The Effect of Motion on Infants' Processing of Novel Faces

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Abstract

This study explored whether motion influences 6- month-old infants' recognition of novel female faces. Infants (*n*=111) were presented either static or dynamic versions of three faces portraying either positive (happy) or negative (disgust) expressions in an infant-controlled habituation procedure. Subsequently, a novel face portraying the same emotional expression was presented and looking time was measured. A repeated measures ANOVA compared the looking times for the different groups.

Introduction

The role of motion in identity processing

Adult Literature

Roark, Abdi, Barrett, Spence, & OÕToole (2003): In review of previous findings reported in the literature, Roark, et al., conclude that there is much inconsistency in the adult literature regarding identity processing, particularly the role played by rigid and non-rigid facial movement.

Lander & Bruce (2003): Faces were more accurately recognized by adults when the faces during familiarization were presented in dynamic form, or in a series of static form with multiple angles rather than static alone.

Knappmeyer, et al (2003): In several experiments, the researchers imposed motion on morphed facial images and concluded that adults use non-rigid motion in identity processing more than rigid motion or static alone.

Pike (1997): Adults demonstrate an advantage for dynamic presentation of faces over static during familiarization; however, this study, like most, uses only static faces during test trials.

Roark & OÕToole (in press): Motion facilitates recognition of unfamiliar faces, but only when the faces are presented in dynamic form for both familiarization and test trials.

Infant Literature

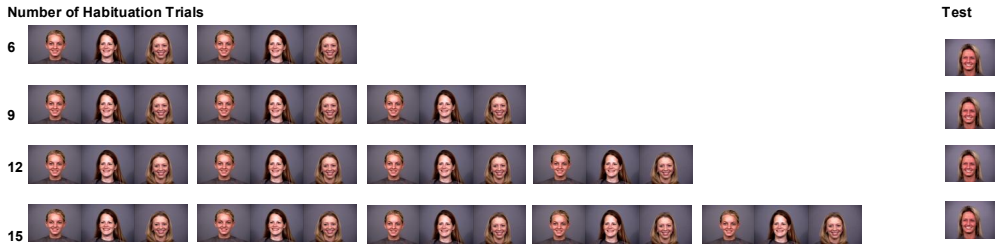
Spencer, OÕBrien, Johnston, Hill (in press): Infants demonstrate the ability to discriminate both moving sequences on faces and the identity of faces in motion.

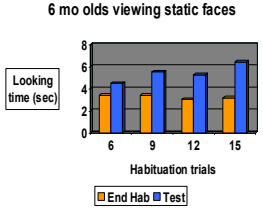
Otsuka (in press): Motion facilitates identity processing for infants when faces during test trials are put in motion. A single static face was used during test trials.

Design

Babies were habituated to a series of 3 female faces portraying either happy or dynamic emotional expressions in either static or 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 novel female face portraying the same emotion seen during habituation.

Babies were randomly assigned to emotional expression categories as well as static and dynamic conditions. Test trials were presented in the same conditions (motion and emotion) as experienced during habituation.

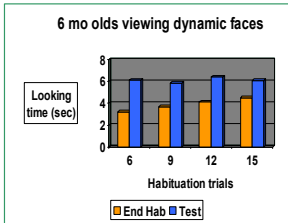




Pairwise Comparison:
Static
Less familiar (6&9 trials)
Trial Blocks End Hab & Test:
Mdiff= -1.546, *SE*=.572, *p*=.012
More familiar (12&15 trials)
Trial Blocks End Hab & Test:
Mdiff= -2.775, *SE*=1.153, *p*=.025

Results:
Repeated Measures ANOVA: Motion (Dynamic vs. Static) X Trial Blocks (End Hab vs. Test) X Familiarization (less familiar vs. more familiar)

Trial Blocks Main Effect:
F(1, 107)= 21.39, *p*=<.000



Pairwise Comparison:
Dynamic
Less familiar (6&9 trials)
Trial Blocks End Hab & Test:
Mdiff= -2.252, *SE*=.712, *p*=.002
More familiar (12&15 trials)
Trial Blocks End Hab & Test:
Mdiff= -1.820, *SE*=1.217, *p*=.146

Discussion

At 6 months of age, infants are able to identify new faces following habituation to a series of 3 faces in both moving and static conditions. However, it is not evident that motion facilitates recognition, per se. There are interesting trends to point out.

1. Infants in the dynamic group who have experienced the faces fewer times (2 or 3) appear to be more likely to recognize a new face, while those who have experienced the faces multiple times (4 or 5) do not demonstrate recognition of a new face.

2. Infants in the static group are able to recognize a new face regardless of the number of times faces are viewed (2, 3, 4 or 5).

These findings imply that motion is interfering with infantsô identity processing as familiarization to the stimulus increases. Infants may be distracted from identity processing, because their primary focus becomes the motion itself, rather than identity. This is consistent with Bahrickôs findings of infantsô recognition of motion over faces.

Infantsôability to recognize a new face after limited experience during familiarization is consistent with the findings of Otsuka and her colleagues, as familiarization time in their experiment was merely 50 sec.

As familiarization time increases, it may be necessary for infants to focus on a static image to become more familiar with the internal features of the face. Evidence for featural processing has been documented by Nelson and his colleagues.

Much is left to be discovered about the role of motion in infantsô processing of faces. Future studies should include additional age groups of infants. Research could also include the use of varying facial expressions on the same faces in familiarization in both moving and static form to further investigate how infants are relying on internal facial features for identity processing.

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