PITCH ACCENT TYPE AND METRICAL STRESS IN INFANT SPEECH SEGMENTATION

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Previous research has shown that from 7.5 months of age infants use rhythmic patterns to extract words from speech, relying on stressed syllables in English or German (Jusczyk et al., 1999, Bartels et al., 2009). At the same time, artificial language studies show that 7.5-month-old infants exploit pitch in order to group disyllables (Bion et al., 2011), but already at 9 months, they generalize over pitch in word recognition tasks, at least in English (Singh et al., 2008). In two head-turn preference experiments, we tested infants' reliance on pitch and metrical stress in segmentation.

In Experiment 1, German 10-month-olds were familiarized with two trisyllabic target words with penultimate stress (e.g., *Lagune*), embedded 6 times in short text passages. Target words were produced with a pitch fall, whose peak was either realized before (H+L*, 'early peak') or on the stressed syllable (H*, 'medial peak') (Kohler, 2012). The naturally recorded target words were matched for pitch range, duration, and vowel quality across intonation conditions. For the test lists, the speaker recorded 15 repetitions of trochaic part-words starting at the stressed syllable (e.g., *gune*) with a high-falling pitch accent. Infants were randomly assigned to 2 of the 4 familiarization paragraphs; the familiarization phase ended when the infant had attended to each of the 2 paragraphs for at least 45s. During test, infants listened to 3 repetitions of the 4 test lists, each containing 15 tokens separated by 800ms of silence in a randomized order. The duration of orientation for each test list was recorded on-line and was averaged for novel and familiar lists for each infant.

Log-normalized looking times for 32 infants showed a significant interaction between familiarity and intonation condition ($p < 0.05$). There was a novelty effect in the medial peak condition only ($p < 0.05$): infants looked 1.3s longer to novel than to familiarized part-words.

In Experiment 2, we tested whether infants recognize the part-words in a different intonation contour. We familiarized another group of 17 infants with the paragraphs in the medial peak condition and tested them on the same trochaic part-words, but this time produced with a pitch rise instead of a fall. Results also showed a novelty effect of 1.2s ($p = 0.05$).

Our results demonstrate that German 10-month-olds rely on high-pitched syllables for lexical segmentation. They fail to segment when the pitch peak precedes the stressed syllable. They also generalize over the intonational realization in recognition, however, suggesting that intonation only plays a role for segmentation, but not in early lexical representations.

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