Effects of speaker language and listener language on children's stop place

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Different stereotypical stop place errors

- A stereotypical error in English-speaking children is "velar fronting" — the transcribed substitution of alveolar [t] or [d] for target /k/ or /g/ — which is observed in both front and back vowel environments (dark gray bars in /k,g/ groups, right panel, Fig. 1).
- In Japanese-speaking children, by contrast, fronting errors for velars are typical only of front vowel contexts where they are often transcribed as substitutions of [tʃ] or [dʒ] instead of [t] or [d] (medium gray bar in first /k,g/ group, left panel, Fig. 1).
- A more stereotypical error for Japanese-speaking children is "backing" of target /t, d/ to [tʃ, dʒ] and even to [k, g] (medium and light gray bars in /t,d/ group, left panel, Fig. 1). In English-speaking children backing to [k, g] is observed very rarely.

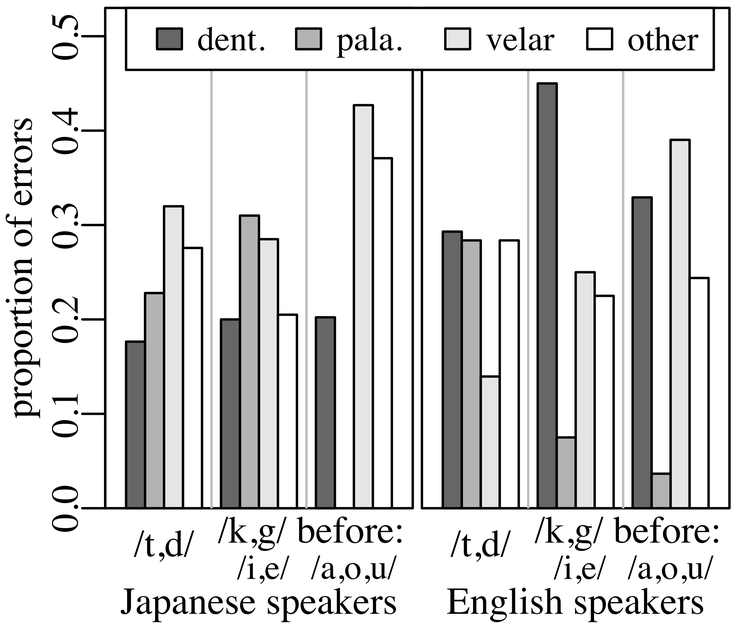


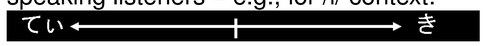
Figure 1 : Distribution of transcribed place errors for word-initial target phonemes (1) /t, d/ versus (2) /k, g/ in front vowel contexts versus (3) /k, g/ in back vowel contexts in the paidologos corpus of word productions elicited from Japanese- and English-speaking children.

Hypothesis

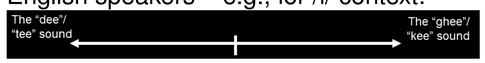
- Beckman, Yoneyama, & Edwards (2003) suggest that these differences are due to the different relative frequencies of the stop types in different vowel contexts, and the generally more coronal articulatory setting for English relative to Japanese.
- If this suggestion is correct, we might predict that Japanese- and English-speaking adults differ in how they perceive young children's productions of stops.

Method

- **stimuli:** CV stimuli from paidologos corpus
  - spliced from children's productions of Japanse words such as *kame* 'turtle' and *tisshuu* 'tissue' and English words such as *garden* and *deer*.
  - included both correct productions and incorrect productions selected to represent stereotypical errors of both languages – e.g., taking all alveolar-backing errors of English and a sample of the same number of velar-fronting errors
- **subjects:** 20 Japanese-speaking adults (in Tokyo) and 18 English-speaking adults (in Minneapolis)
- **task:** subjects listened to each stimulus and rated it on a visual analog scale that was anchored by vowel-appropriate
  - hiragana symbolizations for the Japanese speaking listeners – e.g., for /i/ context:



  - monosyllabic nonce word spellings for the English speakers – e.g., for /i/ context:



Discussion

- Median responses to the English /d/ and /g/ stimuli (Fig. 2, right panels) are consistent with the hypothesis that English stops are generally more anterior than Japanese stops: Japanese listeners had an overall tendency to perceive English stops as more coronal, even when they were perceived to be robustly dorsal by English listeners.
- Median responses to the Japanese /t/ stimuli (Fig. 2, top left panel) provide complementary though somewhat weaker evidence of the hypothesis: a substantial subset of the stops that were transcribed as dental were perceived to be more posterior by the Japanese listeners than by the English listeners.
- By contrast the English-speaking listeners' responses were more bi-modal, suggesting that they assimilated the Japanese /t/ productions categorically to their own English /t,d/ or /k,g/ phoneme targets.

Results – median ratings on a visual analog scale from coronal to dorsal place

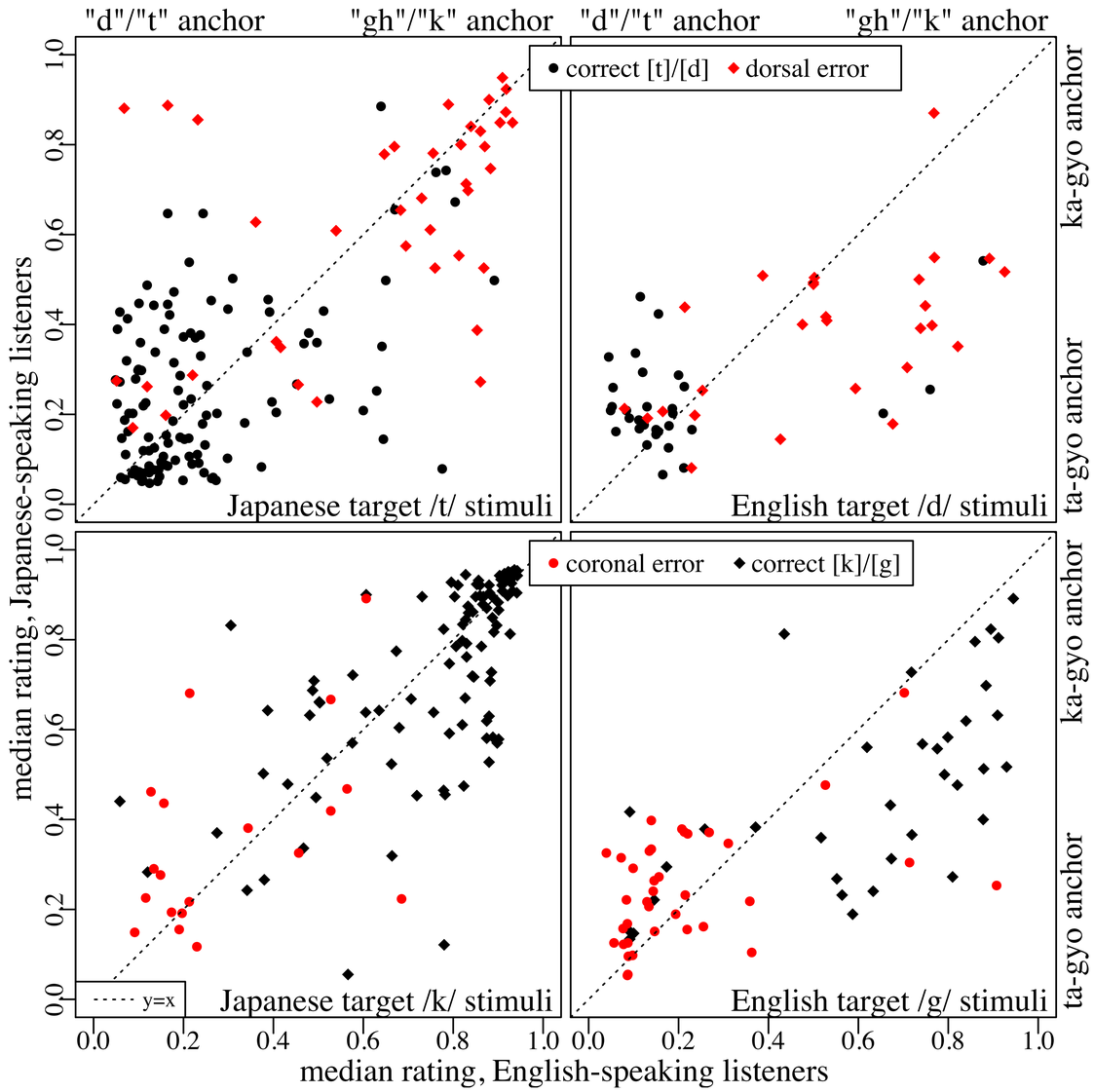


Figure 2 : Place ratings by Japanese- and English-speaking listeners for stimuli with coronal targets (top) and with dorsal targets (bottom) produced by Japanese-speaking children (left) and by English-speaking children (right). Black plotting characters are stimuli that had been transcribed as on target by the native-speaker phonetician transcribers and red plotting characters are stimuli that had been transcribed as backing errors (top panels) or fronting errors (bottom panels). Points on the dotted lines are tokens where the median response by the Japanese-speaking listener was at the same position on the VAS line (judged to be as front or as back) as the median response by the English-speaking listeners.

Acknowledgments

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