Individual differences in non-clinical maternal depression impact infant affect and behavior during the still-face paradigm across the first year

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A B S T R A C T

Maternal depression can significantly impact mothers’ sensitivity to their infants’ needs as well as infants’ social and emotional development. The still-face paradigm (SFP) is widely used to assess infants’ understanding of the contingency between their own behavior and that of their caregivers, as well as infants’ ability to self-regulate arousal levels during sudden changes in maternal responsiveness. Infants of clinically depressed mothers display blunted levels of negative affect compared to infants of non-depressed mothers during the still-face (SF) phase. However, little is known about whether individual differences in elevated, non-clinical levels of maternal depression similarly affect mother-infant interactions. The current study examines the longitudinal effects of non-clinical maternal depression on infant and maternal behaviors during the SFP. Infants (N = 63) were assessed at 5 and 9 months and maternal depression was assessed at 5 months using the Beck Depression Inventory (BDI). Infants of mothers with elevated levels of depression displayed less negative engagement during the SF phase compared to infants of mothers with lower levels of depression. This effect was present at 5 months, but not at 9 months. Findings demonstrate that non-clinical levels of maternal depressive symptomatology can have a significant impact on infants’ affective regulation during the first half of the first year of life, but this does not necessarily have a long-lasting influence later in infancy. Interventions may want to target mothers with non-clinical depression to promote healthy infant social and emotional development.

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1. Introduction

When engaging in social interactions, people often take part in mutual exchanges and are responsive to one another’s behavior. Detecting these social contingencies even in infancy is an important precursor for social learning. The still-face paradigm (SFP; Tronick, Adamson, Wise, & Brazelton, 1978) is a way to empirically observe infants’ communicative interactions with their adult caregivers. The SFP is commonly used to measure infants’ temperamental reactions to changes in parental contingencies, infants’ abilities to regulate negative emotions, and as an early marker of later attachment style.
(Beebe et al., 2010; Koulomzin et al., 2002; for review and meta-analysis, see Mesman, Ijzendoorn, & Bakermans-Kranenburg, 2009).

There are three phases within the SFP: interaction, SF, and reunion. During the interaction (i.e., baseline) and reunion phases, the caregiver engages normally with the infant (i.e., touching infant, making play/laughing faces). During the SF phase, the caregiver stops interacting with the infant and assumes a neutral expression regardless of the infants’ responsive behavior. Compared to the interaction and reunion phases, the SF phase breaks parent-infant contingency, thereby eliciting decreased positive affect (e.g., less smiling/laughing) and increased negative reactivity. When this occurs, infants will exhibit crying, screaming, pouting, and/or other signs of distress (e.g., Gusella, Muir, & Tronick, 1988; Tronick et al., 1978) while waning in their bids for their unresponsive caregiver’s attention (Ekas, Haltigan, & Messinger, 2013).

Social contingency between mother and infant is created through consistent dyadic interactions, usually measured by the infant’s responses to maternal bids for communication (Rochat & Striano, 1999). During normal mother-infant interactions, the mother’s behavior is predictive of and contingent on the infant’s behavior and vice-versa. For example, the mother may smile and laugh toward her infant, leading the infant to babble or giggle in return, which results in a form of protoconversation between the two. The majority of studies examining the SFP have investigated infant initiations and reactions. Studies that have focused on maternal behaviors during the SFP have usually done so within the context of maternal contributors to the SF effect (for review and meta-analysis, see Mesman et al., 2009). For example, maternal sensitivity, or reliably predictable and timely reactions to the infant’s cues in an affectively positive way, is found to be a precursor for establishing dyadic reciprocity between mother and infant behavior during the SFP (Conradt & Ablow, 2010; Coppola, Aureli, Grazia, & Ponzetti, 2015; Mastergeorge, Paschall, Loeb, & Dixon, 2014). Hence, maternal sensitivity and reliable caregiving fosters social contingency between mother and infant (Ainsworth, 1991). Therefore, low maternal sensitivity, such as in the case of maternal depression, may inhibit normal, contingent mother-infant interactions.

Maternal depression can significantly impact infants’ social and emotional development by compromising the typical social relationship between mother and infant (Feldman et al., 2009; Skotheim et al., 2013). For example, when the mother becomes emotionally unavailable (i.e., depressed) and thereby unresponsive to her infant’s behavior, the mutual reciprocity and exchange, as well as infant emotion regulation (Weinberg & Tronick, 1998), that occurs during typical mother-infant interactions is significantly reduced (Field, 1994). Studies have consistently revealed a SF effect, in which infants typically display an increase in negative affect (i.e., distress) during the SF phase (for review and meta-analysis, see Mesman et al., 2009). In contrast, infants of clinically depressed mothers display reduced levels of behavioral negativity when their mothers abruptly discontinue interacting with them, possibly as a result of having become habituated to their mothers’ nonresponsive, flattened affect (Field et al., 2007; Field, Diego, & Hernandez-Reif, 2009).

There are some inconsistencies in the literature with regard to the effects of maternal depression on infant behavior during the SF. For instance, some studies report more behavioral and affective negativity in infants of mothers (or fathers) with depressive symptomatology compared to infants of parents with no history of depression (e.g., Forbes, Cohn, Allen, & Lewinsohn, 2004; Weinberg, Olson, Beeghly, & Tronick, 2006), while other studies find no behavioral differences between the two groups of infants (e.g., Moore, Cohn, & Campbell, 2001; Segal et al., 1995; Stanley, Murray, & Stein, 2004). Overall, findings suggest that maternal depression can significantly influence infant and maternal affective behavior. Nevertheless, individual differences in non-clinical maternal depressive symptomatology, as well as the longitudinal effects of the SF paradigm on mother-infant dyadic interactions remain to be examined.

Given that typically-developing infants are sensitive to parental social cues (i.e., eye gaze; Hains & Muir, 1996), and that maternal sensitivity to infant cues is essential for establishing social reciprocity and healthy attachment between a mother and her infant (for a theoretical analysis, see Shin, Park, Ryu, & Seomun, 2008), it is important to explore the kinds of behavioral and emotional responses that mothers with non-clinical symptoms of depression may elicit from their infants during dyadic interactions. Recently, Skotheim et al. (2013) reported that infants of mothers with subclinical levels of post-partum depression are less sensitive to social cues (i.e., eye gaze, affect) and contingency compared to infants of non-depressed mothers, suggesting that even slight elevations in maternal depressive symptomatology can interfere with normal, healthy mother-infant interactions. However, there is a paucity of literature assessing the impact of elevated, but non-clinical, maternal depression on infant and/or maternal behaviors during the SFP and, more broadly, mother-infant interactions. If such effects exist, clinicians may want to consider developing and providing treatments for mothers with elevated, non-clinical depression in addition to those with clinical depression.

The purpose of the current study is to investigate whether there are longitudinal effects of elevated levels of non-clinical, maternal depression on infant and maternal behaviors during the classic SFP. Whether infants of mothers with elevated, but non-clinical, levels of depression display blunted emotionality during the SF paradigm, and whether this effect is persistent was examined between 5 and 9 months of age. Furthermore, differences in maternal behavior during the SFP between high and low depression groups were explored at 5 and 9 months. It was predicted that infants of mothers with higher levels of non-clinical depression would display a decrease in negative affect during the SF phase than during the interaction and reunion periods compared to mothers with less symptoms of depression. In addition, it was predicted that mothers with lower levels of depression would display less social positivity during the interaction and reunion phases than mothers with lower levels of depression.
2. Methods

2.1. Participants

Typically developing infants (N=90; 45 males) and their mothers participated in the current study. Families were contacted by mail using commercially available lists of names and addresses, and were recruited as part of a longitudinal study assessing early associative learning in relation to later social development. The population of infants was representative of the greater Washington, DC area with 50.0% Caucasian, 23.3% African American, 2.2% Hispanic, 2.2% Asian, and 23.3% mixed ethnicity. The infants’ mothers were well educated, with 37.8% completing a graduate degree, 41.4% completing a college degree, 10.0% completing professional or trade certificate, and 10.0% completing a high school degree. Of the 90 dyads that visited the laboratory at 5 months of age, 24 did not return for the 9-month assessment, and 3 were missing maternal depression data, resulting in a final sample size of 63 mother-infant dyads. See Table 1 for sample demographics.

2.2. Procedure

Mothers brought their infants into the laboratory at 5 (M = 5.15 months, SD = 0.20) and 9 (M = 9.17 months, SD = 0.18) months of age. At each visit, they were informed about the study and consented to participate. After consent was obtained, mothers and infants participated in the still-face paradigm (SFP; Tronick et al., 1978). In addition, mothers were assessed for non-clinical depression via the Beck Depression Inventory (BDI, Beck, Ward, & Mendelson, 1961) at the 5-month visit. All procedures were approved by the University of Maryland’s Institutional Review Board.

2.2.1. Still-face paradigm

The SFP consisted of three, 2-min phases: interaction, still-face, and reunion. During the interaction and reunion phases, mothers were instructed to interact as they normally would with their infants without any toys. During the still-face phase, mothers abruptly stopped interacting with their infants and assumed a neutral expression while continuing to look at their infants. A variety of infant and maternal behaviors were coded on a second-by-second basis using the Infant and Caregiver Engagement Phases (ICEP; Weinberg & Tronick, 1999). Behaviors were standardized by computing percentage scores, which were defined as the total amount of time each behavior was displayed during each phase, divided by the total time of each phase multiplied by 100.

2.2.2. Infant behavior

Infant protest, withdrawn behavior, object/environment engagement, social monitoring, social positive engagement, and oral self-comforting were coded. Protest was characterized by displays of facial and bodily expressions of anger. Withdrawn behavior was characterized by displays of sad facial expressions and whimpering/fussy vocalizations when disengaged from the mother. Object/environment engagement was described as the infant looking at either proximal or distal objects including the infant’s seat, infant’s hand, wall posters, etc. Social monitoring occurred when infants directed their attention toward their caregiver as opposed to inanimate objects around the room. Social positive engagement was characterized when infants displayed joyful and playful facial expressions with occasional cooing toward the caregiver. Oral self-comforting was coded as instances in which the infant contacted parts of his/her body with the mouth. Protest and withdrawn behaviors were summed to create a negative engagement score. Object/environment engagement and oral self-comforting were summed to create an emotion regulation score. Two independent coders were responsible for coding the data. Inter-rater reliability was computed from 20% of the 5-month data (α ranged between 0.71 and 0.99).

2.2.3. Maternal behavior

Maternal negative engagement, non-infant focused engagement, social monitoring (with and without vocalizations coded separately), social positive engagement, and exaggerated positive engagement were coded. Negative engagement consisted of the mother displaying negative, intrusive, hostile, or withdrawn behaviors. Non-infant engagement involved the caregiver not attending to the infant and instead remaining involved in non-infant related activity (e.g., fidgeting with clothing, observing objects that the infant is not looking at). Social monitoring with neutral or no vocalizations was coded for instances when the mothers focused their attention on their infants’ activities and behaviors while maintaining a neutral facial expression. Social monitoring with positive vocalizations was similarly coded, but when the mothers expressed positive vocalizations (e.g., use of infant-direct speech, making kissing sounds). Both forms of social monitoring were summed to create a total social monitoring score. Social positive engagement was scored whenever mothers displayed non-exaggerated positive affect (e.g., full smiles, play faces). Exaggerated positive engagement occurred when mothers exhibited extravagant social displays of face, voice, and action. Social positive engagement and exaggerated positive engagement were summed to create a total social positivity score. Mothers in the current sample did not display negative engagement toward their infants and rarely displayed non-infant focused engagement; therefore, these measures were not further examined. Two independent coders were responsible for coding the data. Inter-rater reliability was computed from 20% of the 5-month data (α ranged between 0.70 and 1.0).
Table 1
Demographics.

<table>
<thead>
<tr>
<th></th>
<th>Low Maternal Depression (N = 30)</th>
<th>High Maternal Depression (N = 33)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>50% Male</td>
<td>52% Male</td>
</tr>
<tr>
<td>Mean Age at 5 months (SD)</td>
<td>5.09 (0.34)</td>
<td>5.14 (0.23)</td>
</tr>
<tr>
<td>Mean Age at 9 months (SD)</td>
<td>9.13 (0.16)</td>
<td>8.84 (2.14)</td>
</tr>
<tr>
<td>Maternal Education</td>
<td>79% College or greater</td>
<td>73% College or greater</td>
</tr>
<tr>
<td>Ethnicity</td>
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<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>50%</td>
<td>61%</td>
</tr>
<tr>
<td>African American</td>
<td>20%</td>
<td>12%</td>
</tr>
<tr>
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<td>3.3%</td>
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</tr>
<tr>
<td>Hispanic</td>
<td>3.3%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Mixed</td>
<td>23%</td>
<td>24%</td>
</tr>
<tr>
<td>Mean BDI Score (SD)</td>
<td>5.12 (0.28)</td>
<td>8.97 (1.55)</td>
</tr>
</tbody>
</table>

SD = standard deviation, BDI = Beck Depression Inventory.

2.2.4. Maternal depression

Non-clinical maternal depression was evaluated at 5 months using the BDI, which consists of 21 multiple-choice items asking about depressive symptomology occurring during the previous week (α = 0.732). The BDI demonstrates good internal consistency, with alpha coefficients ranging from 0.73 to 0.92 (Beck, Steer, & Garbin, 1988). Each item ranges in intensity from 0 (indicating no depressive symptoms) to 3 (indicating the most intense depressive symptoms for that item). Items include: (0) I do not feel sad; (1) I feel sad; (2) I am sad all the time and I can't snap out of it; (3) I am so sad or unhappy that I can't stand it. The BDI was completed by 87 out of 90 mothers who participated in the study. Scores on the BDI range from low (0–16), moderate (17–30), to high (31+) levels of depression. Scores for our sample ranged from 0 to 17, with greater scores indicating higher levels of non-clinical depression. Hence, the mothers in our sample did not actually meet the criteria for either high non-clinical or clinical depression according to the BDI scale.

2.3. Statistical analyses

Initial analyses examined whether infant sex, maternal education, or birth order (first vs. later born) affected individual infant and maternal behaviors separately. There were no main or interaction effects of these variables on either infant or maternal behavior. For the infant data, separate repeated measures ANOVAs were conducted for each reported infant behavior, with age (5 and 9 months) and phase (interaction, SF, reunion) serving as the within-subjects factors. For the maternal data, similar repeated measures ANOVAs were conducted for each maternal behavior, but with age (5 and 9 months) and phase (interaction, reunion) serving as the within-subjects factors. To examine individual differences in maternal depression levels on infant and maternal behavior, the continuous maternal depression scores were included as a covariate. To simplify the graphical display of results, maternal depression scores were divided using a median split into high and low depression groups (see Table 1 for demographics of these groups); however, all reported results reflect the effects of continuous maternal depression scores.

3. Results

3.1. Infant behavior

3.1.1. Negative engagement

Repeated measures analyses revealed a significant Phase x Maternal Depression interaction effect (F (2,122) = 4.273, p = 0.016) on infant negative engagement. Specifically, infants of mothers with higher levels of non-clinical depression displayed less negativity during the SF phase compared to the interaction and reunion phases versus those with lower levels of clinical depression. When 5- and 9-month data were examined separately, a significant Phase x Maternal Depression interaction effect was found only at 5 months (F (2,122) = 3.803, p = 0.025; Fig. 1A), but not at 9 months (p > 0.2; Fig. 1B). Five-month-old infants of mothers with higher levels of depression displayed blunted negative engagement during the SF phase compared to the interaction or reunion, while those infants whose mothers had lower levels of depression displayed the typical increase in negative engagement during the SF phase.

Overall, a significant main effect of Phase (F (2,122) = 16.161; p < 0.001) was found, in which infants displayed increased negative engagement during the SF phase compared to the interaction and the reunion phases. A significant main effect of Phase was found at both 5 (F (2,122) = 6.909, p = 0.001) and 9 (F (2,122) = 9.253, p < 0.001) months of age. All other interaction and main effects were not significant.

3.1.2. Social monitoring

A significant Age x Phase interaction effect (F (2, 122) = 5.224, p < 0.01) was found on infant social monitoring. Follow-up paired-sample t-tests revealed that 5-month-olds (Fig. 1C) displayed significantly greater social monitoring than 9-month-
Fig. 1. Effects of non-clinical maternal depression on infants’ behavior during the still-face paradigm. (A) Infants of mothers with high levels of depression (high maternal depression, dashed line) displayed less negative engagement behaviors during the still-face phase compared to infants of mothers with low levels of depression (low maternal depression, solid line) at 5 months, but not at (B) 9 months. High and low maternal depression did not affect infants’ displays of (C, D) social monitoring, (E, F) social positive engagement, or (G, H) emotion regulation at 5 or 9 months.
olds (Fig. 1D) during the interaction ($t$ (62) = 4.273, $p < 0.001$) and SF ($t$ (62) = 3.344, $p = 0.001$) phases, but not during the reunion ($p = 0.10$).

Overall, a significant main effect of Phase ($F(2, 122) = 6.685, p = 0.002$) was found, in which infants demonstrated decreased social monitoring during the SF phase compared to the interaction and reunion phases. Examination of each age separately revealed a significant main effect of Phase at 5 ($F(2, 122) = 10.016, p < 0.001$), but not 9 ($F(2, 122) = 2.401, p = 0.095$) months. An Age x Phase x Maternal Depression interaction effect was found to be marginally significant ($F(1, 122) = 2.401, p = 0.095$). All other interaction and main effects were not significant.

3.1.3. Social positive engagement

A significant Age x Phase interaction effect ($F(2, 122) = 9.90, p < 0.001$) and a significant main effect of Age ($F(1, 61) = 19.301, p < 0.001$) was found on infant social positive engagement. Follow-up paired-sample $t$-tests revealed that 5-month-olds (Fig. 1E) displayed significantly less social positive engagement than 9-month-olds (Fig. 1F) during each phase [interaction: $t$ (62) = −7.257, $p < 0.001$; SF: $t$ (62) = −2.009, $p < 0.05$; reunion: $t$ (62) = −3.214, $p = 0.002$]. Moreover, a significant main effect of Phase ($F(2, 122) = 41.138, p < 0.001$) was found on infant social positive engagement, wherein infants displayed less social positivity during the SF phase than during the interaction and reunion phases. Follow-up analyses by age showed a significant main effect of Phase at both 5 ($F(2, 122) = 15.669, p < 0.001$) and 9 months ($F(2, 122) = 35.971, p < 0.001$), with decreased positivity during the SF phase compared to the interaction and reunion phases. All other interaction and main effects were not significant.

3.1.4. Emotion regulation

A significant main effect of Phase ($F(2, 122) = 11.855, p < 0.001$) was found on infant emotion regulation, in which infants demonstrated increased regulation during the SF phase compared to the interaction and reunion phases. Follow-up analyses by age revealed a significant main effect of Phase at both 5 ($F(2, 122) = 5.060, p < 0.01$; Fig. 1G) and 9 months ($F(1, 122) = 10.202; p < 0.001$; Fig. 1H), with increased emotion regulation during the SF phase compared to the interaction and reunion phases. In addition, a marginal main effect of maternal depression ($F(1, 61) = 3.397; p = 0.070$) was found, whereby infants of mothers with less depressive symptomatology displayed decreased emotion regulation than infants of mothers with higher levels of depression. All other interaction and main effects were not significant.

3.2. Maternal behavior

3.2.1. Social monitoring

A significant main effect of Phase ($F(1, 61) = 9.502; p = 0.003$) was found for maternal social monitoring, in which mothers displayed increased social monitoring during the reunion phase compared to the interaction. When analyzing each age separately, a significant main effect of Phase on maternal social monitoring was found at both 5 ($F(1, 61) = 4.848, p = 0.031$; Fig. 2A) and 9 ($F(1, 61) = 8.066; p = 0.006$; Fig. 2B) months, in which mothers exhibited greater social monitoring during the reunion phase than during the interaction. Paired-sample $t$-tests revealed a significant difference in social monitoring between the interaction and reunion phases at both 5 ($t$ (62) = −3.312, $p = 0.002$) and 9 ($t$ (62) = −4.902, $p < 0.001$) months. All other interaction and main effects were not significant.

3.2.2. Social positivity

A significant main effect of Phase ($F(1, 61) = 8.998, p = 0.004$) was found for maternal social positive engagement, in which mothers showed more social positivity with their infants at 9 months than at 5 months. Examining each age separately, a significant main effect of Phase was observed at both 5 ($F(1, 61) = 4.416, p = 0.040$; Fig. 2C) and 9 ($F(1, 61) = 7.776; p = 0.007$; Fig. 2D) months, whereby mothers exhibited greater social positivity toward their infants during the interaction than during the reunion phase. Paired-sample $t$-tests revealed a significant difference in social positivity between the interaction and reunion phases at both 5 ($t$ (62) = 3.239, $p = 0.002$) and 9 ($t$ (62) = 4.816, $p < 0.001$) months. All other interaction and main effects were not significant.

4. Discussion

The current study examined whether individual differences in non-clinical maternal depression have an effect on infant social contingency detection and emotional affect during the still-face paradigm (SFP), and whether this effect is persistent across the first year of life. Infants of mothers with elevated levels of non-clinical depression were found to display significantly less behavioral negativity during the still-face (SF) phase compared to infants of mothers with lower levels of depression. Previous studies examining mothers diagnosed with depression found that infants of mothers with major depressive disorder displayed less negative affect and behavior during the SF phase compared to infants of non-depressed mothers (i.e., Weinberg, Beeghly, Olson, & Tronick, 2008). Results of the current study expand upon these findings by demonstrating an effect of non-clinical maternal depression on infant negative engagement at 5 months, but not at 9 months. Specifically, infants of mothers who scored relatively high on the BDI exhibited blunted negative affect and behavior at 5 months compared to infants of mothers who scored low on the BDI. This effect, however, was no longer present at 9 months. These findings suggest that infants may be sensitive to subtle signs of maternal depression early on without it continuously
interrupting their abilities to detect social contingencies over the course of development. Hence, higher levels of maternal depression at 5 months may not have a lasting influence on infant behavior and development. Furthermore, the current study emphasizes that individual differences in non-clinical levels of maternal depression may have an impact on infant affective regulation and, thus, have important implications for mother-infant interactions.

It has previously been hypothesized that infants of mothers with depression display blunted emotionality during the SF phase because they have become accustomed to their mothers unresponsive and/or non-contingent behavior at home (Field et al., 2007, 2009). The current study demonstrates that a similar pattern of mother-infant interactions may occur even when mothers have slightly elevated levels of non-clinical depression as opposed to a diagnosis. Consistent with the current findings, non-clinical levels of maternal depression have been found to affect infants’ preferences for contingent vs. non-contingent social interactions, such that 3-month-old infants of mothers with elevated, non-clinical depression did not significantly focus their attention on their mothers during mutually contingent interactions as did infants of non-depressed mothers (Skotheim et al., 2013). These findings suggest that disruptions in contingency do not have a relatively negative impact on infants of mothers with subclinical depression. The current study corroborates this finding by showing that, at least during the SFP, infants of non-clinically depressed mothers are not disturbed by non-contingent maternal communication (or lack thereof) as are infants of mothers with lower levels of depression.

Elevated levels of non-clinical maternal depression affected infant behavior at 5 months of age, but did not persist through 9 months. This change may be the result of differences in assessment between 5 and 9 months of age as well as changes in levels of maternal depression. One limitation of this study is that assessment of maternal depression was conducted at 5 months, but not at 9 months. Hence, the effects at 5 months could have been due to postpartum depression that may have subsided by 9 months. Thus, the lack of long-term effects in this study are confounded by the short-term measurement of depression. Having a concurrent measure of maternal depression at 9 months may have elicited similar findings during the 9-month SFP, as observed at 5 months.

It should be noted that the mothers in this study did not have a BDI score greater than 17, which is typically categorized in the moderate range. Hence, some mothers who showed mild or moderate depressive symptoms at 5 months may have recovered by 9 months, which is likely to occur as mothers become more competent in their parenting skills, gain greater sensitivity to their infants’ needs overtime, and as their infants learn to adjust their own behaviors in response to that of their mothers. Lastly, it is likely that more pronounced and longitudinal effects of maternal depression would have been observed at both 5 and 9 months if the mothers in the current sample were clinically depressed. The current findings are in line with those of Forbes et al. (2004), who found that parental history of depression, but not current depression diagnosis, affected infant behavior during the SFP at 3 months, but not at 6 months.

![Fig. 2. Effects of non-clinical maternal depression on mothers’ behavior during the still-face paradigm. High maternal depression (dashed line) and low maternal depression (solid line) did not affect mothers’ displays of (A, B) social monitoring or (C, D) social positivity at 5 or 9 months. Compared to the interaction phase, mothers displayed higher (A, B) social monitoring and less (C, D) social positivity during the reunion phase at both 5 and 9 months.](image-url)
Maternal sensitivity, which fosters social contingency, is important in dyadic interactions between mothers and their infants because it is associated with healthy infant social and emotional development. Specifically, maternal sensitivity consistently predicts greater infant social positivity during the SF (Braungart-Rieker, Garwood, Powers, & Wang, 2001; Lowe, Handmaker, & Aragón, 2006; Tronick, Ricks, & Cohn, 1982) and reunion (Rosenblum, McDonough, Muzik, Miller, & Sameroff 2002) phases, overall lower infant negativity and more attention-seeking behaviors during the SFP (Mesman et al., 2009), and greater willingness to reengage with the mother (i.e., less resistance to and/or avoidance of mother's bids) after the completion of the SFP (Kogan & Carter, 1996; Mastergeorge et al., 2014). In turn, low maternal sensitivity, which arguably contributes to less contingent parenting, may be symptomatic of maternal depression. Infants may then become accustomed to their mothers’ perpetually flattened affect and adjust their own behavioral and emotional reactions accordingly.

Given these previous findings, it was predicted that maternal depression would affect maternal behavior. In contrast, however, elevated levels of non-clinical maternal depression did not have an effect on maternal behavior. There may be several reasons for the lack of differences in maternal behavior between high and low depressed mothers. First, mothers in previous studies demonstrating differences in maternal behavior were diagnosed with clinical depression, while the mothers in the current study reported only elevated levels of depression via the BDI. It may be that differences in maternal behavior are more obvious in mothers with clinical depression as opposed to elevated levels of non-clinical depression. Second, given the subtle differences in reported levels of depression, it may be difficult to capture differences in maternal behaviors within the 4 min of mother-infant dyadic reciprocity observed during the SFP. Regardless, blunt negative affect observed in 5–month-old infants of mothers with elevated levels of non-clinical depression suggest that there may be a history of decreased maternal sensitivity during daily interactions between this sample’s mothers and their infants. Lastly, the mothers in this study were not assessed for post-partum depression. The BDI, which was administered instead, may not have been a good measure of symptoms associated with maternal depression, but rather general depression. Future studies on the effects of maternal depression on infant behavior during the SFP should consider administering both a measure of general depression, such as the BDI, and a measure of post-partum depression, such as the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987).

Within the typically developing sample of infants examined in the current study, typical phase effects were observed at both 5 and 9 months. Specifically, negative engagement, social positive engagement, social monitoring, and emotion regulation differed during the SF phase compared to the interaction and reunion periods. Additionally, there was the typical carry-over effect from the SF episode to the reunion phase, in which infant negative engagement was higher during the reunion than during the initial interaction between mother and infant, possibly because the infant is “calming down” from the distress elicited by the SF episode (Tronick et al., 1978). Furthermore, there were phase effects in maternal behavior (i.e., social positivity, social monitoring) from the interaction to the reunion, in which social monitoring increased while social positivity decreased. Therefore, the phasic patterns displayed in the current study replicate previous findings (for review and meta-analysis, see Mesman et al., 2009), suggesting a robust SF effect.

The current study demonstrates that slight elevations in maternal depression can have a significant impact on the infant’s affective regulation during the first half of the first year of life. However, elevated, non-clinical maternal depression does not necessarily have a long-lasting influence later in infancy. Nevertheless, because non-clinical depression did have an impact on mother–infant dyadic interactions, it may be crucial for interventions such as Parent Child Interaction Therapy (PCIT; Eyberg, 1988) to target mothers with elevated levels of non-clinical depression in order to promote healthy infant social and emotional development.

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References


