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Full length article

## Mutual regulation between infant facial affect and maternal touch in depressed and nondepressed dyads

Ida Egmo<sup>\*</sup>, Katharina Cordes, Johanne Smith-Nielsen, Mette Skovgaard Væver, Simo Køppe

Department of Psychology, University of Copenhagen, Denmark

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### ABSTRACT

The ability to regulate affect is important for later adaptive child development. In the first months of life, infants have limited resources for regulating their own affects (e.g. by gaze aversion), and for this reason they are dependent on external affect regulation from their parents. Previous research suggests that touch is an important means through which parents regulate their infants' affects. Also, previous research has shown that post-partum depressed (PPD) mothers and nonclinical mothers differ in their touching behaviors when interacting with their infants. We examined the affect-regulating function of affectionate, caregiving and playful maternal touch in 24 PPD and 47 nonclinical mother-infant dyads when infants were four months old. In order to investigate the direction of effects and to account for repeated observations, the data were analysed using time-window sequential analysis and Generalized Estimating Equations. The results showed that mothers adapt their touching behaviors according to negative infant facial affect; thus, when the infant displays negative facial affect, the mothers were less likely to initiate playful touch and more likely to initiate caregiving touch. Unexpectedly, only in the PPD dyads, were the mothers more likely to initiate affectionate touch when their infants were displaying negative facial affect. Our results also showed that mothers use specific touch types to regulate infants' negative and positive affects; infants are more likely to initiate positive affect during periods with playful touch, and more likely to terminate negative affect during periods with caregiving touch.

### 1. Introduction

The ability to regulate affect is highly important for adaptive child development. A lack of regulatory abilities is associated with poorer academic skills and social competencies, as well as a higher risk for psychopathology, crime, and health-risk behaviors later in life (Calkins & Hill, 2007; Moffitt et al., 2011; Zeman, Cassano, Perry-Parrish, & Stegall, 2006). Although infants possess inborn, internal mechanisms for affect regulation (e.g. gaze aversion and self-touch), these are far from fully developed, and infants are dependent on their caregivers' external feedback to regulate their affect (Calkins & Hill, 2007; Tronick & Beeghly, 2011). In addition, it is through the experience of successful affect regulation within early caregiver-infant interaction that infants' regulatory abilities are assumed to develop (Beebe & Lachmann, 1998; Feldman, Greenbaum, & Yirmiya, 1999; Tronick & Beeghly, 2011).

The Mutual Regulation Model (MRM) provides a theoretical framework for understanding reciprocal moment-to-moment processes in caregiver-infant interactions (Tronick, 1989). The MRM conceptualizes the caregiver and the infant as a dyadic system in

<sup>\*</sup> Corresponding author.

E-mail address: [i@egmo.dk](mailto:i@egmo.dk) (I. Egmo).

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which both partners regulate the interaction by responding to each other's affect and behavior. Thus, according to the MRM, infants are not only regulated by their parents' external feedback, but they also regulate their parents' behavior through, amongst other things, their affective displays (Tronick, 1989; Weinberg, Olson, Beeghly, & Tronick, 2006). In line with the notion of mutual regulation, Cole, Martin, and Dennis (2004) differentiate between affect as regulated and affect as regulating. Affect as regulated refers to situations, where the parent's behavior regulates the infant's affect; for example, affectionate parental behaviors may relax and decrease negative infant affect. Affect as regulating refers to situations, where the infant's affect regulates the parent's behavior; for example, display of positive infant affect may increase playful parental behaviors. In the current study, this two-fold definition of affect regulation is adopted in order to investigate the bidirectional regulatory influences between infant facial affect and maternal affectionate (e.g. stroking, caressing), caregiving (i.e. touch with a functional caregiving purpose, such as readjusting the infant's seating position or wiping the infant's mouth), and playful touch (e.g. jiggle, large movements with arms or legs).

### 1.1. Maternal touch and infant affect

Several studies have shown that caregivers' touching behaviors are vital for the regulation of infants' affects. For example, in a series of modified Still-Face (SF) experiments (Tronick, Als, Adamson, Wise, & Brazelton, 1978), it has been demonstrated that the presence of touch reduces the classic SF-effect, i.e. a decrease in positive affect and an increase in gazing away from mothers, fretting and neutral affect. When the mothers touched their infants during the SF-period, the infants showed more positive and less negative affect, and gazed more at their mother's still face (Gusella, Muir, & Tronick, 1988; Jean & Stack, 2009; Jean, Stack, & Arnold, 2014; Stack & LePage, 1996; Stack & Muir, 1990, 1992). These findings indicate that maternal touch is an important means to both increase positive affect and to reduce negative affect (Hertenstein, 2002).

Several studies have suggested that it is necessary to differentiate between touch types, when examining the regulation of infant affect by maternal touch. Affectionate or nurturing touch, such as kissing, stroking, or massaging, has been found to relax infants and to reduce the level of negative infant affect (Arnold, 2002; Moreno, Posada, & Goldyn, 2006; Peláez-Nogueras et al., 1997). On the other hand, playful or stimulating touch, such as tickling, lifting, and rhythmic touch, has been found to reinforce infants' social behaviors, such as eye contact and positive affect (Lowe et al., 2016; Moreno et al., 2006; Peláez-Nogueras et al., 1997; Peláez-Nogueras, Gewirtz et al., 1996; Stack & LePage, 1996; Wolff, 1963). Caregiving touch (also termed utilitarian, instrumental and matter-of-fact touch) is touching with a functional caregiving purpose, and is usually employed to alleviate infant discomfort by e.g. adjusting the infant's seating position. The role of caregiving touch in regulating infant affect has not been examined to the same extent as affectionate and playful touch. One reason for this is that caregiving touch has been observed only infrequently in studies examining affect regulation via maternal touch (e.g. Jean et al., 2014; Moreno et al., 2006). The present study adds to existing literature by investigating the effects of caregiving touch on infant affect, together with playful and affectionate touch.

While much is known about how infant affect is regulated by maternal touch, only little is known about how infant affect is regulating maternal touching behaviors, i.e. how mothers adapt their touching behaviors in regard to infant affect. One study investigated associations between infant distress and maternal touch and found that mothers used more affectionate touch, when their infants exhibited high levels of distress compared to during low levels of distress (Jean & Stack, 2009). However, another study failed to find this relationship (Lowe et al., 2016). Regarding playful touch, one study found that playful touch co-occurred with infant smiling (Jean et al., 2014). However, as this study did not investigate the direction of the effect, it remains unknown whether playful touch was initiated as a response to infant smiling or vice versa. Interestingly, one study found that both affectionate and playful maternal touch increased during the reunion period of the SF-experiment, indicating that mothers use these touch types to facilitate re-engagement after a disruption in the interaction (Jean & Stack, 2012). Finally Jean and Stack (2009) did not find an association between the use of utilitarian touch and infant distress.

### 1.2. Maternal touch and postpartum depression

Several studies have found that maternal touching behavior may be negatively affected when the mother is suffering from psychopathology, such as depression in the postpartum period. Postpartum depression (PPD) is an episode of depression following childbirth affecting 7–19 percent of mothers (Gavin et al., 2005; O'Hara & McCabe, 2013). Studies suggest that concurrently depressed mothers show two different interactional styles: withdrawn or intrusive (Cohn, Matias, Tronick, Connell, & Lyons-Ruth, 1986; Field, Healy, Goldstein, & Guthertz, 1990; Field, 2010). These interactional styles have also been observed in studies on maternal touch showing that depressed mothers tend to touch their infants less often or in a more negative way, e.g. rough tickling and poking (Beebe et al., 2008; Field et al., 1990; Herrera, Reissland, & Shepherd, 2004; Malphurs, Raag, Field, Pickens, & Peláez-Nogueras, 1996) when compared to typical mothers. Furthermore, mothers with 'maternity blues', i.e. a transitional depressive state following child birth, have been found to use less stimulating and caregiving touch compared to mothers without maternity blues (Ferber, 2004).

It has been suggested that high levels of preoccupation (i.e. self-focused attention and recurrent negative intrusive thoughts), often accompanying depression, may account for the differences in infant-directed behaviors between depressed and nonclinical mothers: Maternal preoccupation may compromise the mother's ability to attend and respond sensitively to her infant's signals (Beebe et al., 2008; O'Hara & McCabe, 2013; Stein, Lehtonen, Harvey, Nicol-Harper, & Craske, 2009). Hence, one could expect that depressive mothers would be less attentive or have difficulties responding promptly and appropriately to their infants' affective signals. In turn, depressive mothers may be less inclined, or less able, to regulate their touching behaviors in accordance with their infants' affects, compared to nonclinical mothers. In line with this idea, it has been found that infants of depressed mothers employ

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