

The role of lexical tones in acquisition of word-object associations in Chinese infants

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Human infants are innately able to perceive sound distinctions at phonemic level across all languages (Eimas, et. al., 1971), but gradually become less sensitive to those in non-native languages (Werker & Tees, 1984) and more sensitive to native ones (Kuhl et al., 2006). However, they do not distinguish phonetic contrasts sophisticatedly in word-to-world mapping: previous studies showed that 14-month-old infants neglected subtle phonetic differences in a novel word-object pairings test, although they were successful in the same test when words had remarkable differences (Stager & Werker, 1997). Infants increasingly use phonetic details in their word mapping as the growth of vocabulary, which indicates that the semantic and functional knowledge may facilitate infants to categorize phonemes.

In the present study, we tested whether and when Mandarin-learning infants attended to and used tonal information during their associative word-learning. Like the consonant and vowel, the lexical tone is also one kind of phonemes of importance in representing lexical meaning in a tonal language, such as Chinese. Language-specific tone perception emerges earlier (at about 4 months of age) than that of vowels and consonants, so it appears that lexical tone is more perceptually remarkable (Yeung, Chen & Werker, 2013).

We used habituation-switch task to habituate 14- and 18-month-old infants with two word-object pairs and explored whether they could be dishabituated when the word-object association was switched. Specifically, we compared two conditions: the syllable association (eg, fāi vs. tén) and the tone association (eg, fāi vs. fǎi). The nonsense syllables accords with Mandarin phonotactics.

Two age groups (14 and 18 months) took part in the present study. The results showed that in the tone condition, 18-month olds showed a significant shorter looking time at the “same” trial compared with the “switch” trial where the familiarized association was switched, $F(1, 36)=5.473$, $p<0.05$, but 14-month olds did not show this trend. In the syllable condition, a main effect of the test type revealed that compared with the “same” test, infants look longer to the “switch” trials, $F(1,36)=9.720$, $p<.0.01$. No interaction with age groups was found. It indicated that infants could not distinguish the switched word-object associations until 18 months when two words only had different tones (eg, fāi vs. fǎi), even though they could do so as early as 14 months when two words had different syllables (eg, fāi vs. tén).

These results indicated that infants could attend to and use tonal information in word learning only at a late stage (18 months). The late development of sensitivity to tonal information may result from infants’ increasing vocabulary size, and could be an indirect evidence of functional reorganization of the tonal perception. However, it was also possible that infants’ perception of lexical tones was constrained when the learning process was complicated and

resource heavy. So 18-month-olds who have more developed and mature word learning skill may have more energy to track tonal information.

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