

Looking Away from the Speaker's Mouth: A Developmental Shift from Infancy to Preschool



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Abstract

Our research examined where infants and children focus their attention when viewing a speaker. We hypothesized that infants would spend more time looking at the speaker's mouth than the eyes, while preschool children would spend more time looking at the speaker's eyes than the mouth. Using eye tracking technology, we measured gaze duration to the eyes and mouth of the speaker. The results supported our hypothesis.

Background and Aims

Recent research has shown that there are important developmental shifts in eye gaze related to the learning of language. One such shift occurs between four and eight months. An infant at four months focuses attention on the eyes of a speaker, while an infant at eight months attends to the mouth of a speaker (Hansen & Lewkowicz, 2010). Rader and Zukow-Goldring (2010) found that infants between the ages of 9 and 15 months continue to focus their attention on the mouth of the speaker. However, by about four years of age attention shifts again to the eyes of a speaker (e.g., Pelphrey, et al., 2002).

Our current study was designed to determine when this later shift from the mouth to the eyes occurs. We hypothesized that while infants spend more time looking at the mouth than the eyes, preschoolers would spend more time looking at the eyes than the mouth. To test this hypothesis, we used infant eye tracking data from Rader and Zukow's study and compared the infant archival data to the data collected in the current study in which preschool-aged children participated.



Fig. 1 Testing Room Set-up

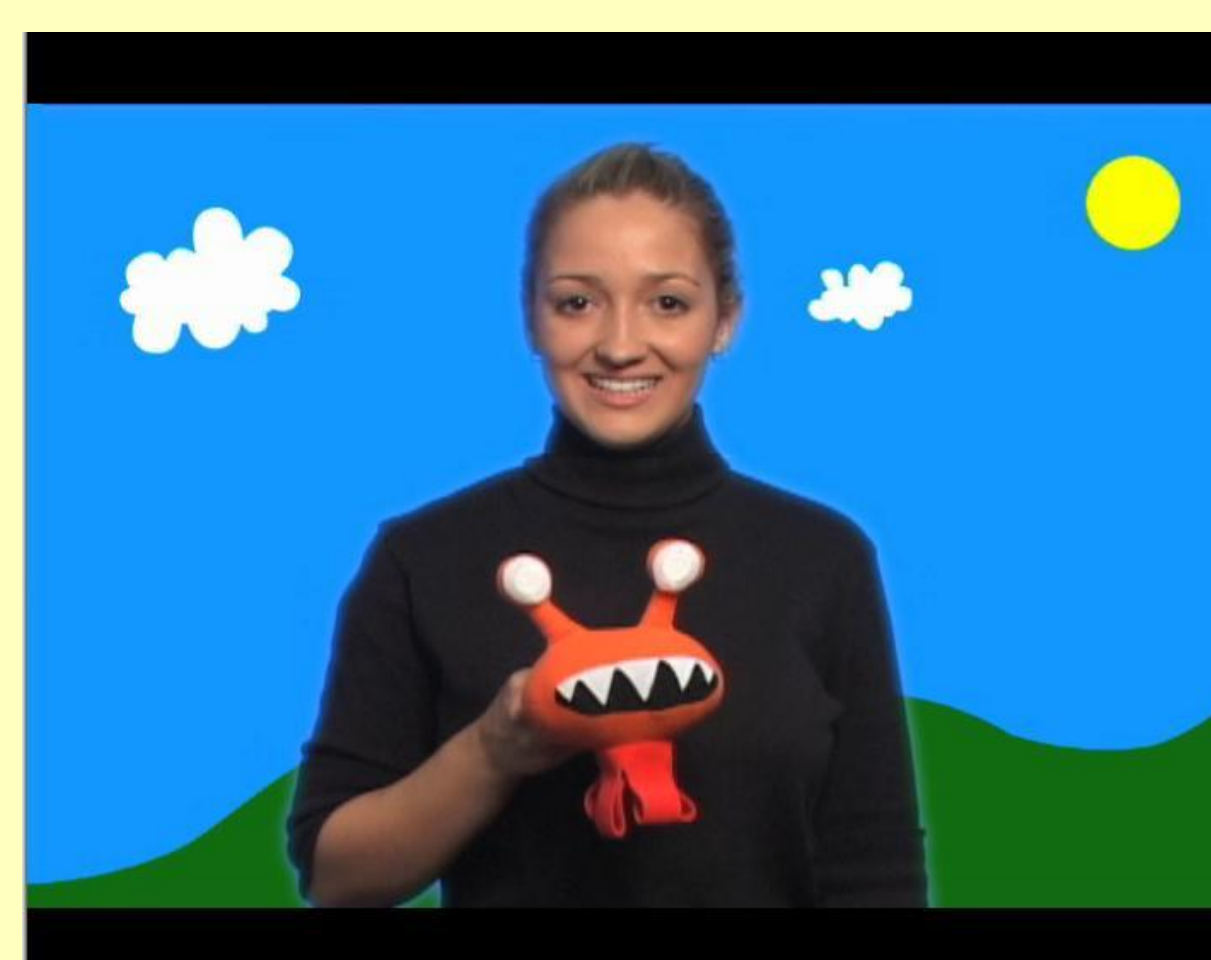


Fig. 2 Video Screen with Speaker and Novel Object

Method

Twenty typically developing children (10 males and 10 females) ranging in age from 19 to 49 months ($M = 32.14$, $SD = 10.49$) participated in the study. We compared these children to fourteen typically developing infants from the first study (7 males and 7 females) ranging in age from 9 to 15 months ($M = 12.01$, $SD = 1.54$). All were residents of upstate New York and were primarily Caucasian.

The procedure of our current study was the same as that of the previous infant study. The only variation was the use of a different physical set-up to accommodate the size of the older children. Children were seated in a toy truck that was placed approximately two feet away from a computer screen on which the children watched the video. The testing room set-up is shown in Figure 1.

The video contained a speaker against a cartoon sky holding a novel object that was given a nonce name. See Figure 2 for an example of the video screen. In the infant study, the hypothesis involved gaze to an object based on the dynamic or static gestures of the object presented. To maintain consistency, we used the same video, but were less concerned with effects of the speaker's gestures and more with where the child was looking.

Eye fixations were measured using a system provided by the Mangold Corporation. This system is able to take into account the movements of the child as eye gaze is tracked in relation to the video being viewed. Calibrations were done before and after the video presentation to ensure accuracy of the data.

Analysis and Results

Using the Mangold program, areas of interest were identified. For this study, we analyzed the eyes and mouth of the speaker.

For our dependent measure, we computed a ratio of the time spent looking at the eyes to the time spent looking at the mouth. This ratio provides a measure for the comparative time spent looking at the mouth and eyes regardless of the absolute time spent looking at either. We carried out an independent t -test comparing the infant and preschool participants. For the children in the early childhood study, the mean ratio was 3.60 ($SD = 4.96$), while for the infants it was .286 ($SD = .325$); this difference was significant, $t(32) = 2.485$, $p = .018$. See Figure 3.

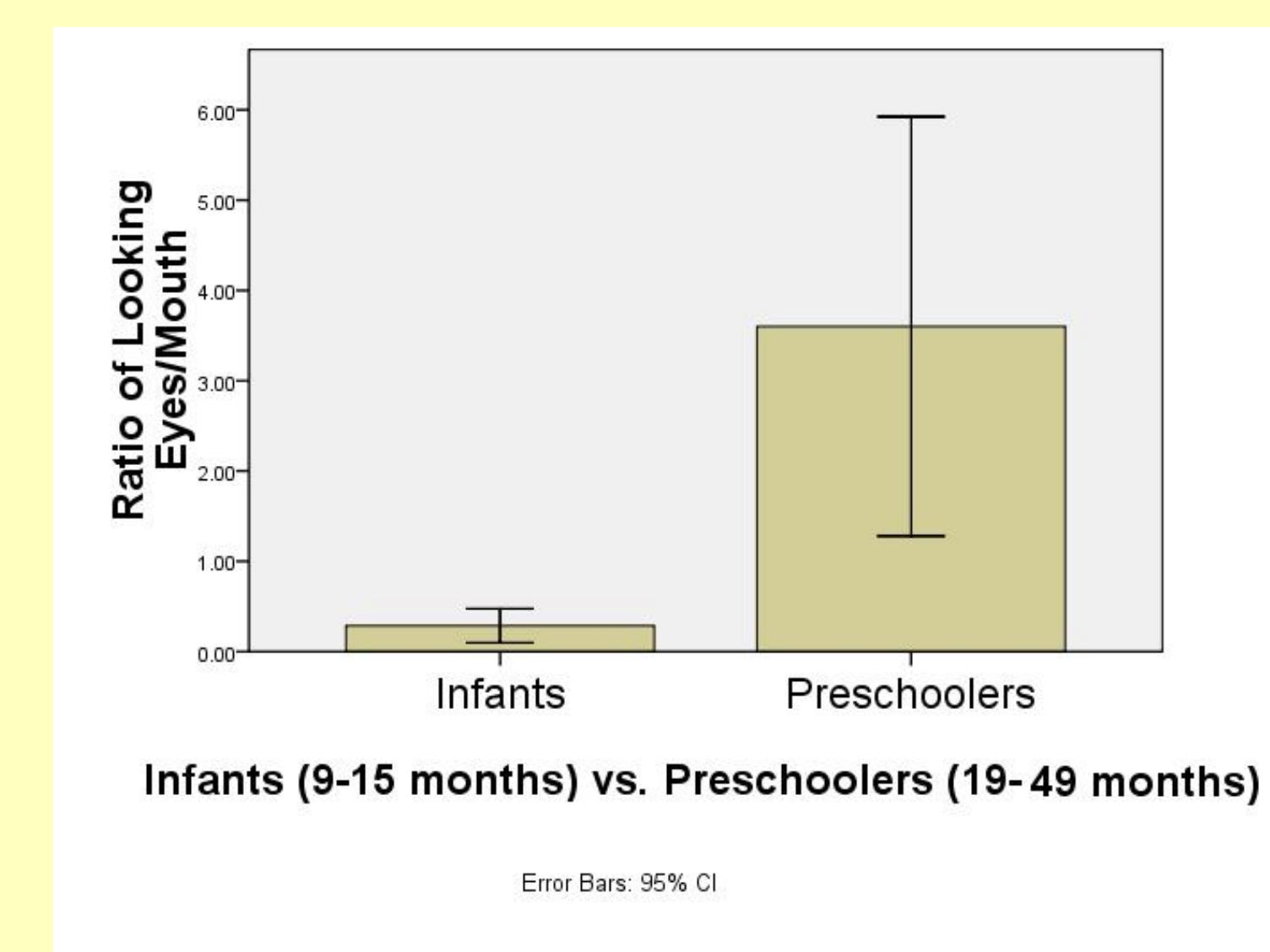


Fig. 3 Differences in the Ratio of Looking to the Eyes and Mouth in Infants and Preschoolers

Discussion

During early development, children make progress in many aspects in life, including language development. The results from these studies indicate that between infancy and early childhood, children make a shift in attention from spending a majority of the time looking at a speaker's mouth to looking at the speaker's eyes. Future research should look closely at the ages 15-19 months to document the change as it occurs.

The developmental shift in gaze could have implications for many aspects of development, especially language. For example, attending to the mouth might help with learning new words and attending to the speaker's eyes may provide information related to social meaning.

Given that eye contact is important in social interactions, patterns of eye gaze could be important for understanding social disorders such as autism. Previous research has found that children with autism spend less time looking at eyes than at the mouth (Jones, Carr, & Klin, 2008). Understanding the gaze patterns in typically developing children should contribute to comprehending the etiology of gaze patterns in children with autism.

References

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