InfantsôCategorization of Dynamic Faces: Comparing Repeated and Fixed Trial Procedures

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Abstract

This study compared infantsôcategorization of dynamic emotional expressions of female faces in two procedures. Most studies of facial expression categorization have presented infants with static photographs of exaggerated expressions and have reported that 4- to 7-month-olds categorize expression contrasts such as happy and fearful. However, it is important to study infantsôprocessing of dynamic faces since motion provides unique information for processing both facial identity and emotional expressions.

Introduction

The need for multiple methods in infant categorization tasks

Use of static faces

Previous literature has used static faces in emotion categorization tasks, though it may lend to processing of facial features, rather than facial emotions.

- Ludeman, 1991
- Caron, Caron & Meyers, 1985

Use of a single face during habituation

Many studies use the same face throughout the familiarization process. By not providing varying exemplars in the same category, infants may not be focusing on the emotional expression, rather learning subtle differences portrayed by a single face.

- Labarbara, Izard, Vietzi & Parisi, 1976
- Brown, Rosenfeld & Horowitz, 1977
- Nelson & Dolgin, 1985

Repetition of stimuli during habituation

By experiencing faces more than once during habituation, infants may be learning the pattern of identities presented. In doing this, they are unable to perform according to expectations during test trials.

- Touchstone & Spence, 2006

Infants were found to have performed better on object categorization tasks when using a fixed number of familiarization trials, rather than repeating objects in habituation.

- Pauen & Pahnke, 2004

Infant-controlled habituation versus fixed trial procedures

In the infant-controlled habituation procedure, infants were familiarized with 3 exemplars from the same category until habituation criteria was reached. As a result, infants experienced faces repeatedly during habituation. Infants then demonstrated an effect for facial recognition, rather than emotion categorization. The fixed trials study was designed as a follow-up study to introduce all novel exemplars of the same category during familiarization so that infants would demonstrate a categorization effect.

Design

Babies were assigned to either the Infant-Controlled Habituation Procedure or the Fixed Trial Procedure. Each of these is described below.

Infant-Controlled Habituation Procedure

Infants (*n*=104) were habituated to a series of 3 female faces portraying either happy or dynamic emotional expressions in dynamic form. Babies reached habituation criterion when 3 consecutive trials decreased 50% or below 1st 3 trials of habituation. Once habituated, babies were shown a 2 novel female faces portraying the same emotion seen during habituation (within emotion) followed by 2 novel faces portraying the opposite expression (between emotion).

Habituation:
3 faces repeated until criterion reached.

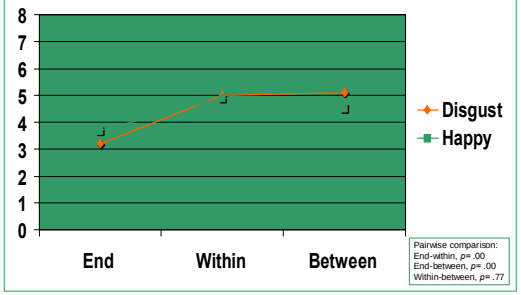
Test Trials
Within Emotion | Between Emotion

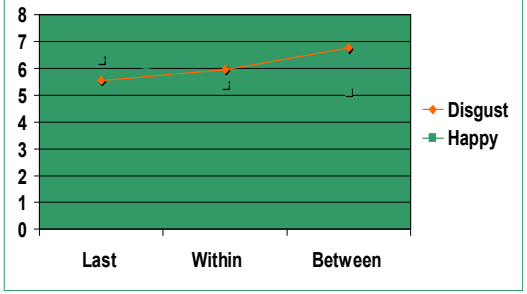
Fixed-Trial Procedure

Infants (*n*=35) were familiarized to 7 female faces portraying either happy or disgust expressions in dynamic form. Subsequently, babies were shown 1 novel face portraying the same emotion seen during familiarization (within emotion) followed by 1 novel face portraying the opposite expression (between emotion).

Familiarization:
Each face viewed only once

Test Trials
Within Emotion | Between Emotion





Results:

Infant- Controlled Habituation Procedure
Repeated Measures ANOVA: Emotion (Disgust vs. Static) X Trial Blocks (End Hab vs. Test Trials)
Trial Blocks Main Effect: $F(1, 422)= 466.49$, $p=<.000$

Fixed Trials Procedure
Repeated Measures ANOVA: Emotion (Disgust vs. Static) X Trial Blocks (End Hab vs. Test Trials)
No Effects

Discussion

Infants in the infant-controlled habituation experiment demonstrated a clear effect of recognition of facial identity but did not demonstrate an effect for emotion categorization. They increased their looking times from the end of habituation to the within-emotion test trials, as well as from the end of habituation to the between-emotion test trials. However, infants did not increase looking time between the 2 crucial measures (within emotion to between emotion). These findings indicate that infants at 6 months of age are obligatorily processing identity.

Infants in the fixed-trials experiment did not increase looking time from the end of familiarization to the within-emotion test trial. Infants could not show an effect of identity processing, as all of the faces were different identities. This suggests that repeating the identity of the faces during habituation sets the infant up for identity processing. Interestingly, infants in the fixed trials experiment did not demonstrate a significant increase in looking time between the crucial measures (within emotion to between emotion). The fixed trials procedure did not increase the likelihood that infants would categorize moving faces portraying emotional expressions, though a smaller number of subjects was used in this procedure. It may be necessary to test more infants in order to increase the power of the results.

Six-month-old infants are not categorizing emotional expressions portrayed by moving faces in either group. Motion may be adding another dimension to the experiment that makes the task more difficult than looking at static faces alone. Though motion may be beneficial for tasks of object processing, it appears to hinder infantsôabilities to comprehend the differences between expressions.

In future studies, older infants should be tested to investigate whether older infants are able demonstrate categorization of emotional expressions on moving faces.

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