Prosodic Interaction Between Speakers of American and British English

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Overview

- Experimental study of speaker convergence between speakers of different dialects
  - Examining prosodic and segmental characteristics

Background: Speaker convergence

- Speakers’ production converges in the course of a conversation (Pardo 2006)
  - Speakers’ productions of lexical items are more similar to their co-speaker’s when produced during a conversation than when produced before or after the task.

- Speakers’ production changes depending on the language environment (Sancier & Fowler 1997)
  - A bilingual speaker’s VOT shifted in both of her languages depending on the country she was staying in. The speaker’s Portuguese VOT shifted towards the VOT of English when in the US, and her English VOT production shifted towards Portuguese when in Brazil (Sancier & Fowler 1997).
  - In a similar study examining Spanish speakers living in the US, convergence was found for VOT, but not for F2 in vowels (Tobin 2009).
Convergence across dialects

- Ní Chiosáin (2007) examines interaction between two dialects of Irish, using the synchronous speech paradigm.
- Investigated variables: lexical stress, vowel duration, lenition
- Only small effects of convergence found, mainly for lexical stress
Convergence as Gestural Drift

- Convergence can be explained by speakers’ inclination towards imitation (Sancier & Fowler 1997, Kuhl & Meltzoff 1996).

  - Gestural drift: “perceptually guided changes in speech production” (Sancier & Fowler 1997)

- Can form the basis for continuous language learning and accent change
Synchronous speech paradigm


- Minimizes individual, non-linguistic variation without inducing artificial temporal properties

- Dyads read a text simultaneously
  - seated facing each other and recorded on stereo channels with head-mounted microphones

- Captures in a unique way speakers’ shared knowledge of linguistic timing (Cummins 2002)

- Reduces variability in F0 contour (Kim & Nam 2009)
Outstanding research questions

- **Nature of speaker convergence**
  - What is the effect of interaction between speakers of different dialects (British and American English)?
  - Examining whether convergence occurs across dialects
  - How are prosodic characteristics affected?
  - Examining whether convergence occurs in suprasegmental properties and whether it differs from convergence in phonemes

- **Synchronous Speech Paradigm (Cummins 2002, Cummins 2003)** as a means to investigate speaker interaction
Acoustic experiment

- Part of a larger study
- Here: A short story containing 10 test words differing between the dialects in vowel quality and 4 words differing in stress placement
- Subjects read 6 repetitions of the story, with 84 filler sentences between each repetition.
- Recordings on separate days for solo and synchronous condition
  - solo condition always first

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Stimuli

The nurse took a bath when she woke up. Then she put on a plain yellow dress and a fleece jacket, picked up her goose Nico, and headed north to work. She worked with her father in a company that produced cloth for cleaning crystal. But a strange thing happened when she walked out of the door: She saw a goat standing near the big garage where she kept her coffee and tools. That reminded her of a story where a dictator had a square hat and always talked about caffeine at press conferences. She was a young adult when she first heard the story, and her favorite meal was tuna with parsley.

Adapted from Honorof, McCullough & Somerville 2000
Subjects

- 8 speakers (4 dyads)
  - 4 native speakers of American English
  - 4 native speakers of British English

Length of stay in the US:
- recently arrived: 3 months (subject C), 1 year (subject F)
- long time residents: 5 years (subject A), 19 years (subject H)
Measurements

Segmental convergence: vowel quality

Prosodic convergence: stress placement, intonation contour

- IPA transcription for vowel quality and stress placement

- Vowel quality:
  - F1, F2 (for ‘bath’, ‘dress’, ‘cloth’, ‘goat’)
  - F3 to examine r-coloring

- F0: intonation contour comparisons
Statistical analysis

- Two-factor ANOVA on F1, F2, and F3 data, testing for each speaker separately the effects of
  1. Speaking condition (solo and synchronous)
  2. Test word

- Criterion for significant difference $p < .05$
Results: Observations

- One dyad was excluded from the analysis
  - The speakers did not synchronize well enough, with one subject speaking much faster than the other, and the other attempting to match the speed.

- For different dialects the synchronous speech task was difficult
  - especially for recently arrived speakers and during the short story
  - many errors, comments by the subjects
    - not typical for synchronous speech task
Results: Vowel quality I

- Transcription showed no categorical changes in vowels

- F1 and F2:
  - 3 subjects showed changes on F1 on some test words
  - 5 subjects showed changes on F2 on some test words
  - In all but one case, the change involves lowering of the formant.
  - In terms of convergence: inconsistent in direction, with same subjects showing both converging and non-converging direction of change.
Results: Vowel quality II

R-coloring

Two subjects showed an effect of condition and word (but no interaction), and one an effect of word and a trend of condition effect (all in the same direction)

British subjects

- One subject (F) showed F3 lowering and one (C) a trend to F3 lowering => convergence for recently arrived subjects

American subject

- Subject D showed F3 raising => convergence
Results: Stress

Solo condition: speakers produced expected stress patterns except for one British subject (A), who produced ‘garage’ with stress on the second syllable.

Synchronous condition:

British speakers

- Subject C: twice stress placement on ‘caffeine’ unclear
- Subject A: three times restart on ‘dictator’, once stress on first syllable

American speakers

- Subject D: once stress placement on ‘caffeine’ unclear, three times stress on first syllable
Results: Intonation contour I
Dyad AB (one sentence mid story)
Results: Intonation contour II
Dyad CD (one sentence mid story)
Results: Intonation contour III
Dyad FG (one sentence mid story)

American solo (G)

British solo (F)

American synchronous

British synchronous
Summary & Conclusions

- Interaction leads to convergence for both segmental and prosodic properties, although only for some subjects.
  - Subjects C, F (recently arrived British subjects) and D (American) show convergence for vowel quality
    - F3 (r-coloring), but not F1 and F2, shows effects of interaction
  - Subjects A, C (British), and D (American) show convergence for stress
  - Intonational contours show indication of reduced variability

- British subjects converged more than American subjects. Most affected were the subjects who had recently arrived from Britain.

- Synchronous speech can be used for examining convergence, but it is a difficult task for speakers of different dialects and therefore might interfere with the process of convergence.
References