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Selective attention to the mouth is associated with expressive language skills in monolingual and bilingual infants

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ABSTRACT

Infants increasingly attend to the mouths of others during the latter half of the first postnatal year, and individual differences in selective attention to talking mouths during infancy predict verbal skills during toddlerhood. There is some evidence suggesting that trajectories in mouth-looking vary by early language environment, in particular monolingual or bilingual language exposure, which may have differential consequences in developing sensitivity to the communicative and social affordances of the face. Here, we evaluated whether 6- to 12-month-olds' mouth-looking is related to skills associated with concurrent social communicative development—including early language functioning and emotion discriminability. We found that attention to the mouth of a talking face increased with age but that mouth-looking was more strongly associated with concurrent expressive language skills than chronological age for both monolingual and bilingual infants. Mouth-looking was not related to emotion discrimination. These data suggest that selective attention to a talking mouth may be one important mechanism by which infants learn language regardless of home language environment.

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Introduction

Language learning is a multimodal process that builds on infants' attention to the face as a source of both social communicative information (Brooks & Meltzoff, 2005; Kuhl, 2007; Munhall & Johnson, 2012) and audiovisual speech cues (Lewkowicz & Pons, 2013; Rosenblum, Schmuckler, & Johnson, 1997; Teinonen, Aslin, Alku, & Csibra, 2008). For infants learning two languages, the audiovisual speech cues afforded by the face may be particularly informative and relevant for visually differentiating the types of languages being spoken (Pons, Bosch, & Lewkowicz, 2015; Sebastián-Gallés, Albareda-Castellot, Weikum, & Werker, 2012; Weikum et al., 2007). However, the precise mechanisms by which visual social attention to faces and language environment support language acquisition and early social communicative skills remain unclear. Here, we examined the possibility that developmental changes in face perception reflect an increased sensitivity to social and communicative affordances of the face, which in turn contributes to skills necessary for language and social development. In particular, the current study primarily focused on selective attention to mouths and its association with concurrent language skills in 6- to 12-month-olds from monolingual and bilingual households. We also examined the relation between mouth-looking and emotion discriminability in our sample to further evaluate a potential additional effect of mouth-looking on social development in monolingual and bilingual infants.

Mouth-looking and language development

During the latter half of the first postnatal year, infants—regardless of language background—gradually shift from preferentially looking at the eyes toward preferentially looking at the mouths of others (Ayneto & Sebastián-Gallés, 2017; Frank, Vul, & Saxe, 2011; Hunnius & Geuze, 2004; Lewkowicz & Hansen-Tift, 2012; Pons et al., 2015; Tenenbaum, Shah, Sobel, Malle, & Morgan, 2013; Wagner, Luyster, Yim, Tager-Flusberg, & Nelson, 2013). The timing of this phenomenon coincides with the approximate onset of babbling (~6 months), an early expressive language skill. Studies examining this phenomenon have found that the developmental trajectory for mouth-looking may differ between monolingual and bilingual infants. For monolingual infants, some studies reported that mouth-looking continues to increase over the latter half of the first postnatal year (Frank et al., 2011; Tenenbaum et al., 2013), whereas other work found that monolingual infants' trajectory for mouth-looking follows an inverted U-curve such that preferential attention to the eyes is reestablished after the first birthday (e.g., Lewkowicz & Hansen-Tift, 2012). In contrast, bilingual infants have been consistently found to exhibit protracted mouth-looking trajectories and continue to increasingly attend to the mouth at 12 months (Ayneto & Sebastián-Gallés, 2017; Pons et al., 2015). Thus, although monolingual and bilingual infants exhibit similar mouth-looking behaviors at younger ages, the developmental trajectory for mouth-looking may differ by 12 months.

The protracted developmental trajectory of mouth-looking in bilingual infants may have consequences for language learning. Developmental increases in mouth-looking—especially during the establishment of initial language expertise—are believed to facilitate the detection of redundant audiovisual speech cues (Hillairet de Boisferon, Tift, Minar, & Lewkowicz, 2017; Lewkowicz & Hansen-Tift, 2012; Pons et al., 2015). Young infants are able to disambiguate speech cues from mouth movements (e.g., Rosenblum et al., 1997), and, importantly, bilingual infants have been shown to visually discriminate between two languages even at ages when monolingual infants are no longer able to do so (Sebastián-Gallés et al., 2012; Weikum et al., 2007). Developmental differences in sensitivity to redundant audiovisual speech cues and attunement to mouths may, to some extent, underlie individual differences in specific aspects of language acquisition (e.g., language production vs. comprehension skills). For instance, longitudinal studies of monolingual infants have found that greater attention to the mouth during the first postnatal year is associated with greater rates of expressive language growth during the second postnatal year (Tenenbaum, Sobel, Sheinkopf, Malle, & Morgan, 2015; Young, Merin, Rogers, & Ozonoff, 2009). What remains unknown is whether differences in mouth-looking in monolingual and bilingual infants also reflect individual differences in early language profiles, including those in expressive versus receptive language skills. Given that monolingual