

The effectiveness of auditory phonetic training on Greek native speakers' perception and production of Southern British English vowels

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Abstract

This study investigated the effectiveness of auditory phonetic training on Greek native speakers' perception and production of Southern British English vowels. The trainees identified and produced English bVt words before and after receiving five sessions of High Variability Phonetic Training (multiple speakers in multiple contexts). All of the trainees improved in their overall identification of English vowels. A perception experiment showed that their post-training productions were more accurately identified by native English speakers than their pre-training productions. Taken together, the results demonstrate that speakers of a language with a simple 5-vowel system (viz. Greek) can improve in both perceiving and producing the vowels of a language with a complex system (viz. English) via intensive laboratory training.

Key words: auditory training, second-language learning

Introduction

Second language (L2) learners are usually found to experience great difficulty in perceiving and producing vowels in the target language. When both members of an L2 vowel contrast assimilate to the same first language (L1) vowel category, learning is more challenging than cases where each member assimilates to a different L1 vowel category (Best 1995, Flege 1995).

L2 learners' perception of novel contrasts can improve via auditory training (with most studies focusing on consonant learning, e.g. Logan et al. 1991) with gains in perception transferring in production both for consonants (Bradlow et al. 1997) and vowels (Lambacher et al. 2005). However, research on vowel training has exclusively examined Japanese L1 speakers (e.g. Lambacher et al. 2005, Nishi and Kewley-Port 2007) with the exception of Iverson and Evans (2007) who trained German and Spanish L1 speakers' perception of English vowels but did not examine gains in production.

The present study examined whether native speakers of Greek (Gr) can be trained both in perceiving and producing the Southern British English (SBE) vowels. Gr speakers do not have tense-lax or long-short distinctions in L1 and consequently find most SBE vowels difficult to perceive especially when durational information is reduced (Lengeris and Hazan, 2007).

Method

Participants

Ten Athenian Gr speakers (mean age = 23 years, range = 18-35 years) participated in the training programme (twenty speakers were tested in total but only the results for the first ten are reported here). Another ten Athenian Gr speakers (mean age = 26 years, range = 18-42 years) served as controls, i.e. received no training. All of the participants had 10-12 years of formal English instruction in Greece with none having spent a period of more than one month in an English-speaking country. They all passed a pure-tone hearing screening at frequencies from 250 to 4000 Hz at 20 dB SPL.

Procedure

Following Logan et al. (1991), the training programme consisted of a pre-test phase, a training phase, and a post-test phase. In pre- and post-test both groups were given a large battery of perceptual tests, however, this study reports only on their identification of SBE vowels. The stimuli consisted of ten SBE bVt words (all SBE monophthongs except /ʊ/ in a ten-alternative forced-choice task) spoken by two SBE speakers (1 m, 1 f). The post-test also included a *generalization* test where a new SBE speaker (f) was added. Participants responded to 40 trials in the pre-test (2 speakers \times 10 vowels \times 2 times) and 60 trials in the post-test (3 speakers \times 10 vowels \times 2 times).

After completing the pre-training identification task, the participants were asked to read aloud from a screen the 10 bVt words they had previously attempted to identify (each word was read two times). The participants had therefore encountered the target words before producing them although the task was not a direct repetition one. Two SBE speakers, aged 26-28 years, identified Gr speakers' pre- and post-training SBE vowel productions in a 10AFC task (all productions were fully randomized).

The training stimuli and procedure were the same as in Iverson and Evans (2007). Five SBE speakers (2 m, 3 f) recorded 140 target words containing 14 SBE vowels, arranged in 4 groups (/i: ɪ aɪ eɪ/, /u: əʊ ɜ:/, /ɒ əʊ ɔ:/, /e æ a:/), i.e. each group consisted of 10 minimal pairs. The trainees completed 5 sessions of computer-based auditory training with feedback within 2-3 weeks with a different speaker each day. In each session the participants responded to 225 trials (in 45-60 minutes); they heard an English word and chose one of 3 or 4 candidates as displayed on a computer screen. If a correct answer was given "Correct!" was displayed on the screen, a cash register was heard and the target word was repeated once. If an incorrect answer was given "Wrong" was displayed on the screen, two beeps were heard and both the target and the (wrongly) chosen word were repeated twice. Percent correct identification was displayed at the end of each session.

Results

Auditory training and L2 perception

Figure 1 (left panel) shows percent correct pre- and post-training identification of SBE vowels for the trained and the control group. A two-way ANOVA with Group (trained, control) and Test (pre, post, generalization) as factors showed significant main effects of Group [$F(1,10) = 7.3$, $p = 0.015$] and Test [$F(2,36) = 13.9$, $p < 0.001$] and a significant Group \times Test interaction [$F(2,36) = 10.6$, $p < 0.001$]. The trained group improved significantly (Bonferroni adjusted $p < 0.05$) from pre- ($M = 57\%$) to post- and generalization test ($M = 78\%$ and 81% respectively) whereas the control group did not improve from pre- ($M = 56\%$) to neither post- nor generalization test ($M = 58\%$ and 57% respectively).

Auditory training and L2 production

Figure 1 (right panel) shows percent correct identification of trained and control groups' pre- and post-training SBE vowel productions as judged by the SBE L1 speakers. A two-way ANOVA with Group (trained, control) and Test (pre, post) as factors showed a significant main effect of Test [$F(1,18) = 17.6$, $p < 0.001$] and a significant Group \times Test interaction [$F(1,18) = 6.6$, $p = 0.018$]. The trained group improved significantly (Bonferroni adjusted $p < 0.05$) from pre- ($M = 53\%$) to post-test ($M = 70\%$) whereas the control group did not improve from pre- ($M = 57\%$) to post-test ($M = 60\%$).

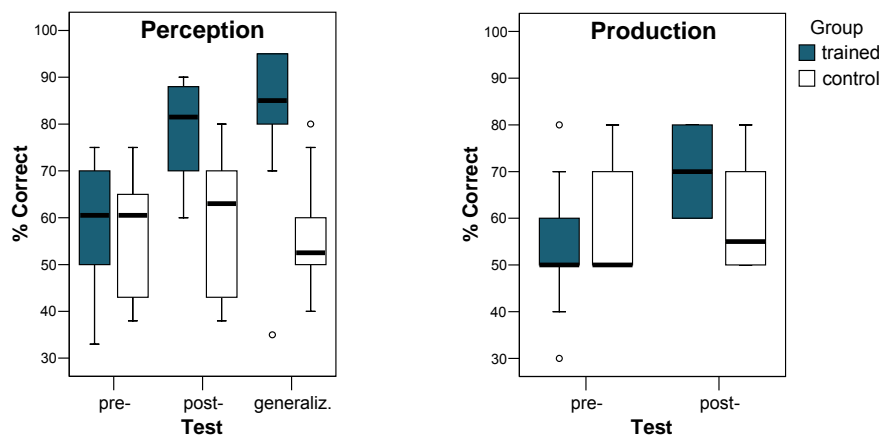


Figure 1. Percent correct identification of SBE vowels in pre- post- and generalization tests for trained and control group (left panel) and percent correct identification of trained and control groups' pre- and post-training SBE vowel productions as judged by SBE speakers (right panel).

Discussion

This study investigated the effectiveness of auditory phonetic training on Gr L1 speakers' perception and production of SBE vowels. It was found that intensive auditory training improved the trainees' identification and production of L2 vowels even though they did not receive any explicit production training. This finding supports not only the notion of plasticity in L2 learning but also a link between perception and production when acquiring an L2.

Acknowledgements

I am grateful to Valerie Hazan for her useful comments on an earlier version of this paper and to Paul Iverson for kindly providing me with the training materials and software. This study was supported by a research grant from the A.G. Leventis Foundation.

References

- Best, C.T. 1995. A direct realist view of cross-language speech perception. In Strange W. (eds.) 1995, *Speech perception and linguistic experience: Issues in cross-language research*, 171–204. Timonium, MD: York Press.
- Bradlow, A.R., Pisoni, D.B., Akahane-Yamada, R., and Tohkura, Y. 1997. Training Japanese listeners to identify English /r/ and /l/: IV. Some effects of perceptual learning on speech production. *Journal of the Acoustical Society of America* 101, 2299–2310.
- Flege, J.E. 1995. Second language speech learning theory, findings, and problems. In Strange W. (eds.) 1995, *Speech perception and linguistic experience: Issues in cross-language research*, 233–277. Timonium, MD: York Press
- Iverson, P. and Evans, B. 2007. Auditory training of English vowels for first-language speakers of Spanish and German. *Proc. of the 16th Intern. Congress of Phonetic Sciences*, 1625–1628, Saarbrücken, Germany.
- Lambacher, S.G., Martens, W.L., Kakehi, K., Marasinghe, C.A. and Molholt, G. 2005. The effects of identification training on the identification and production of American English vowels by native speakers of Japanese. *Applied Psycholinguistics* 26, 227–247.
- Lengeris, A. and Hazan, V. 2007. Cross-language perceptual assimilation and discrimination of Southern British English vowels by native speakers of Greek and Japanese. *Proc. of the 16th Intern. Congress of Phonetic Sciences*, 1641–1644, Saarbrücken, Germany.
- Logan, J.S., Lively, S.E., and Pisoni, D.B. 1991. Training Japanese listeners to identify English /r/ and /l/: A first report. *Journal of the Acoustical Society of America* 89, 874–886.
- Nishi, K. and Kewley-Port, D. 2007. Training Japanese listeners to perceive American English vowels: Influence of training sets. *Journal of Speech, Language, and Hearing Research* 50, 1496–1509.