



Social referencing in infants of mothers with symptoms of depression

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ABSTRACT

The present study examined the acquisition of social referencing skills in infants of mothers with symptoms of depression ($n = 44$). We aimed to determine if a short discrimination training could facilitate infants' social referencing. Mothers were instructed to pose either joyful or fearful facial expressions to cue infants' approach/avoidance responses toward an ambiguous object. Maternal expressions were correlated with pleasant or unpleasant events occurring after the infant's response. The results showed that after the intervention, infants looked at their mothers more frequently and reached or avoided the ambiguous object based on the preceding maternal expression. The results suggest that discrimination training procedures can establish social referencing in infants of mothers with symptoms of depression.

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1. Introduction

Social referencing is the tendency of infants to use the vocal, and gestural expression of another person in order to evaluate ambiguous events and regulate his or her behavior accordingly (Pelaez, 2009). Social referencing is frequently established with the infant's parents and also with other individuals providing reliable information about the environment (Walden & Kim, 2005). There is limited evidence showing how social referencing is acquired and maintained. Some authors suggest that prewired emotional responses and perceptions are crucial for acquiring social referencing (e.g., Campos, 1983; Desrochers, Ricard, Décarie, & Allard, 1994). By contrast, the behavior-analytic approach defines social referencing as a sequence of environmental and behavioral events. Namely, during a referencing episode an ambiguous object signals the gaze shift of an infant toward another person, whose facial, vocal, and gestural cues may then signal a subsequent infant response (e.g., reaching for the object) (Pelaez, Virues-Ortega, & Gewirtz, 2012). For instance, Pelaez et al. (2012) used maternal joyful and fearful expressions as cues (discriminative stimuli) for subsequent positive or negative stimuli (e.g., crib music vs. blender noise) that would follow as consequences to specific responses of 3- and 4-month old infants (reaching for the object). Infant responses toward the ambiguous object were not cued by maternal facial expressions during baseline, which suggested that social referencing was not yet established in the infant's repertoire. The authors implemented a discrimination phase during which maternal joyful and fearful facial expressions were consistently correlated with the consequences of the subsequent infant response. During each training trial infants were confronted with a novel object followed by a joyful

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or fearful maternal expression. A reaching response after a joyful expression was followed by crib music, while reaching responses after a fearful expression were followed by an obnoxious noise. After the intervention, infants were more likely to reach for the novel object following a joyful face, while approaching behaviors became unlikely after the presentation of a fearful expression. On another example, [Brim, Townsend, DeQuinzio, and Poulson \(2009\)](#) successfully used an intervention based on the behavior-analytic approach to teach social referencing in older children diagnosed with autism.

1.1. *Infants of mothers with depression*

There is evidence to suggest that the acquisition of early social repertoires including social referencing is disrupted among infants of mothers with symptoms of depression as opposed to infants of non-depressed mothers. Infants of up to one year of age of mothers with depression have shown limited responsiveness to facial expressions and voices and limited play and exploratory behavior ([Field, Diego, & Hernandez-Reif, 2009](#); [Hart, Field, del Valle, & Pelaez-Nogueras, 1998](#)). Mothers with depression seem to respond less frequently to the vocal and gestural signs of their infants ([Field et al., 2009](#)), which may be detrimental to the development of mother–infant interaction. Communication between the infant and the caregiver at this early age may rely on responsiveness to subtle cues, which may explain why not only clinical depression but subclinical depressive symptoms have been associated with disrupted parent–infant interaction ([Tronick & Reck, 2009](#)).

Mothers with depression are likely to provide limited information when their infants reference them for cues in situations of uncertainty. For instance, [Stenberg \(2003\)](#) manipulated maternal attentiveness in a series of experimental conditions showing that infants of mothers that were instructed to be inattentive were less likely to refer their mothers in a social referencing paradigm. Similarly, [Pelaez-Nogueras, Field, Cigales, Gonzalez, and Clasky \(1994\)](#) observed 3-month-old infants interacting with either their mothers or their nursery school teachers. All mothers had significant symptoms of depression. Infants were non responsive when interacting with their mothers but showed frequent positive interactions toward their teachers. [Hart et al. \(1998\)](#) observed mothers with and without depression when interacting with their 1-year old infant during a toy play situation. They found that toddlers of mothers with depression showed lower engagement during free play and demonstrated more negative affect than those of non-depressed mothers. Moreover, mothers with depression reportedly show a withdrawn or intrusive parenting style when playing with their infants in a structured situation ([Hart et al., 1998](#); [Malphurs et al., 1996](#)). In spite of these findings, there is evidence suggesting that relatively simple modifications of maternal behavior may have a significant impact on the infant. For instance, [Pelaez-Nogueras, Field, Hossain, and Pickens \(1996\)](#) reported that providing maternal touch stimulation increased the positive affect and attention of infants of mothers with depression.

Social referencing and other early repertoires including play and exploratory behavior may be disrupted as a consequence of the parenting style of mothers with depression. [Field et al. \(2009\)](#) suggested that effective early interventions to support depressed mothers of young infants are instrumental to promote the social and emotional adjustment of the child. Meanwhile, behavioral intervention has been used successfully to establish social referencing in infants ([Pelaez et al., 2012](#)). However, no study has examined the effects of social referencing training in infants of mothers with depression. Given the potential challenges faced by this population in the development of mother–infant communication, testing effective maternal training procedures may have some clinical value.

While mothers with depression may provide less facial, vocal, and modeling cues to their infants during spontaneous interactions, scripted referencing trials delivered by the mothers could potentially increase the referencing responses of their infants. Namely, it may be possible to establish a functional relation between a scripted series of maternal cues (independent variable) and the infant's referencing responses (dependent variable). The present study examined the effects of a behavioral intervention protocol to increase social referencing responses in a group of infants of mothers with significant symptoms of depression.

2. **Material and methods**

2.1. *Participants*

Forty-four 8- to 12-month-old infants (mean age = 9.0 months, $SD = 0.7$) and their mothers with significant symptoms of depression (mean age = 18.5 years, $SD = 2.1$) participated in this study. One participant was 7 months old, nine were 8 months old, 24 were 9 months old, seven were 10 months old, and three were 11 months old. An a priori power analysis established that a sample of 32 infants would suffice to establish moderate to large effects ($\eta^2 \geq 0.10$) in a repeated measures ANOVA with one between-group factor ($\alpha = 0.05$; $\beta = 0.80$) ([Faul, Erdfelder, Buchner, & Lang, 2009](#)). Therefore our sample of mother–infant dyads with significant symptoms of maternal depression would be appropriate to establish moderate to large treatment effects.

All infants were of normal gestational age ($M = 39$ weeks) and birth weight, and had no history of medical conditions. Mothers were of medium socioeconomic status according to a self-reported 5-point scale ($Me = 3$; 1 = *low socioeconomic status*, 5 = *high socioeconomic status*). Mothers were black (59.1%), Hispanic (36.4%), or Caucasian (4.6%). The majority of mothers were single or lived alone (88.7%), while the rest were married or under a civil union (11.3%) ([Table 1](#)).

Mother–infant dyads were recruited from a day care center for adolescent mothers in Miami metropolitan area. Infants were attending a day care center for eight daily hours while their mothers completed their education. The day care center

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