Six- and twelve-month-olds’ discrimination of native versus non-native between- and within-organ fricative place contrasts

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Abstract

Discrimination of native versus non-native between- and within-articulatory organ fricative contrasts was examined in 6 and 12 month-old infants. 12 month-olds discriminated between- (tongue-tip vs. lips) but not within-organ place contrasts (two tongue tip constriction locations), but 6 month-olds only did so for the non-native between-organ contrast. The results support the Articulatory Organ Hypothesis that infants attend more to differences between active articulatory organs than to differences between specific gestures of a single organ (e.g., constriction location or degree).

Index Terms: speech perception, infant development

1. Introduction

Infants under 6 months of age can discriminate both native and non-native consonant contrasts, while infants over 10 months have difficulty discriminating some non-native consonants. The Articulatory Organ Hypothesis (AOH) [1] predicts that infants attend more to the articulatory organ that is active in a speech gesture than to its constriction location or degree, when attuning to native speech. Thus, while younger infants may discriminate between- and within-organ contrasts equally, older infants should show better discrimination for between than within-organ contrasts. This is consistent with infant discrimination findings thus far [e.g., 2], but the contrasts tested involved organs that are also contrastive in the infants’ native language. Here we investigate whether 6-7 and 11-12 month-old English-learning infants discriminate English (ENG) between- vs. within-organ fricative contrasts (/θ/ vs. /θ/ vs. /θ/) and Nuu Chah Nulth (NCN) contrasts that involve an organ distinction not used in English: Tongue Body vs. Root (between: /g/-/h/ vs. within: /g/-/x/).

2. Method

English-learning 6-7 and 11-12 month-olds (n=48 per age) were tested in an infant-controlled conditioned visual fixation task. Multiple tokens of ENG /θ/ or NCN /θ/ were presented until habituation, followed by novel (between- or within-organ stimuli alternating with the habituation tokens) and control test trials (habituation stimuli only).

3. Results

We tested whether fixation times for between- and within-organ test trials were higher than control trials using one-tailed paired t-tests for each age x language group. Mean fixation times are presented in Figure 1 and statistical test results in Table 1.

4. Discussion

In support of the AOH, 12 month-olds discriminated between- but not within-organ contrasts in both languages, despite ENG /θ/ vs. /θ/ being acoustically difficult for adults and NCN /θ/ vs. /θ/ involving a non-native organ distinction. Surprisingly, both ENG contrasts were difficult for 6 month-olds, questioning the notion that young infants discriminate all native and non-native consonant contrasts. They discriminated only the non-native NCN between-organ contrast, consistent with the AOH.

5. Acknowledgements

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6. References