Production of /i/-/ɪ/ vowel contrast by Spanish learners of English: a phonetic imitation study

Context & problem: Spanish speakers acquiring English often face challenges in acquiring English's tense/lax contrasts such as /i/-/ɪ/ (e.g. [2,3]. Phonetic imitation, also known as phonetic accommodation, is the dynamic process in which a speaker assimilates the acoustic characteristics of another person after being exposed to their speech ([1]). Previous research on second language (L2) phonetic imitation has demonstrated that L2 speakers can adjust their speech toward first language (L1) norms when repeating after native speakers (shadowing task) (e.g. [4]). This study aims to answer the following questions: (1) Can using imitation as an exposure method improve the production of F1 and F2 of English/i/-/ɪ/ among native Spanish speakers? (2) If so, does listening to native speakers without shadowing have the same impact?

Methodology: 20 female native Spanish speakers from Mexico, learning English as a second language, participated in a study via OpenSesame. Initially, they read aloud 20 English words to establish a baseline. Then, participants were assigned to one of two conditions: shadowing or listening. In the shadowing condition, they immediately repeated (shadowed) the words pronounced by a pre-recorded model speaker. In the listening condition, participants heard the model speaker without repeating. Finally, both groups read the words aloud again to evaluate the impact of exposure to the model speaker on their pronunciation. F1 and F2 were measured using a Praat script.

Findings: *RQ1:* Graphical analysis suggested that the participants in the shadowing phase imitated the model talker since F1 and F2 for both /i/ and /ɪ/ shifted from being very similar to each other to being closer to the model talker. To test this, I built a series of linear mixed-effects models, which found that F1 and F2 for /ɪ/ and F1 for /i/ were significantly different from the baseline to the shadowing in the direction of the model talker values (F1 of /ɪ/: $\beta = 0.6079$, $p < 0.001$; F2 of /ɪ/: $\beta = -1.1702$, $p < 0.001$; F1 of /i/: $\beta = 0.08$, $p < 0.05$). These findings suggest that participants, through the process of imitation, demonstrated an improved ability to recognize the vowel contrast and produce it with a more native-like accent. *RQ2:* To test this question, I built a series of linear mixed effects models testing whether the participants made statistically significant shifts towards the model talker from baseline to post-exposure and whether any such shift depended on whether they shadowed the model talker or simply listened to the voice. The results showed that the participant in the shadowing condition showed relatively subtle, but significant, shifts towards the model talker for /ɪ/ (F1: $\beta = 0.11$, $p < 0.05$; F2: $\beta = -0.35$, $p < 0.001$), while those in the listening group made no shift.

References
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