INFANT RESPONSES TO ADULT HAPPY AND SAD VOCAL AND FACIAL EXPRESSIONS DURING FACE-TO-FACE INTERACTIONS

Barbara D'Entremont
Darwin Muir
Queen's University

We examined 5-month-olds' responses to adult facial versus vocal displays of happy and sad expressions during face-to-face social interactions in three experiments. Infants interacted with adults in either happy-sad-happy or happy-happy-happy sequences. Across experiments, either facial expressions were present while presence/absence of vocal expressions was manipulated or visual access to facial expressions was blocked but vocal expressions were present throughout. Both visual attention and infant affect were recorded. Although infants looked more when vocal expressions were present, they smiled significantly more to happy than to sad facial expressions regardless of presence or absence of the voice. In contrast, infants showed no evidence of differential responding to voices when faces were obscured; their smiling and visual attention simply declined over time. These results extend findings from non-social contexts to social interactions and also indicate that infants may require facial expressions to be present to discriminate among adult vocal expressions of affect.

face-voice perception **social interactions** **infant attention and affect** **5-month-olds**

Several theorists (e.g., Cohn & Tronick, 1982; Stern, 1977; Trevarthen, 1983) have suggested that when infants and adults interact, each partner adjusts his or her responses according to the emotional expressions of the other partner. To be effective partners in these social interchanges, infants must both convey and *perceive* affective signals. This paper examines infants' responses to adults' affective facial and vocal expressions within this interactive context. Many studies have looked at infants' discrimination between facial and vo-

• **Barbara D'Entremont**, Department of Family Studies, University of Manitoba Winnipeg, MB, Canada R3T 2N2; Tel: (204) 474-8051; Fax: (204) 474-7592; e-mail: dentremb@ms.umanitoba.ca.

INFANT BEHAVIOR & DEVELOPMENT 22 (4), 1999, 527–539 ISSN 0163-6383

cal expressions within a non-interactive context, and a few have tested their responses to perturbations of facial features during interactions, but none have directly examined the relative importance of facial versus vocal emotional expression in regulating infant attention and affect during *face-to-face social interactions*.

Infants discriminate static facial expressions and different vocal expressions (when they are accompanied by a face) by 5 months (see De Haan & Nelson, 1998; Walker-Andrews, 1988, 1997 for review). With dynamic faces, researchers have generally found that infants respond to changes in both parts of a compound face plus voice stimulus but not always to a change in facial features when the face is silent or to a change in vocal features when the facial features are held constant. For example, Haviland and Lelwica (1987) found that 10-week-old infants showed differential facial expressions to their mothers who modeled non-contingent facial and vocal expressions. Caron, Caron, and McLean (1988) showed that 4- and 7-month-olds discriminated a change in a videotaped compound face plus voice stimulus but not a silent face stimulus while 5-month-olds discriminated a change in both the compound face plus voice and the silent face. This was interpreted as evidence for the dominance of vocal expressions because the infants only discriminated between the facial expressions when the voice was present. However, Caron et al. did not test a change in vocal expressions only. In contrast, Lewkowicz (1996) habituated 4-, 6- and 8-month-olds to a videotape of a person reciting a prepared script and then changed either the vocal or facial expression while holding the other constant or else changed both the vocal and facial cues. Infants at each age dishabituated most readily to either the compound or the facial change but not the vocal change. Only when the stimuli changed from a male speaking in adult-directed-speech to a female speaking in infant-directed-speech did the 6- and 8-month-olds dishabituate to the vocal-only change. Thus, using non-contingent stimuli, infants discriminate static faces, voices accompanied by a static face, and a compound dynamic face plus voice stimuli within the first 6 months of life; however, the relative importance of facial expressions versus vocal expressions in bimodal presentations is not clear.

Infants also appear sensitive to changes in facial expressions within face-to-face social interactions. Infants respond to a still-face (a procedure where the adult adopts a neutral, non- responsive face in the middle of a normal interaction) with reduced smiling and gazing (Gusella, Muir, & Tronick, 1988; Tronick, Als, Adamson, Wise, & Brazelton, 1978). The lack of dynamic facial expression appears to be the main contributor to the still-face effect; infants smiled less when presented with a static face accompanied by an interactive voice than when presented with a live interacting face without a voice (Gusella et al., 1988). However, infants are sensitive to the facial expressions during the still face, smiling slightly more to a happy still face than to a neutral or sad still face (D'Entremont & Muir, 1997).

Other perturbations of the face during face-to-face interactions have also resulted in decreased infant affect, although not infant attention. Three- to 6-month-olds showed reduced smiling, but not attention, to inverted versus upright faces during face-to-face interactions with adults (Muir & Rach-Longman, 1989; Muir, Humphrey, & Humphrey, 1994). Similarly, effects were found with five-month-olds when the adults' facial expressions were blocked from the infant's view during the interaction. In contrast, infant smiling and visual attention remained high when the adult interacted with normal facial expressions while silently miming the words (Cao, Hains, & Muir, 1992). These studies suggest that the young infants' positive affect displayed during face-to-face interactions is elicited by the adult facial expressions. However, in two experiments infants smiled slightly, but reliably, more to an adult's inverted face plus voice than to her inverted silent face (Cao, Rach-