Learning a Novel Accent: the Acquisition of vowel Epenthesis in s-clusters by monolingual and bilingual learners

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Introduction

Bilingualism has been linked with improved function regarding aspects of linguistic processing, e.g. manipulating language in terms of discrete units, novel word acquisition, and learning unfamiliar sound patterns in novel accents. In this study, we add to recent work suggesting bilinguals also have enhanced phonetic and phonological learning abilities compared to monolinguals.

Phonetic and phonological learning (PPL)

Ability to learn a novel accent of an already known language following brief initial exposure

- **Phonetic**: details of pronunciation such that it results in native-sounding speech
- **Phonological**: sound patterns (organization and restrictions related to sounds in the new inventory)

Not typically a challenge for children but difficult to acquire in native-like fashion in adulthood -- 'Joseph Conrad' phenomenon, phonological deafening (Werker & Tees 1984)

Bilingualism and PPL

Bilinguals outperformed monolinguals experimentally:

- learning a new pattern of Russian vowel neutralization (Kondratenko & Spinu 2014)
- learning a new pattern of Sussex English word-final glottalization (Spinu et al. 2018)
- vocabulary learning using foreign phonetic contrasts (Antoniou et al. 2015)
- enhanced speech perception abilities after training (Tremblay & Sabourin 2012)

But not across the board:

- slight monolingual advantage in learning a novel intonation pattern (Spinu & Rafat, 2019)

NEXT STEP: control features of novel accent more rigorously to avoid intrinsic variability of natural accents, and include different novel features addressing intonation, consonantal, vocalic, and syllabic aspects.

Experiment

As part of a larger study by the last author on the connection between PPL and auditory sensory memory, mono- and bilingual participants were trained on a new artificially constructed accent of English, differing in four ways from standard North American English.

Methodology

STIMULI

1. **Tapping**: /l/ → [ɾ] intervocalically ('color' → 'co**d**or')
2. **Diphthongization**: /ɛ/→ [jɛ] after an onset C ('bed' →'b**ee**-ed)
3. **Vowel epenthesis**: sC̥ → sə̲C̥ ('spy' → 's**u**-py')
4. **Intonation change**: MLH pattern in tag questions

EXAMPLE STIMULI:
*The **st**atus is unknown.*
*She put a **sp**ell on him.*
*He happily offered his guests **sc**otch, **didn't he**?*

Sentences constructed containing 20 each of tapped /l/, diphthongized vowel, epenthetic vowel and 10 tag questions (single and in 2 and 4 combinations) → two lists of 40 sentences (baseline/testing & training).

HYPOTHESIS

Bilingual speakers will outperform monolinguals in their phonetic and phonological learning.

PARTICIPANTS

Undergraduate students at CUNY Kingsborough:

- **31 monolingual** (born and raised in the US)
- **30 early bilingual** (born and raised in the US, exposure to two languages before the age of 3)

PROCEDURE

The participants were tested individually, and they were recorded using a Zoom H4N recorder and Sennheiser professional headset with mic in an acoustic booth on campus.

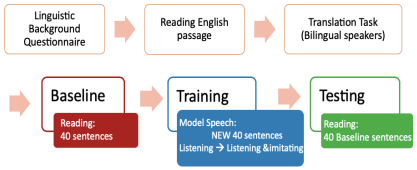


Figure 1. Order of experimental tasks.

ANALYSIS

Recordings first evaluated by a trained phonetician who assigned a score of 1 for each feature in a target word that was 'correctly placed' (and 0 if 'not').

Focus: epenthesis in s-clusters.

Segments in each cluster: aligned and labeled manually. Durations obtained using Praat script.

NOTE: preliminary results based on manual inspection of 23 early bilinguals and 23 monolinguals (s-cluster analysis).

Results

Accent Score by different feature

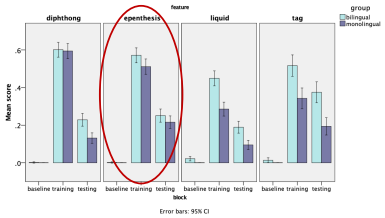


Figure 2. Manual scoring for each novel feature in B(aseline), Tr(aining), and Te(sting).

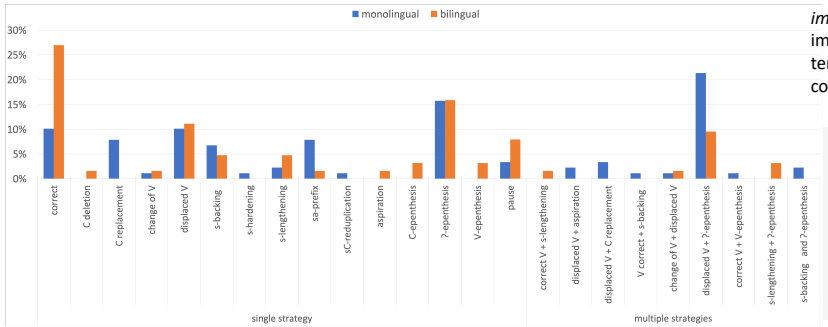


Figure 3. Different types of 'epenthesis' strategies used by the different groups.

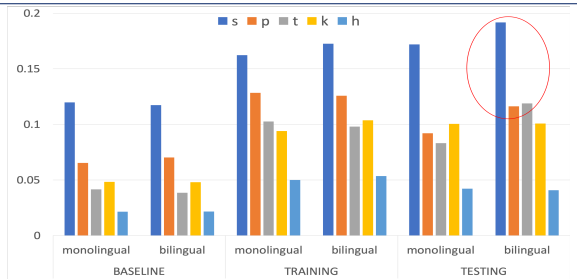
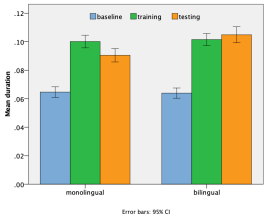


Figure 4. Duration of cluster consonants (including stop aspiration) in Baseline, Training, and Testing. Both groups exhibited increased durations in training, but bilinguals did not lower them in testing – see Figure 5 below.



UNIVARIATE ANOVA: significant effects of Speaker, (monolingual / bilingual) p<.001, Block (baseline / training / testing), p<.001, and their interaction, p=.003.

Figure 5. Overall segment duration.

Summary & Discussion

Hypothesis confirmed: Bilinguals were more successful in the learning of all 4 novel features compared to monolinguals.

☛ Bilinguals produced more correct epenthetic structures in testing and even when they did not get the specific pattern they had a tendency to replace it with a **single** process.

☛ Monolinguals were more likely to use double strategies instead of the correct pattern (memory differences?)

☛ Bilinguals produced equally long segment durations in training and *testing*.

☛ Both groups equally good at *imitating* two of the features → imitation produces behavior temporarily exceeding actual competence (Barry et al., 1989).

Examples of strategies used:

- Correct: [səp^haɪ]
- s-lengthening: [sss.p^{h}aɪ]
- Correct V + V-epenthesis: [səp^həaɪ]
- Displaced V + glottal stop insertion: [sp^{h}əʔaɪ]
- Displaced V + aspiration: [sp^{h}əhaɪ]