



The Role of Segmental and Intonational Cues in Dialect Discrimination

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Background

- Adults are capable of discriminating their native language and dialect from foreign languages and dialects.
 - Infants can do this by 5-months (Nazzi, Jusczyk & Johnson 2000)
 - English vs. Dutch
 - American English vs. British English
- It is assumed adults can use segmental information for this task.
- Adults can use intonational cues for language discrimination.
 - English adults discriminated between English and Dutch using intonational cues (Willems 1982; de Pijper 1983)
- Adults can distinguish two non-native languages using resynthesized ‘saltana’ speech
 - French adults discriminated between English and Japanese (Ramus & Mehler 1999)
 - using ‘saltana’ speech (intonation, rhythmic, and broad phonotactic cues available)
 - ‘sasasa’ speech (intonation and rhythmic cues available)
 - ‘flat sasasa’ speech (rhythmic cues only)
 - **But not** ‘aaaa’ speech (intonation cues only)

What kinds of phonetic cues can adults use to discriminate their native dialect from a foreign dialect?

Present Study

Several experiments examining the ability of adults to use different phonetic cues in dialect discrimination:

- **Experiment 1** – Full Cue (segmental, rhythmic and intonation cues)
- **Experiment 2** – Low-pass Filtered Speech (rhythmic and intonation cues; impoverished segmental cues)
- **Experiment 3** – Flat Intonation Speech (segmental and rhythmic cues)
- **Experiment 4** – Crossed Intonation (intonation; conflicting segmental and rhythmic cues)
- **Experiment 5** - ?a?a?a Speech (rhythmic and intonation cues only)

Methods

Stimuli –

- 39 sentences, taken from (Nazzi, Jusczyk & Johnson 2000).
- Recorded by 8 American Southern Californian female speakers and 8 Australian female speakers
- Stimuli was modified in different ways for each experiment
 - **Experiment 1** – Full Cue Speech
 - Sentences were not modified
 - **Experiment 2** – Low-pass Filtered Speech
 - Sentences were low-pass filtered in Praat at 400 Hz (with 50 Hz smoothing).
 - **Experiment 3** – Flat Intonation Speech
 - Sentences were resynthesized in Praat to show a flat intonation contour at 200 Hz.
 - **Experiment 4** – Crossed Intonation Speech
 - American English sentences were resynthesized in Praat to show American and Australian intonation contours.
 - Originally intended to test the use of intonation cues, but has a confound of conflicting segmental cues.
 - **Experiment 5** - ?a?a?a Speech
 - New synthesized sentences created to match recorded sentences – share rhythm and intonation
 - Obstruents in original sentence replaced with silence (/ʔ/); sonorants replaced with /a/.

Task –

- Sentences played to subjects one at a time.
- Subjects asked to label as “American” or “Other”

Subjects –

- Between 10-14 native American English users for each experiment.

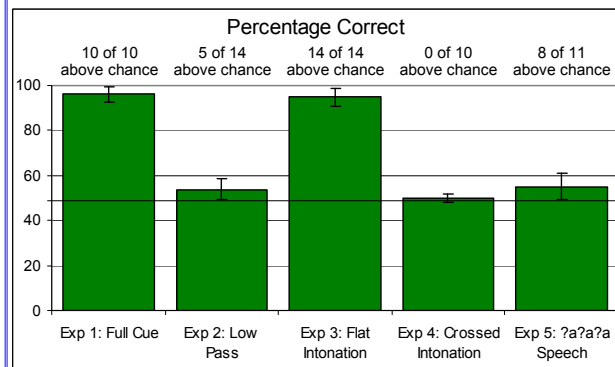
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Results

- Results analyzed two ways:
 - Percent correct (ANOVA & Tukey Post-hoc)
 - Proportion of subjects above chance (Chi-square)
- Performance on Exps. 1 & 3 and Exps. 2 & 5 not different.
- Percent correct different for Exps. 1 & 5, but proportion of subjects performing above chance is not different.
- Percent correct near different for Exps. 2 & 4, but proportion of subjects above chance is significantly different.



Discussion

- Adults can use both segmental and prosodic information to distinguish their native dialect from a foreign dialect.
 - Segmental cues allow for very accurate discrimination.
 - Prosodic cues can be used to discriminate at better than chance, but overall accuracy is quite low.
- In Exp. 4, when segmental and intonational cues were mismatched, subjects seemed to favor the segmental cues (which were American) and performed at chance.
- With the current experiments, we cannot determine whether adults rely on intonation or rhythmic cues for discrimination in Exps. 2 & 5.

Future Work

- We plan to tease apart the use of prosodic information in discrimination using:
 - Flat Intonation ?a?a?a Speech – Only rhythmic cues available.
 - Uniform Syllable Duration ?a?a?a Speech – Only intonational cues available.
- Replicate these experiments for English and German, to test if the same cues are used in language discrimination as for dialect discrimination.
- Replicate these experiments with 5-month-old infants.
 - Are cues used by infants the same as those used by adults?
 - 5-mo.-olds don't show a preference for the phonotactics of their native language at this age (Jusczyk et al. 1993). They may prefer prosodic cues over segmental cues.
 - Are infants of this age familiar with the intonation of their native language?