Abstract: The present study explored the impact of faces on 4-month-old infants’ (n=94) categorization of infant-directed speech (IDS). Parents modify acoustic properties of IDS dependent on infants’ affective states, providing infants opportunities to associate different caregiver vocal responses with different infant behaviors. When parents speak in an approving manner, utterances are higher in frequency and have ascending frequency contours. In contrast, comforting IDS has lower frequencies and falling frequency contours. Previous research showed no categorization of IDS approvals or comforts at 4 months of age when infants viewed a checkerboard while hearing IDS. But 4-month-olds categorized approving and comforting IDS passages when presented with a static, neutral female face (Spence & Moore, 2003; Spence, Chiang & Sokolik, 2004). In the current study, 4-month-olds heard either approving or comforting IDS during an infant-controlled habituation procedure while viewing one of 3 visual stimuli: a female face, a male face, or a scrambled face. Faces were used to test the hypothesis that social context of faces impacts infants’ processing of IDS. Infants were habituated to either approvals or comforts and then tested with two new exemplars from the habituation category followed by two exemplars from the novel category. Planned pairwise comparisons indicate that infants in the female face condition who were habituated to comforts increased attention to approving IDS, but not novel comforting IDS. Infants in the male face and the scrambled face conditions failed to significantly recover looking to the novel IDS category at test. These findings have implications for understanding the role of faces in infants’ processing of infant-directed speech.

Introduction:

- Infant-directed speech (IDS) may communicate speakers’ affect to infants
  - Adults vary IDS as a function of context and intent (Fernald, 1992; Peiper, et al., 1991; Stern, et al., 1992)
- 4-month-olds do not categorize approving and comforting IDS while viewing a checkerboard (Moore, Spence, & Katz, 1997; Spence & Moore, 2003)
- But, when viewing a static female face, 4-month-olds categorize IDS (Spence, Chiang, & Sokolik, 2004)
- Why does the face facilitate processing of IDS?
  - Faces provide a social setting for the discrimination of vocal affect (Miezin, Andrews, & Lernon, 1999; DiGeronimo & Mur, 1999)
  - Faces recruit infant attention in social settings more than voices alone (D’Entremont & Mur, 1999)
- 4-month-old infants discriminated approving and comforting utterances when viewing videos of a woman producing IDS (Gales, Searle, & Balicki, 2004)

Hypothesis: Infants should categorize IDS while viewing either male or female faces, but will not categorize when the facial features are scrambled. It is the social context of the face and not the perceptual information that facilitates categorization of IDS.

Methods:

- Participants:
  - N = 94, 4-month-olds (M = 127 days old, SD = 11.8)
- Stimuli:
  - Auditory stimuli:
    - Infant Directed Speech
    - Approvals and comforting utterances
    - Recordings of mothers speaking to their infants (Katz, et al., 1996)
    - Mean F2:
      - Approvals: M = 369.96 Hz (SD = 23.7)  F1: M = 221.94 Hz (SD = 91.3)
      - Comforts: M = 369.96 Hz (SD = 23.7)  F1: M = 221.94 Hz (SD = 91.3)
- Variation of mean F2 range of individual stimuli:
  - Approvals: 17.46 - 27.6 Hz
  - Comforts: 17.46 - 27.6 Hz
- Visual Stimuli:
  - Image of infant was presented a female, male, or scrambled face contingent on visual attention

Results:

- Face:
  - Habituation to Approvals and Comforts
  - Female Face:
    - Habituation: 2-3 consecutive trials decreased to 30% max (n = 2003)
    - Male Face:
      - Habituation: 2-3 consecutive trials decreased to 30% max (n = 2003)
- Experimental Test:
  - Female Face:
    - 2 novel IDS utterances from habituation category
    - 2 novel IDS utterances from different IDS category than habituation
  - Male Face:
    - 2 novel IDS utterances from habituation category
    - 2 novel IDS utterances from different IDS category than habituation

Discussion:

- Female Face Condition
  - Infants categorized IDS stimuli when they were habituated to comforts and tested with approvals
  - Infants habituated to approvals and tested with comforts did not categorize IDS
- Asymmetrical categorization in female face condition may be due to variability of approval stimuli
  - Male Face
    - No categorization in male face condition
    - Infants lack of exposure to male voices at 4 months limits ability to form male face prototypes (Ramsey, Langlois, & Martin, 2000)
- Scrambled Face
  - No hypothesized categorization in scrambled face condition

- Sex differences may be a potential perceptual difference between male and female faces (Turati, Velona, & Seronda, 2004)

- Results of female and scrambled face conditions supported the hypothesis that IDS categorization at 4 months is facilitated by the social context of the face.
- Male face condition results add further support for infants’ delay in processing of male faces stated by Ramsey, Langlois, & Martin, 2005.

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