

Unpublished Research Summary

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2007

Study of 18 Rhesus Monkeys following from Petitto's Published paper

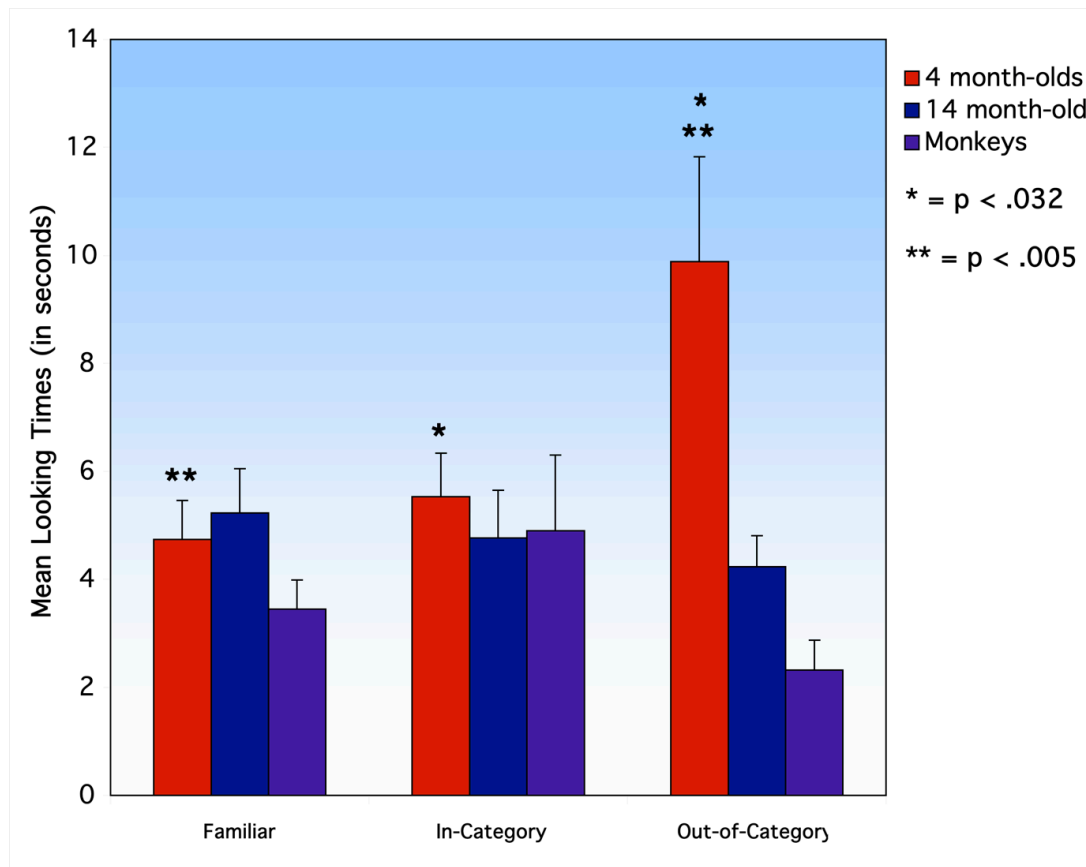
New insights into old puzzles from infants' categorical discrimination of soundless phonetic units

Baker, S.A., Golinkoff, R. M., & Petitto, L.A. (2006). New insights into old puzzles from infants' categorical discrimination of soundless phonetic units. *Language Learning and Development*, 2(3), 147-162.

Introduction. Since the early 1970s, a looming question has been this: How do young infants discover the phonetic building blocks of their language from the constantly varying linguistic and perceptual stream around them? Initial research findings indicated that young infants have a specialized mode of linguistic/phonetic processing that is species-specific (see Jusczyk, 1997 for a review). Subsequent research with non-human primates weakened this specialized processing claim since non-human primates also discriminate human speech sounds (see Kuhl, 2000 for a review). All research to date has used speech to test language processing, and contemporary science has been unable to separate out linguistic processing from acoustic processing in the auditory speech stream. And so the question remains unanswered: Is this categorical capacity unique to humans and specific to language or general to all species capable of perceiving and forming categories? Here we took a novel look at this question by using soundless phonetic units from a natural signed language, American Sign Language (ASL), and testing discrimination abilities in young human infants and primates. Signed languages offer a unique way to answer this question of species-specificity because they occur in the visual modality, allowing us to tease apart linguistic processing from perceptual processing.

Participants. 32 (16 M, 16 F) healthy, full-term, hearing, speech-exposed infants (no sign) in one of two age groups: 4 month-olds (mean age = 4 mths, 9 days) and 14 month-olds (mean age = 14 mths, 2 days), and 7 (2 M, 5 F) laboratory-raised rhesus monkeys (*Macaca mulatta*; mean age = 9 years) participated. **Stimuli.** Phonetic variants of the ASL linguistic phonemes /5/ and /flat O/ ('5' and 'flat O' are diacritics used for the notation of signed languages similar to the phonetic notation for speech) for which native signing deaf adults have been shown to discriminate categorically were used (Baker, Idsardi, Michnick-Golinkoff, & Petitto, 2004). **Procedure.** The classic infant-controlled habituation procedure (Cohen, 1972, 1973) was used to test both the infants and the primates to allow for comparison of the results. Infants and primates were habituated to 1 of the 2 phonetic handshapes in ASL that were adjacent to the native signing deaf adult category boundary, and then tested on 3 phonetic ASL handshapes (1 familiar and 2 novel), the order of which was randomized and counterbalanced across participants. A post-test recovery trial (a picture of an infant's face) followed the 3 test trials. **Results.** Infants' look times during test indicated that the 4 month-old infants looked significantly longer only at the Out-of-Category handshape, indicating that they were discriminating the handshapes on the basis of linguistic category membership. The 14 month-old infants did not look significantly longer at any of the test handshapes, indicating that they were not discriminating the handshapes on the basis of linguistic category membership, which precisely parallels the developmental speech perception literature (e.g., Werker & Lalonde, 1988). The macaques' looking times during test indicated that they did not look significantly longer at any of the test handshapes, indicating that

they also were not discriminating the handshapes on the basis of linguistic category membership (see Fig.1). Thus, only the 4 month-old infants discriminated the handshapes based on category membership along the same category boundaries as native users of ASL. These results lend support to the hypothesis that the detection of phonetic units is being driven by the detection of linguistic *patterns* rather than the detection of perceptual features (auditory or visual), and that this processing capacity is species-specific.



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