

# Disruption of Six-Month-Olds' Infant-Directed Speech Categorization in the Presence of Faces



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## Introduction

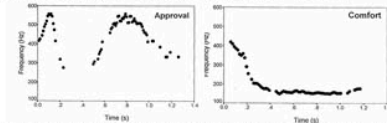
### This research examined if female faces support IDS categorization by 6-month-old infants

- Infant-directed speech (IDS) may communicate speakers' affect to infants
  - Adults vary IDS as a function of context and intent (Fernald, 1992; Papousek et al., 1991; Stern et al., 1982)
- 6-month-olds, but not 4-month-olds, categorize approving and comforting IDS while viewing a checkerboard
  - Checkerboard presented on 2 monitors, infants could look at either
  - Between Subjects design; On test trials infants presented IDS from either same category or different category as familiarization
- 4-month-olds do categorize IDS while viewing a female face but not a scrambled face (Atchison & Spence, 2007; Spence, Chuang, & Sokolsky, 2004)
- These findings are consistent with research suggesting faces:
  - Provide social context for infants' discrimination of vocal affect (D'Entremont & Muir, 1999; Walker-Andrews & Lennon, 1991)
  - Are more easily associated with IDS than ADS in associative learning tasks (Kaplan, Jung, Ryther & Zarlengo-Strouse 1996)
  - Maintain 5-month-olds' attention in social interactions more effectively than voices alone (D'Entremont & Muir, 1999)
- Social context of a female face facilitates 4-month-olds' categorization of IDS (Atchison & Spence, 2007)

## Experiment 1: Static Face

### Methods:

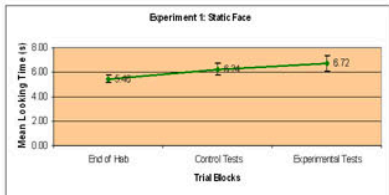
- Participants:**
  - N = 54: 6-month-olds (M = 181.6 days, SD = 15.7 days)
- Auditory stimuli:**
  - Infant-Directed Speech: 8 approving and 8 comforting utterances
    - Recordings of mothers speaking to their infants (Katz, Cohn & Moore, 1996)
  - Approvals
    - Mean F<sub>0</sub>: 399.96 Hz (SD = 79.57); F<sub>0</sub> range: 17.70 – 279.93 Hz
  - Comforts
    - Mean F<sub>0</sub>: 221.04 Hz (SD = 31.20); F<sub>0</sub> range: 17.46 – 76.33 Hz
- Visual Stimuli:**
  - Female face was presented with IDS stimuli contingent on visual attention
- Procedure:**
  - Habituated to approvals or comforts
    - Habituation criterion: 3 consecutive trials decreased to 50% (Habit 2000; Cohen, Atkinson, & Chaput, 2000)
  - Four Test Trials
    - Control test trials: 2 novel IDS utterances from habituation category. Trials averaged to get mean looking time.
    - Experimental test trials: 2 novel utterances from different IDS category than habituation. Trials averaged to get mean looking time.



• DDD/DARPA Human ID project database (O'Toole, Hams, Snow, Hurst, Pappas, Ayyad & Abdi, 2005)

### Results:

- No significant categorization effects



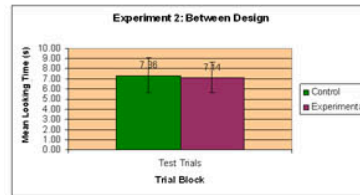
## Experiment 2: Between Design

### Methods:

- Participants:**
  - N = 26: 6-month-olds (M = 188.7 days, SD = 10.8 days)
- Stimuli:**
  - Same as experiment 1: Both IDS stimuli and static face presented
- Procedure:**
  - Habituation same as experiment 1
  - Between Test Design: Similar to Spence and Moore (2003) design
    - Control Condition: 2 novel IDS utterances from habituation category
    - Experimental Condition: 2 novel utterances from different IDS category than habituation

### Results:

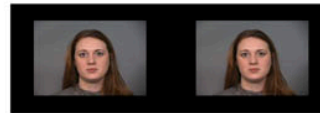
- No significant categorization effects



## Experiment 3: 2-Monitor Design

### Methods:

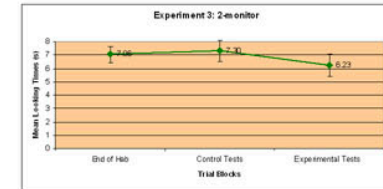
- Participants:**
  - N = 30: 6-month-olds (M = 189.8 days, SD = 7.7 days)
- Stimuli:**
  - Auditory Stimuli same as Experiment 1
  - Visual stimuli same except 2 identical images shown side-by-side to replicate previous 2-monitor design (Spence & Moore, 2003)
  - Presented on a Sony 60" Widescreen TV. Individual picture size comparable to individual size on the 17" computer monitor
- Procedure:**
  - Same as experiment 1
    - Habituation
    - Within-Subjects Design



## Experiment 3: Continued

### Results:

- No significant categorization effects



## Experiment 4: Moving Face

### Methods:

- Participants:**
  - N = 35: 6-month-olds (M = 188.6 days, SD = 10 days)
- Stimuli:**
  - Auditory stimuli: Same as experiment 1
  - Visual Stimuli: Video of a woman moving, talking, and smiling. Not synchronized with auditory stimuli.
- Procedure:**
  - Same as experiment 1
    - Habituation
    - Within-Subjects Design



### Results:

- No significant categorization effects



## Discussion:

- Previous research has shown that 6-month-olds categorize approving and comforting IDS (Moore, Spence, & Katz, 1997; Spence & Moore, 2003). A static or asynchronous moving face seems to disrupt this ability.
- Different visual information supports IDS categorization at 4 and 6 months of age:
  - 6-month-olds: Categorize with checkerboard stimulus (Moore, Spence, & Katz, 1997; Spence & Moore, 2003) but not a static or asynchronous moving face
  - 4-month-olds: Can not categorize with checkerboard stimulus (Spence & Moore, 2003) but need the social context provided by a female face (Atchison & Spence, 2007)
- As infants become more experienced with faces and voices, asynchronous IDS stimuli may interrupt 6-month-olds' attention to the IDS category boundaries. Further research with synchronous audio and visual stimuli is needed at both ages to investigate infants' categorization of naturalistic IDS.

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