The Impact of Multimodal Exposure to Other-Race Faces on Face Processing in 9- to 12-Month-Old Infants

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BACKGROUND

- The other-race effect (ORE) refers to perceptual biases that lead to processing advantages for faces of one's own race relative to faces that belong to another race (Meissner & Brigham, 2001).
- The ORE is generally observed in infancy by 9-months of age (Kelly et al., 2007).
- Even though exposure to faces occurs mostly in multisensory settings, past research on the ORE has commonly used static, unimodal face stimuli.
- Intersensory redundancy (IR) refers to the temporally synchronous presentation of multimodal information from a single source across different senses, which may affect how infants attend to other-race faces.
- In this study, we recruited 9- to 12-month-olds to investigate how the presence of IR impacts infants' attention to and recognition of other-race faces.

RESEARCH QUESTIONS

1) Do other-race faces presented synchronously with the soundtrack during familiarization recruit greater attention than other-race faces presented asynchronously?

2) Are infants able to demonstrate recognition of dynamic other-race faces presented with audiovisual synchrony or asynchrony?

3) Is there a relationship between looking times during familiarization and looking times during the VPC trials?

METHOD

Participants

- 57 9- to 12-month-old infants were recruited to participate online via Lookit (Scott & Schulz, 2017)
  - M_{age} = 312 days (10.4 months)
    - Range = 257-384 days
  - Gender: 21 f, 26 m
  - Race:
    - 23 White/Caucasian
    - 3 Asian
    - 1 Indigenous American/Alaska Native
    - 10 two or more races
  - Ethnicity: 6 Hispanic/Latino

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References
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Kelly, D. J., Quinn, P. C., Slater, A. M., Lee, K., Ge, L., Pascalis, O. (2007). The Other-Race Effect Develops During Infancy. *Association for Psychol. Sci.* 18(12), 1084-1089.
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Procedure

Familiarization. Infants viewed two videos of South Asian actors simultaneously. A soundtrack played that was synchronous with one of the two videos. The familiarization lasted for 30 seconds.

Familiarization
Two videos, one synchronous with the soundtrack

Visual paired-comparison (VPC) trials. Static pictures of the familiar faces and a novel face were presented in pairs. Each VPC trials lasted 7.5 s.

Sync-fam vs. Async-fam
Faces viewed during familiarization

Sync-fam vs. Novel
Synchronous face from familiarization, one novel face

Async-fam vs. Novel
Asynchronous face from familiarization, one novel face

Data Coding and Analysis

Datavyu (2014) was used to code and process the data. Multiple analytical strategies were employed to investigate looking preferences:

1. One-sample t-tests were used to test whether look durations to each stimulus in the stimulus pairs were above the chance value of 50% during familiarization and VPC trials.
2. Correlations were calculated to examine individual differences in relations between looking times during familiarization and the VPC trials.

RESULTS

Familiarization

- During familiarization, **infants looked at the asynchronous video significantly more than the synchronous video** (54% vs. 46%), $t(56) = 2.400$, $\mathbf{p = .02}$.

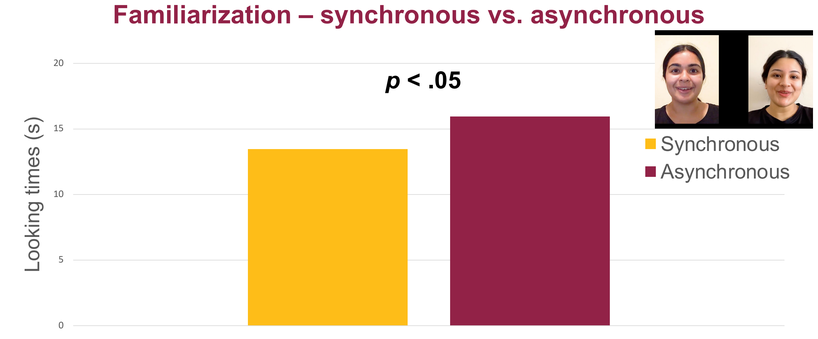
VPC Trials

- **Infants looked at the async-fam face significantly more than the sync-fam face** when paired together (i.e., 54.9% of the time), $t(50) = 2.261$, $\mathbf{p = .028}$,

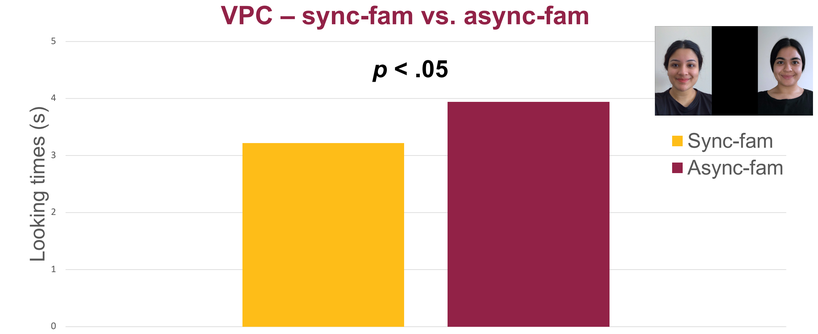
Correlations

- Total looking time during familiarization was positively correlated with:
  - Total looking time during the VPC with two familiar faces, $r = .365$, $N = 57$, $\mathbf{p = .008}$,
  - Total looking time during the VPC with async-fam and novel faces, $r = .319$, $N = 52$, $\mathbf{p = .021}$,
  - Looking time to the novel face (vs. sync-fam face), $r = .306$, $N = 50$, $\mathbf{p = .031}$.

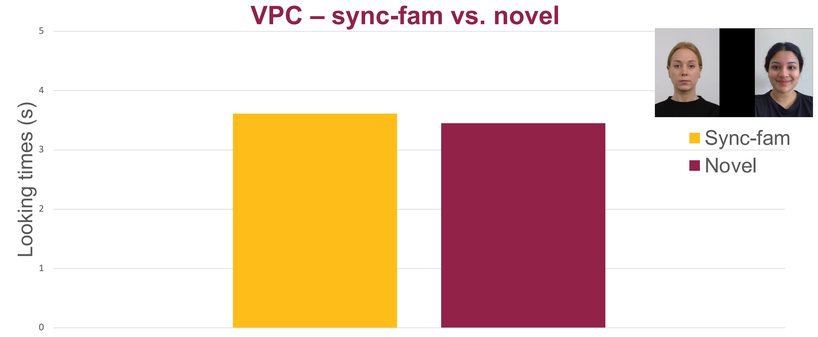
Familiarization – synchronous vs. asynchronous



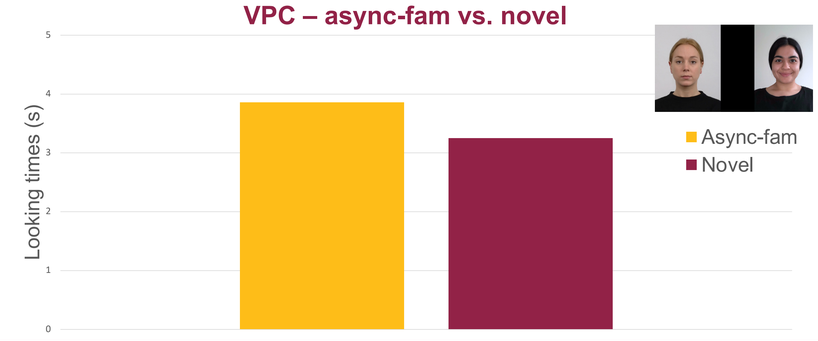
VPC – sync-fam vs. async-fam



VPC – sync-fam vs. novel



VPC – async-fam vs. novel



DISCUSSION

- While own-race faces promote integrated audiovisual perception (Ujiie et al., 2021), participants looked significantly longer at the asynchronous than the synchronous video during familiarization. This indicates that **intersensory redundancy may not attract infant visual attention when viewing other-race faces**.
- In the VPC trial, infants attended to the async-fam face longer than the sync-fam face. This looking preference indicates that **infants recognized the asynchronous face, but had not fully processed it.**
- The positive correlations between looking times during the familiarization and VPC trials imply **that some infants might have been more attentive to the stimuli in general**, such that their engagement during familiarization predicted heightened attention during the VPC trials.
- **This line of research can benefit from the use of more racially diverse face stimuli** to understand how intersensory redundancy exposure to facial stimuli impacts own- and other-race face recognition. This is currently being investigated in a follow-up study.