A Test of Voice Familiarity Effects on 4-Month-Olds' Categorization of Infant-Directed Speech
Melanie J. Spence, Kristin J. Atchison, Elviciala Granado and Julie F. Sokolsky
The University of Texas at Dallas

Abstract
This study examined the effect of voice familiarity on 4-month-old infants' categorization of approving and comforting infant-directed speech (IDS). Previous studies have shown that 6-month-olds did not categorize IDS presented by unfamiliar talkers. Infants (n=37) were familiarized with a female voice and then tested for categorization of approving and comforting IDS spoken by that voice. Categorization was assessed using a habituation procedure in which either approving or comforting IDS was presented contingent on fixation of a visual stimulus. Following habituation, four test trials occurred, consisting of two novel stimuli from the familiarized category and two novel stimuli from the unfamiliar category. Infants discriminated the familiarized and novel categories only when approval IDS followed comforting IDS (F(2,70) = 3.567, p = 0.033). The results suggest that approving IDS, with higher fundamental frequency and more variable contours, elicits more attention following lower-frequency contours than does comfort following approvals. This finding is consistent with results of other studies testing 4-month-olds' IDS categorization while viewing non-face visual stimuli.

Introduction

- Infant-directed speech (IDS) may communicate speakers' affect and emotion to infants.
- Adults vary IDS prosody as a function of context & intent (Fernald, 1992; Papoucek et al., 1991; Stem et al., 1982)
- IDS regulates infant affect & behavior (Cooper & Aslin, 1990; Fernald, 1993; Pegg et al., 1992)
- If IDS serves these functions, infants must categorize different prosodic IDS classes to discriminate speaker affect and intent.
- Previous studies have shown that 6-month-olds, but not 4-month-olds, categorized approving and comforting IDS produced by multiple unfamiliar talkers.
- Single unfamiliar talker
- Moore, Spence, & Katz, 1997; Spence & Moore, 2003
- 4-month-olds categorized IDS when presented with a female face (Spence, Chang, & Sokolsky, 2004)
- Younger infants may need additional cues for categorization.

Another cue that may aid categorization is talker-specific information

- Speech processing may be a "talker-contingent process" (Hypothesis; Sommers & Pisoni, 1984)
- Talker familiarity improved adults' intelligibility of novel words in noise (Hypothesis; Pisoni, 1984)
- Adult memory for words is better when words are spoken by a single talker (Mulholland, Pisoni, & Sommers, 1986)
- Preschoolers' word recognition is negatively affected by talker variability (Ryalls & Pisoni, 1997)
- 7.5-month-olds recognized words spoken by same gender talker (Houston & Jouyek, 2000)

Methods

- Participants: 37, 3.5- to 4.5-month-olds
- Procedures:
  - Familiarization task: 10 nursery rhyme phrases
  - Categorization task: 10 approving & 10 comforting IDS
  - All stimuli produced by one female talker

- Procedure:
  - Habitation criterion or 20 trials
  - Categorization task:
    - Habitation to approvals or comforts
    - Habitation criterion: 8 consecutive trials decreased 50% or below 1st 3 trials of habitation
    - Habituation block: 2 novel IDS stimuli from the familiarized category
    - Between-Categorization test trials: 2 IDS stimuli from the novel category

Results

- ANOVA:
  - Familiarization Stimuli (Approval & Comfort) x Trial Type (Last Habitation, Within-Category Test Trials, Between-Category Test Trials)
  - Dependent measure: 3.567, p = 0.033
- Pair-wise Comparison:
  - Comfort Group:
    - Last 3 Habitation Trials & Between Category Tests: M diff = 6.024, SE = 1.258, p = 0.051
  - Within Category Tests & Between Category Tests: M diff = 8.752, SE = 2.605, p = .009

- Approval Group:
  - No significant differences

Discussion

- 4-month-olds discriminated approvals following comforts, but did not discriminate comforts following approvals.
- This implies infants responded to acoustic properties of approving stimuli.
- Results consistent with earlier studies using unfamiliar voices.
- Why didn't voice familiarity facilitate processing?
  - Different prosody & utterances at familiarization and categorization tasks
  - Inadequate voice familiarization for discriminating approving and comforting stimuli
  - IDS presented in absence of social context or interaction

Acknowledgements

- This research was funded by:
  - National Institute of Mental Health; National Institute on Deafness and Other Communication Disorders; National Institute of Child Health and Human Development

- Address correspondence and reprint requests to:
  - Melanie J. Spence, School of Behavioral & Brain Sciences, University of Texas at Dallas; Box 803969, 5550 Harry Hines Blvd, Richardson, TX 75083-0689, mspence@utdallas.edu