which a 5-point Likert scale, ranging from 'not applicable' (=0) to 'very applicable' (=5), yields total scores ranging from 0 to 30. In the present study, at T1, the SSQ Cronbach's  $\alpha$  was .92.

### ***Biographic characteristics***

We additionally collected information about the participants' biographic characteristics such as age, relationship status, parity, and educational level with questions especially designed for this study (Klabbers et al., 2014).

### ***Statistical analyses***

Descriptive statistics (M and SD) were calculated for all measures. Pearson product-moment correlations were calculated to determine the associations among MCB measures at 20 weeks of gestation, 36 weeks of gestation, 6 weeks postpartum, 6 months postpartum, and between FOC, MCB, social support, and well-being of the mother (i.e. maternal distress, somatization, depression, measured at T1) and MCB (measured at T1-T4). Additionally, two repeated ANOVAs across two antepartum (T1 and T2) and two postpartum measurement occasions (T3 and T4) were performed to test stability and to compare group means of PRAM scores over time in women with a W-DEQ score  $< 85$  and in those with a W-DEQ score  $\geq 85$ .

## **Results**

The sample consisted of 555 pregnant respondents, of whom 332 (59.8%) were primigravida, see Table 1. At T1, data were obtained from all 555 respondents.<sup>1</sup> There was an outflow at T2 due to technical problems with the digital application of the PRAM and several additional dropouts at T2, T3, and T4. For the exact details, see Figure 2. For biographic characteristics, see Table 1.

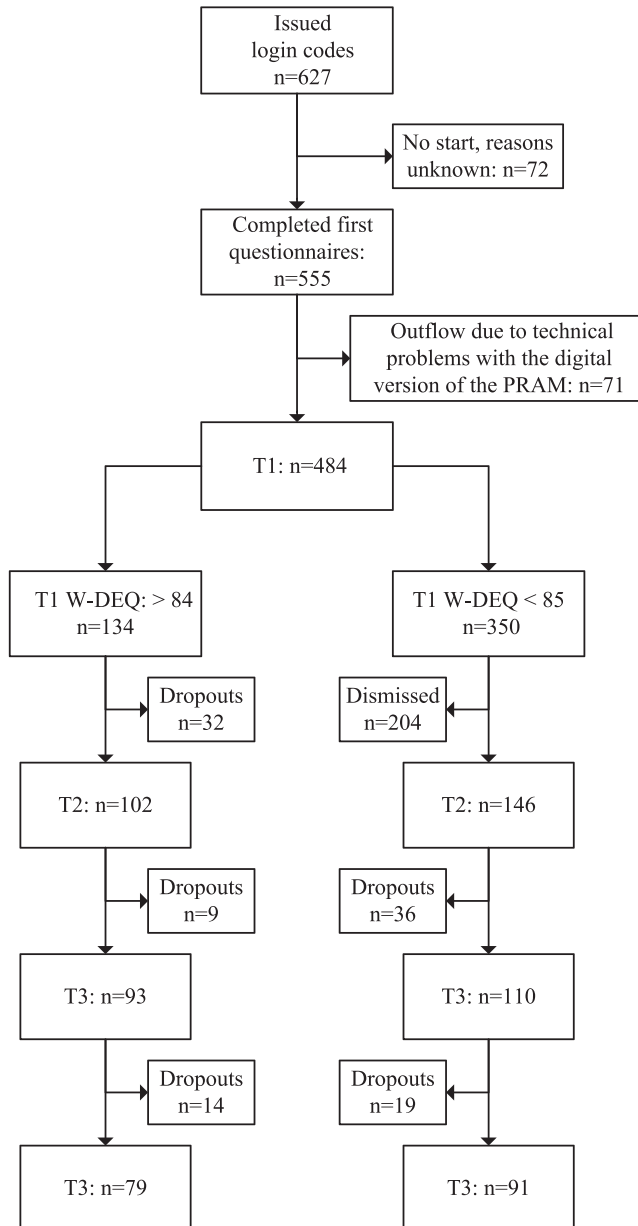
Regarding the development of MCB over time, two results are apparent, see Table 2. First, the mean values were not significantly different between the time points and the correlations between the PRAM scores were all significant (varying between .223 and .386,  $p$ 's  $< .05$ ).

Concerning the second research question, the correlations among antepartum depression, distress, somatization, social support and antepartum and postpartum MCB varied from  $-.114$  to  $.087$  and none reached statistical significance, see Table 3. Having a partner was found to be statistically significantly positively correlated to MCB at T4 ( $r = .198$ ,  $n = 170$ ,  $p = .010$ ). We further found relatively

**Table 1.** Biographic characteristics at T1.

Age ( <i>M</i> -years, <i>SD</i> )	31.9 <i>n</i>	(4.5) %
Primigravida	332	(59.8)
Multigravida	223	(40.2)
High educational level	372	(67.7)
Medium educational level	166	(30.2)
Low educational level	17	(3.1)
Partner	543	(97.8)

Note: T1: 20–24 weeks of gestation.



**Figure 2.** Flowchart. T1: 20–24 weeks of gestation. T2: gestation week 36. T3: 6 weeks postpartum. T4: 6 months postpartum.

**Table 2.** Pearson's correlations between the PRAM scores at T1–T4.

	T1-PRAM	T2-PRAM	T3-PRAM	T4-PRAM
<i>M</i>	70.4	69.9	70.0	69.9
<i>SD</i>	9.3	8.7	6.7	7.8
<i>N</i>	484	248	203	170
T1-PRAM	1	.264**	.223**	.311**
T2-PRAM		1	.386**	.282**
T3-PRAM			1	.296**
T4-PRAM				1

\*\*Correlation is significant at the 0.01 level (2-tailed). PRAM: Pictorial Representation of Attachment Measure. T1: 20–24 weeks of gestation. T2: 36 weeks of gestation. T3: 6 weeks postpartum. T4: 6 months postpartum.

**Table 3.** Pearson's product-moment correlations between fear of childbirth, biographic characteristics, social support and wellbeing of the mother (i.e. maternal depression, distress, somatization) on the one hand and mother-child bonding at T1–T4 on the other.

			T1-PRAM <i>n</i> = 484	T2-PRAM <i>n</i> = 248	T3-PRAM <i>n</i> = 203	T4-PRAM <i>n</i> = 170
T1	W-DEQ:	Fear of childbirth	-.071	-.050	-.145*	.041
	4DSQ:	Distress	-.063	-.059	-.110	.064
		Depression	-.051	-.060	-.030	.027
		Somatization	-.030	-.084	-.114	.045
	SSQ:	Social Support	.087	.065	.077	.020
BC:		Age	-.104*	.066	-.123	-.137
		Education	-.007	-.030	-.030	-.123
		Partner	-.080	.144*	.101	.198**
		Primi-/multigravida	.036	-.059	.011	-.047

\*Correlation is significant at the 0.05 level (2-tailed).

\*\*Correlation is significant at the 0.01 level (2-tailed). T1: 20–24 weeks of gestation. T2: 36 weeks of gestation. T3: 6 weeks postpartum. T4: 6 months postpartum. W-DEQ: Wijma Delivery/Expectancy Questionnaire. 4DSQ: Four Dimensional Symptom Questionnaire. PRAM: Pictorial Representation of Attachment Measure. SSQ: Social Support Questionnaire. BC: Biographic characteristics.

weak associations between mother-child-bonding at 20 weeks of gestation and mother-child-bonding at 6 months, ( $r = .311$ ,  $n = 160$ ,  $p < .001$ ).

To test whether PRAM scores of the group of women with severe FOC, i.e. W-DEQ-score  $\geq 85$  differed from the scores of the group of women with a W-DEQ score  $< 85$ , a repeated measures ANOVA across four measurement occasions (T1–T4) was carried out. No significant mean group differences in MCB (PRAM scores) between pregnant women with a W-DEQ score  $< 85$  and those with a W-DEQ score  $\geq 85$  were found:  $F(3, 142) = .288$ ,  $p = .834$ .

PRAM scores at T1 and the W-DEQ scores at T1 were both normally distributed, with a skewness of  $-.278$  ( $SE = .111$ ) and a kurtosis of  $.577$  ( $SE = .222$ ) for the PRAM, and a skewness of  $.430$  ( $SE = .104$ ) and a kurtosis of  $.254$  ( $SE = .207$ ) for the W-DEQ.

Between FOC at T1 and MCB at T3, a statistically significant negative correlation was found ( $r = -.145$ ,  $n = 203$ ,  $p = .038$ ). Between FOC and MCB at T1 no statistically significant correlation was found ( $r = -.071$ ,  $n = 484$ ,  $p = .117$ ); nor between FOC at T1 and MCB at T4 ( $r = .041$ ,  $n = 170$ ,  $p = .598$ ), see Table 3.

## Discussion

The primary objectives of the present study were to learn more about the stability of MCB over time, both antepartum and postpartum and, second, to investigate the possible association between background variables and the general well-being of the mother, operationalized in terms of FOC and 4DSQ scores, and antepartum and postpartum MCB.

Regarding the first aim of the study, the MCB was stable over a 9 month period and did not change from pregnancy to 6 weeks and 6 months postpartum findings failed to reveal a systematic and substantial change over time.



Concerning the second issue, contrary to expectations, the results also did not show substantial relations between FOC and postpartum MCB, suggesting that FOC may not have a significant impact on MCB or that that influence might be either positive or negative, depending on yet to determine factors, e.g. the attachment style of the mother. We only found a statistically significant negative correlation between antepartum FOC and MCB at 6 weeks postpartum. Between antepartum FOC and postpartum MCB at 6 months postpartum also no statistically significant association was found. When MCB was compared between high and low to moderate FOC women, also no significant mean group differences were observed. Therefore, although previous studies demonstrated that high FOC was associated with several adverse consequences for both mother and infant (Alehagen, Wijma, Lundberg, & Wijma, 2005; Bowlby, 1969; De Bruijn, 2010; Dole et al., 2003; Kurki et al., 1995; Ryding, B. Wijma, Wijma, & Rydhström, 1998; Söderquist, Wijma, Thorbert, & Wijma, 2009), our study did not find an overall negative impact of severe FOC on MCB.

Previous studies used different measuring tools to assess MCB at different measurement points. This may have caused differences in results between the current and previous studies. For example De Cock et al. (2016) used the Maternal Antenatal Attachment Scale (MAAS) at three time points: 26 weeks of gestation, 6 months postpartum, and 24 months postpartum, whereas Ossa, Bustos, and Fernandez (2012), between 25 and 40 weeks of gestation, used the Condon's Antenatal Emotional Attachment Questionnaire (Condon, 1993). Moreover, the percentage of pregnant women with a W-DEQ score  $\geq 85$  was considerably higher (24.2%) in our study than the 10% mentioned in previous research reports (see for an overview Klabbers, Van Bakel, Van den Heuvel, & Vingerhoets, 2016). This may imply a selection bias because this study seemed to attract the attention of high FOC women in particular.

From the biographic characteristics (i.e. age, parity, education, relationship status) and all psychological factors (fear of childbirth, depression, distress, somatization, social support), at 6 month postpartum, only 'having a partner' was weakly positively associated with postpartum maternal feelings of bonding with the baby. This failure to find meaningful association is in accordance with other studies, such as those by Cranley (1981), which also did not show a relationship between prenatal attachment and parity and Armstrong (2002), who demonstrated that depressive symptoms and pregnancy-specific anxiety do not seem to affect subsequent parent-infant attachment in a pregnancy after a previous perinatal loss. However, on the other hand, Ferketich and Mercer (1995) and Van Bussel, Spitz, and Demyttenaere (2010) found that multiparous women had lower attachment scores than primiparous women, Sorensen and Schuelke (1999) demonstrated that prenatal fantasies about the unborn child were more prevalent in primigravida than in multipara, and A. Yarcheski, Mahon, Yarcheski, Hanks, and Canella (2009) found that social support is a predictor of MCB. The reasons for these inconsistent results might be the fact that MCB was measured during different time periods of pregnancy and with different kinds of instruments in these various studies.

The lack of an association between MCB, FOC, and indices of the mother's well-being in our study might be explained in several ways. First, although a significantly high percentage of women in the present study reported suffering from FOC, high levels of FOC did not negatively affect the levels of bonding with their child. Levels of fear thus might not be high enough to influence their feelings of bonding or, as said before, might change bonding in opposite ways. Mothers may feel very fearful about giving birth but, nevertheless, will still be able to feel firmly connected to their unborn child, but the fear that the infant is at serious risk may also dampen this bond, in an attempt to reduce the suffering associated with the loss of the infant. Second, it can be argued that MCB is not readily compromised by the mother's symptoms of distress, or depressive or anxious feelings. For example, the stability of MCB might be comparable to the robustness of the Baby Schema Effect (BSE) (Lehmann, Huis in't Veld, & Vingerhoets, 2013). The BSE refers to the phenomenon that a set of specific infantile physical features, such as the large head, round face, and big eyes, are automatically perceived as cute and motivates caretaking behaviour in adults. Lehmann et al. (2013) demonstrated that BSE is insensitive to a possible negative influence of person factors such as narcissism and insecure attachment. The authors suggest that such an essential biological

phenomenon, which might facilitate MCB, should be rather robust and not too easily be affected by non-optimal person factors in order to guarantee an optimal caregiving process. The same line of reasoning may apply to the findings in the current study, i.e. MCB might also be such a crucial biological phenomenon for the mother and the survival of the child that it is plausible that it is quite resistant to the possible negative influences of high levels of maternal fear and anxiety. Note that the used instrument (4DSQ) must be considered a screening tool and is not able to diagnose reliably a major depression or any other serious psychopathology. Therefore, it cannot be concluded on the basis of the current finding that MCB is not affected by severe psychopathology.

### **Limitations**

First of all, the percentage of high FOC pregnant women was considerably higher (24.2%) in our study than the 10% mentioned in the literature (Klabbers et al., 2016), which suggests a selection bias. Women experiencing FOC may have been more willing to participate in the study and complete the initial questionnaire. Second, when women were invited via Internet advertising, women suffering from FOC might have been more inclined to participate. Further, we had lost data due to software problems with the digital version of the PRAM, causing extra outflow ( $n = 71$ ). Finally, it is not clear to what extent the current digital PRAM may have yielded different findings than the original paper version.

### **Recommendations**

Further research is needed to confirm and extend the present findings. In order to facilitate the comparison with results of previous studies, we recommend using validated measures and tuning the timing of the measurements in future studies better, i.e. using the same questionnaires at the same time points. Moreover, additional research is needed to evaluate the comparability of the paper version of the PRAM and the here used online version (cf. Noyesa & Garland, 2008). Finally, the notion that fear that the infant will not survive delivery may delay the bonding process as a preventive coping mechanism needs further appropriate consideration.

### **Conclusion**

MCB seems not to be negatively affected by maternal depression, distress, somatization, and lack of social support. Antepartum MCB and having a partner are positively associated with postpartum MCB. In women with severe FOC, MCB does not seem to be negatively affected. Antepartum FOC is weakly negatively associated with an impaired MCB at 6 weeks postpartum, but not with MCB at 6 months postpartum, nor is antepartum FOC related to antepartum MCB.

### **Note**

1. Unfortunately, due to software problems, PRAM data of 71 respondents at T1 were not registered. The mean W-DEQ score of those 71 respondents did not significantly differ from the scores of the other 484 respondents:  $F(1, 553) = .023, p = .880$ .

### **Disclosure statement**

No potential conflict of interest was reported by the authors.

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