Two-month-old infants of depressed mothers show mild, delayed and persistent change in emotional state after non-contingent interaction

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Abstract

The aim of this study was to explore how early infants show different responses to non-contingent maternal behavior according to their past history of relations with their mother. Two groups of 2-month-olds interacted with their mother who was assessed as depressed (group 1) or non-depressed (group 2). Although they received a continuous image and voice of their mothers, the infants were presented either a 30-s contingent maternal communication (live episode 1) or a thirty second non-contingent episode (replay of prior maternal communication), or again a 30-s contingent live episode (live2). The lower percentage of negative facial expressions displayed during replay by infants of depressed mothers suggests on one hand that they are less sensitive to a non-contingent maternal behavior than infants of non-depressed mothers. However, within group comparisons demonstrate a notable difference: while infants of non-depressed mothers show a U curve of smile, infants of depressed mothers show decreasing smile throughout the three episodes. Taken together, these results plead in favour of an other profile of sensitivity displayed by infants of depressed mothers. Instead of the strong but short-term reaction of infants of non-depressed mothers, the response of infants of depressed mothers appeared to be a mild, delayed and more persistent change in emotional state. These findings are discussed in the light of possible cognitive and social incidence of passive avoidance of stressful events in infants of depressed mothers.

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A key parameter of social communication is the capacity to detect and expect partner’s contingency. Numerous studies have been devoted to explore the effect of non-contingent behaviour upon the early socio-cognitive development of infants. Pioneer studies of clinical cases have reported unstable contingency of depressed mothers (Tronick, Als, Adamson, Wise, & Brazelton, 1978). In parallel, other studies have shown that infants of depressed mothers are at risk in their socio-cognitive and emotional development (Hay, 1997; Murray & Cooper, 1997; Tronick & Weinberg, 1997). Put together, these elements have led to postulate the importance of establishing stable contingent relationships for an optimal development of infants’ cognitive capacities to expect events (Nadel & Tremblay-Leveau, 1999).

Previous experimental procedures have mostly consisted in simulating all-or-none contingency. Non-depressed
mothers were asked to pause abruptly a still face in the course of an ongoing alert interaction (Cohn & Tronick, 1982; Fogel, Diamond, Longhorst, & Demos, 1982; Gesella, Muir, & Tronick, 1988; Murray & Trevarthen, 1985). Field (1984) enrolled depressed mothers to pause a still face and compared their infants’ reactions to those of infants of non-depressed mothers. In a recent discussion of Field’s work, Nadel (2002) have stressed the value of the comparison developed by Field: Infants of non-depressed mothers enrolled in the experiment experienced non-contingent condition as a novel situation, while infants of depressed mothers had already experienced temporary unresponsiveness or delayed communication of their mother. The comparison that Field led between the two groups of infants introduced the important distinction between interaction and relations, when relations are defined as interactions taking account of past history of relations (Hinde, 1976). As Bigelow suggested, extended experience with minimal contingent social interactions may lessen infants’ sense of self-efficacy and generate functional impairments in cognitive, social and emotional realms (Bigelow, 1999). Cohn and Elmore (1988) have suggested that depression might differentially concern maternal affect and responsiveness. They have manipulated the matching between infant’s and mother’s affect by asking the mother to become still-face each time the infant displayed a positive expression. They found in this situation that 3-month-olds are sensitive to timing violations of reciprocal affective behavior.

We decided to follow this path and explore how early infants show different responses to non-contingent maternal behavior according to the past history of relations of the dyad. To document this question, we used a device that we have designed previously so as to maintain unchanged all parameters of a good communication except the timing aspects: mothers are still gazing, speaking, smiling at infants, they just not respond on time (Nadel, Carchon, Kervella, Marcelli, & Reserbat-Plantey, 1999). We did not break the interactive flow to replay to the infant a segment of previous maternal communication like Murray and Trevarthen (1985), followed by Hains and Muir (1996). Instead, we proposed a continuous image and voice of mother with a seamless shift from contingent to non-contingent and from non-contingent to contingent communication. Used with 9-week-olds, it proved to be extremely sensitive and provided evidence that a 30-s-episode of mother’s non-contingency is enough to generate important changes in infant’s behavior and mood. Our design inspired Stormark and Braarud (2004) who built a similar device and found significant changes in gaze during replay with infants aged 8–16 weeks-olds. Interestingly, they compared the infant’s responses to a replay of prior mother’s behavior already experienced by the infants during the live episode, and a real-time episode of their mother’s behavior responding to a replay of the infant’s behavior during live. There was no difference in the infants’ amount of gaze during these two situations. Although we do not know if the maternal behaviors were similar in the two conditions (they were probably not), such results suggest that the infant sensitivity to non-contingency cannot be explained by the replay procedure: memory traces of prior maternal behaviour do not account for the behavioral changes between live and replay. Obviously, findings with the live-replay procedure are coherent and robust across ages (from 6 to 16-weeks) and designs. This procedure should be relevant to compare infants’ sensitivity to non-contingent interaction according to prior history of relations with a non-depressed or depressed mother (Nadel, Carchon, & Canet, 2001).

Our main hypothesis was that maternal depression would not affect the detection of non-contingency but rather emotional consequences of this detection. More precisely, we propose to make a clear-cut distinction between two aspects of sensitivity to contingency: perceptual discrimination (measured by visual attention), and social sensitivity (marked by affect). Why such a distinction? A basic aspect of a sense of contingency, we suggest, relates to our remote and pre-wired human capacity to establish temporal relationships between events (Blass, Ganchrow, & Steiner, 1984; Soussignan & Schaal, 2005; Watson, 1984): after A comes B, be the event a physical or a social event. A communicative signal addressed by the infant (event A) will generate a communicative response of the mother (event B). Suppose however that event A does not lead to event B but to event C. Infants of depressed and non-depressed mothers will shift their attention as a consequence of a major fact: there is no relationship between A and C. But this is only part of the scenario. A followed by B will generate additional reactions likely to differentiate the emotional states of infants of depressed mothers compared to those of infants of non-depressed mothers. In other words, we hypothesized that children of non-depressed mothers expect B from A and will thus show negative emotional reactions if C. Meanwhile, children of depressed mothers, who have already experienced unstable relations between their social behavior and their mother’s responses, will have moderate expectation linked to A, and, though detecting non-contingency, will express little emotional reaction to violation of contingency.

To test this hypothesis, our experiment enrolled two groups of mothers that were contrasted according to depression scores obtained with classical scales of depression and DSMIV (APA, 1996). A parallel study was led in