Infants’ Categorization of Dynamic Faces: Changes from 6 to 10 Months
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Introduction

This research investigated 6- and 10-month-olds’ categorization of dynamic emotional expressions.

Categorization of static emotional expressions:
Infants between 4 and 6 months of age categorize a variety of emotional expressions on static faces.
(Boharmann & Fleer, 2000; Hofer & Delpit, 1996; Nielsen, Merle & Leventhal, 1975; Samuel, Iglesias & Loechle, 1997)

Questions exist:
Are younger infants processing emotional expressions or distinguishing facial features?
Categorization of static facial expressions may reflect processing of individual salient features rather than the emotions that are conveyed by configurational relations among features.
(De Haan & Nelson, 1998; Carr & Caron, 1998; Nelson, 1998)

When required to categorize positive or negative emotional valence rather than specific emotional expressions, 10-month-olds, but not 7-month-olds, categorized emotional valence.
(Ludemann, 1991)

Practical considerations:
Using moving faces may provide a valid assessment of infants’ facial expression categorization.
Moving facial displays may recruit attention to multiple facial features and relations among features.
(Spence, Touchstone & O’Toole, under review)

Features and distances between features change over time. The peak of an expression may appear only briefly, unlike peak emotional expressions displayed on static images.
(Ambadar, Scherer & Chwa, 2005; Valstar, Paolotti, Ambadar & Cohn, 2009)

Neurological evidence supporting use of dynamic faces:
The Superior Temporal Sulcus (STS) is activated by facial and emotional motion, implied emotion, and socially relevant information.
The Fusiiform Face Area (FFA) is activated by facial features during facial identity tests.
(Moeller, 2002; Allison, Puce & McCarthy, 2000; Heidby, Huffman & Gobbins, 2000; Puce, Allison, Benton, Gore & McCarthy, 1998)

Moving facial displays may preferentially activate the neural system responsible for processing socially relevant facial features.
(Spence, Touchstone & O’Toole, under review)

Methods

Participants:
6-month-olds (n = 72)
10-month-olds (n = 42)

Procedure:
Six- and 10-month-olds were familiarized to six faces portraying either dynamic happy or dynamic disgust expressions. Subsequently, babies were shown a novel face portraying the same expression as the familiar face and tested by a novel face portraying the opposite expression (between emotion).

Results:

6-month-Olds
- Six-month-olds habituated to faces during familiarization.
  - Happy: F(1,71) = 54.99, MSE = 54.99, p < .000
  - Disgust: F(1,71) = 31.35, MSE = 31.35, p = .000

- Six-month-olds did not categorize emotional expressions.
  - Happy: F(1,71) = 10.33, MSE = 10.33, p < .001
  - Disgust: F(1,71) = 8.34, MSE = 8.34, p < .001

- No effects of emotion were observed.
  - F(2,140) = .081, MSE = 18.65, p = .91

10-month-Olds
- Ten-month-olds habituated to faces during familiarization.
  - Happy: F(1,41) = 11.30, MSE = 24.75, p = .002
  - Disgust: F(1,41) = 12.29, MSE = 24.75, p = .002

- Ten-month-olds did categorize emotional expressions.
  - Happy: F(1,41) = 11.29, MSE = 24.75, p = .002
  - Disgust: F(1,41) = 12.29, MSE = 24.75, p = .002

- No effects of emotion were observed.
  - F(2,80) = 1.07, MSE = 26.69, p = .348

Discussion

Categorization of dynamic facial expressions occurred at 10 months of age, but not at 6 months.

Because dynamic faces activate the neural system responsible for processing socially relevant facial motions, the age effect suggests development of expression processing during this age range.

These results are consistent with Ludemann’s report that categorization of emotional expressions per se occurs during the latter part of the first year.

Dynamic expressions may recruit more information-processing resources relative to processing of static expressions and to 6-month-olds performance.

The use of dynamic expressions provides unique insight into infants’ emotion processing and suggests that infant expression categorization occurs only in the latter part of the first year of life.

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