

## Background

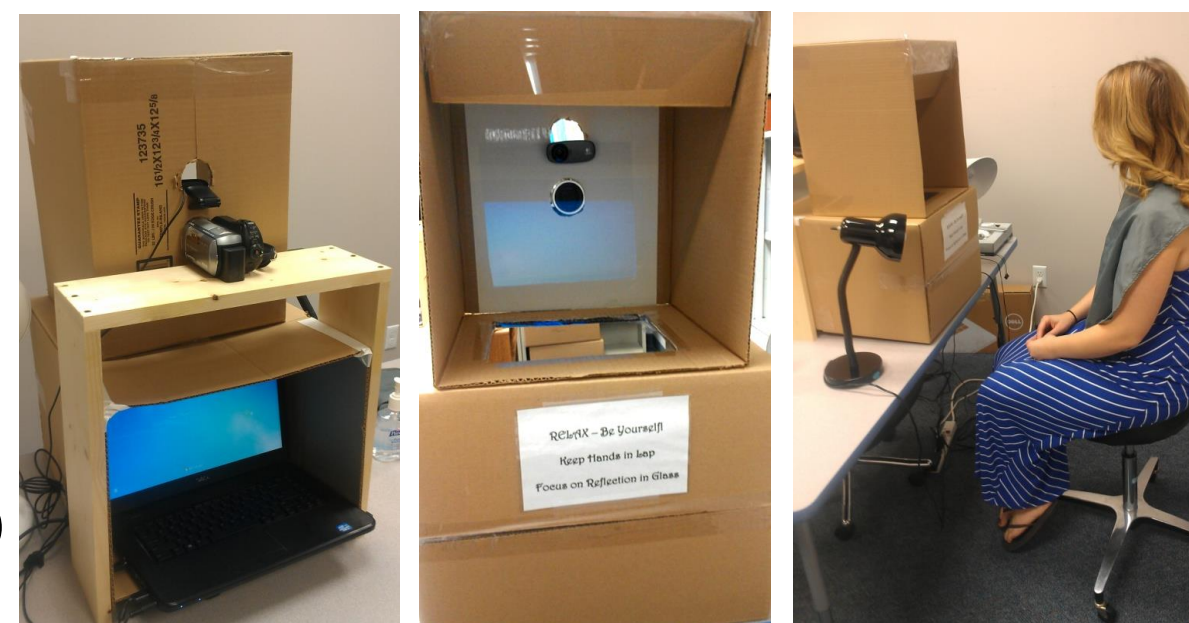
- 6-month-olds' mouth preference predicts future language skills<sup>1</sup>, yet studies report inconsistencies in eye vs. mouth preference<sup>1,2,3,4,7,14</sup>
- Three factors varied across studies but were controlled here:
  - Familiarity:** Familiar (mother) vs. Unfamiliar (stranger) face-voice
    - Infants' face-voice recognition of mother develops early<sup>5,6</sup>
    - 6-mos: on silent dynamic faces, increased attention to mother's mouth vs. eyes<sup>7</sup>, but no preference for stranger's mouth vs. eyes<sup>14</sup>
  - Infant-directedness:** infant-directed (ID) vs. adult-directed (AD)
    - Acoustic and visual differences in ID vs. AD speech and faces<sup>8,9,10</sup>
    - 4-12 mos: on audiovisual videos of stranger, attended longer to mouth of ID but eyes of AD speech<sup>3</sup>
  - Modality:** dynamic vs. static, audio vs. silent
    - Static face is less ecologically-valid than dynamic stimuli<sup>11</sup>
    - AV stimuli elicits greater attention and face recognition via intersensory redundancy<sup>12</sup> and movement<sup>13</sup>
    - 6-mos: attended longer to mouth of speaking vs. smiling video of stranger, despite audible speech in both<sup>14</sup>

## Research Objective

To examine the independent and interactive contributions of the three factors on 6-month-olds' attention to eyes and mouth.

## Method

- Stimuli:** Mothers were video-recorded speaking to their 5-mo-olds (ID) and an adult (AD) via Skype and original teleprompter setup
- Six 10-s clips of ID and AD stimuli**
  - Video-only (VO):** silent dynamic video
  - Audio-only (AO):** static face with audio
  - Audiovisual (AV):** original dynamic video
- 6-mo-olds ( $n = 42$ ,  $M = 177$  days, 24 males), Tobii T60 XL eye tracker
  - Familiar group (FAM):** viewed mother's 6 stimuli in random order
  - Unfamiliar group (UNFAM):** viewed stranger's stimuli (matched by mother's race and infant gender)



## Hypotheses for Specific Modalities

- H1 VO:** Within silent dynamic videos, Mouth preference for FAM ID face
- H2 AO:** Within static face with audio, Eye preference for all static faces
- H3 AV:** Within audiovisual videos, Mouth preference for FAM ID face

## Analyses & Results

- Mean proportion of total looking time (PTLT) to Eye and Mouth AOIs<sup>3</sup> entered into mixed repeated-measures ANOVAs:
  - Across modalities:** Familiarity x Infant-directedness x Modality x Gender x AOI
  - Within modality (H1, H2, H3):** Familiarity x Infant-directedness x Gender x AOI

### Across modalities: Effects of Modality and Familiarity

- Modality x AOI,  $p < .001$ ,  $\eta_p^2 = .51$** 
  - See figure
- Modality x Familiarity,  $p = .019$ ,  $\eta_p^2 = .10$** 
  - Less attention to FAM eyes and mouth of AO face ( $M = .25$ ,  $SD = .06$ ) than FAM AV ( $M = .33$ ,  $SD = .05$ ) and VO ( $M = .34$ ,  $SD = .04$ ) faces

Mouth preference on AV and VO  
Eye preference on AO stimuli

### H1 not supported: No interaction of Familiarity x Infant-directedness

- Main effect of AOI,  $p = .001$ ,  $\eta_p^2 = .27$** 
  - Mouth > Eyes
- Familiarity x Infant-directedness x AOI,  $p = .826$**

Mouth preference on VO stimuli

### H2 supported: Eye preference for all audio-only static stimuli

- Main effect of AOI,  $p = .015$ ,  $\eta_p^2 = .15$** 
  - Eyes > Mouth

Eye preference on AO stimuli

### H3 not supported: No interaction of Familiarity x Infant-directedness

- Main effect of AOI,  $p = .003$ ,  $\eta_p^2 = .21$** 
  - Mouth > Eyes
- Main effect of Infant-directedness,  $p = .023$ ,  $\eta_p^2 = .13$** 
  - Greater attention to ID eyes and mouth than AD eyes and mouth
- Familiarity x Infant-directedness x AOI,  $p = .414$**

Mouth preference on AV stimuli

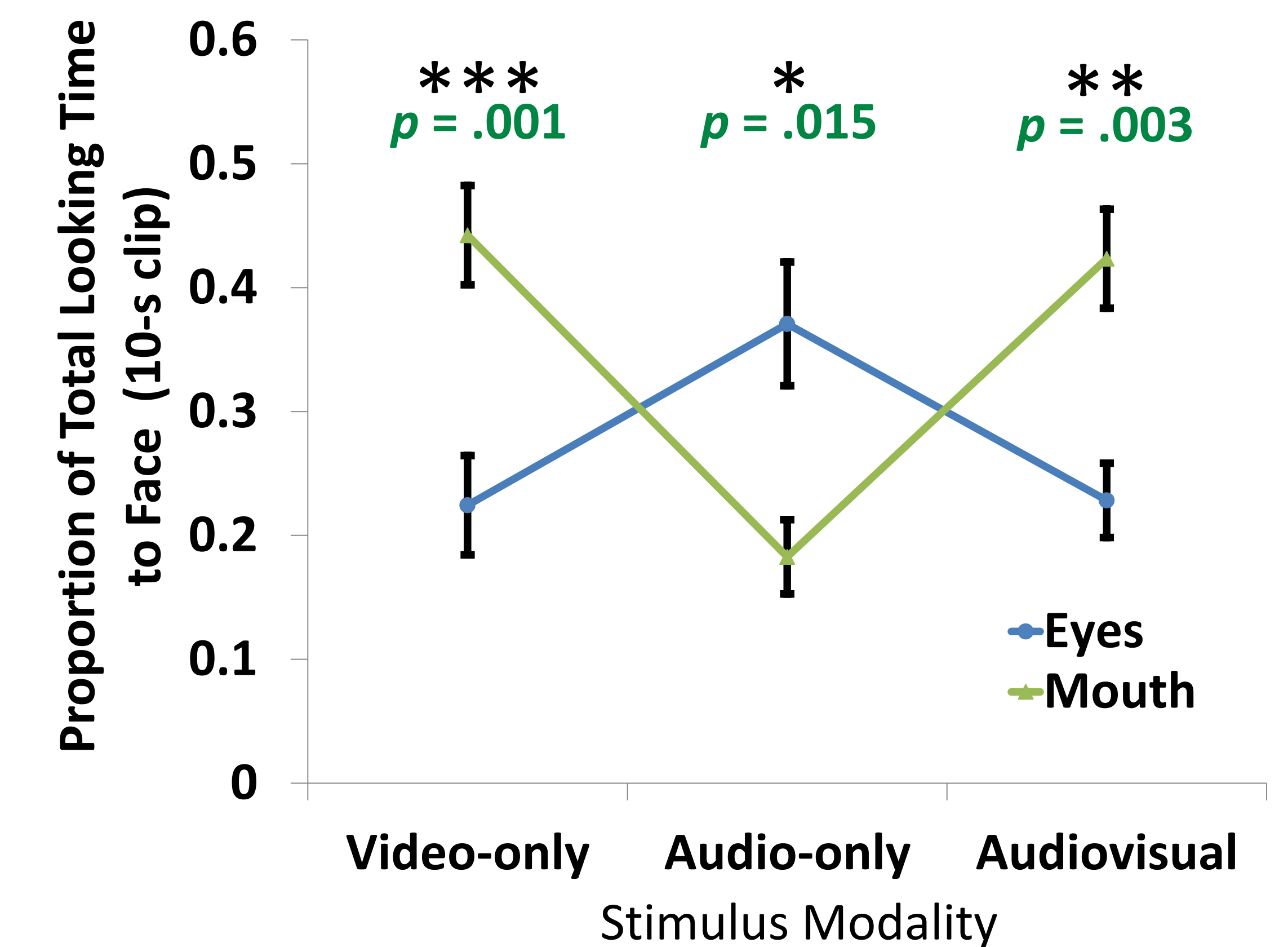
### Post-hoc exploratory analysis: Interaction of Familiarity x AOI

- Above analyses did not support expected interaction of FAM x Infant-directedness x AOI
- Initial attention to faces may differ from sustained attention, as infant orients to stimulus<sup>15</sup>
- Mean PTLT to first 2.5 seconds<sup>16</sup> entered into across- and within-modality ANOVAs
- Only one significant effect/interaction differed from 10-s analyses:

- Within AV modality only, Familiarity x AOI**
  - 2.5s data,  $p = .043$ ,  $\eta_p^2 = .11$ , (10s data:  $p = .222$ )**
    - FAM group, Mouth > Eyes,  $p = .008$
    - UNFAM group, no effect of AOI,  $p = .732$

Initial attention,  
Mouth preference for  
Familiar AV stimuli

## Infants' Eye vs. Mouth Preference by Modality



## Discussion

- Stimulus modality, not familiarity nor infant-directedness, guided 6-mo-olds' mouth vs. eye preference**
  - Dynamic mouth of video-only and audiovisual stimuli elicited mouth preference, not static mouth paired with audio
  - Mouth movement elicits attention, regardless of speech signal
  - Visual modality provides important communicative information for 6-mo-olds, e.g. language discrimination<sup>17</sup>
- Static stimuli hinders ecological validity of scanning data**
  - Eye preference may be related to unexpected stillness
  - Static face may elicit still-face response, given reduced attention to AOIs of mothers' vs. strangers' static stimuli
- Initial vs. sustained attention to faces may depend on face familiarity**
  - Mothers' familiarity may streamline attention to mouth, while unfamiliarity triggers broader scanning of facial features.

## References & Acknowledgments

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