The Production of Spanish-English Code-Switching:

VOT and the *like*

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GrEP July 4, 2011

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Introduction

• Code-switching is when proficient bilingual speakers switch between two languages in one utterance.

• Most work has been on the syntactic/morphological aspects of code-switching (e.g. Spanish-English Pfaff, 1979; Poplack, 1980; Myers-Scotton, 2008).

• Little research on the phonetics of code-switching.
Past Research

• Past work on phonetics of code-switching investigated whether the switch is categorical or if there is an overlap of phonologies at code-switching boundaries.

• Some posit one merged phonological system where bilinguals must constantly suppress one language’s phonology while accessing the other (Roelofs & Verhoef, 2006).

• Studies regarding bilingual speech processing suggest there may be dual activation at least at the phonetic level (Marian et al., 2003; Costa et al., 2000).
Past Research: Grosjean & Miller (1994)

- **Experiment**
  - French-English bilinguals.
  - **EX:** Pendant les premiers jours, il faudra qu'il [k]opie [K]ARL constamment.
  - Measure VOT of [k] in “copie” and “CARL” in monolingual and code-switching utterances.

- **Results**
  - No significant difference in production of [k] in “copie” between contexts.
  - Suggests no anticipatory bleeding effect when speaker about to switch.
Past Research: Bullock et al. (2006)

- **Experiment**
  - Spanish-English bilinguals.
  - Measured VOT at pre-switch (“todos”), switch (“talked”), and post-switch (“kids”).

- **Results**
  - Subjects maintained distinct categories for Spanish and English.
  - However, English VOTs were affected by switching at pre-switch and switch, and Spanish VOTs were also affected at pre-switch but not in the expected direction.
Past Research: Problems

• All scripted material.
• Does not take advantage/consider preplanning.
• Takes away communicative aspect of code-switching.
• Stimuli not always ecologically valid (e.g. proper names as code-switches).
Current Research Questions

1. Will English speech produced at code-switching boundaries be more “Spanish-like” than when produced in a monolingual context?
   – For example, English VOT should be shorter in code-switching utterances compared to monolingual utterances.
Current Research Questions

2. Can an added distraction, such as a non-linguistic task, affect the frequency of code-switching and degree to which the two phonologies overlap?

– Distraction should put extra stress on processing abilities, thus making it hard to keep the two phonologies separate in general and particularly in code-switching utterances.
Methodology: Subject

- Four pairs of self-identified simultaneous Spanish-English bilinguals (2 F-F, 2 F-M).
- Knew partner before experiment.
- 3 acquired English first, 5 Spanish first.
- 6 listed English as their dominant language, 2 Spanish.
- 7 identified with Mexican culture, 1 Cuban culture.
Methodology: Stimuli

- Conversational topics with picture about Mexican-American culture.
- Prompts given in Spanish and English.
- Conversational topics were:
  1. *Chavo del Ocho* (Mexican TV show)
  2. *Quinceañera* (girl’s 15th birthday)
  3. *Día de los Muertos* (Day of the Dead)
Methodology: Tasks

• Control
  – Subjects told to talk for 15 minutes about the prompt until the experimenter returned to stop the recording.

• Distracter
  – Subjects had to individually complete four 12 piece puzzles while discussing the prompt and alert experimenter once done.
VOT-English

• Bilinguals do maintain two distinct categories for monolingual English and Spanish voiceless stops (Flege & Eefting, 1987).
• Current study aims to see if this distinction is maintained in code-switching utterances.
• Voice Onset Time (VOT) of English words beginning in voiceless stops (/p/, /t/, /k/) measured from burst to beginning of following vowel or consonant.
VOT-English: Coding

• VOT coded according to whether in a code-switching phrase or not.
• A segment was considered within a “code-switching phrase” if it was in the same utterance as Spanish with a pause of less than 300 milliseconds between the English and Spanish.
• This included intrasentential, intersentential, and single word switches.
VOT: Coding Continued

- **ML** = monolingual
  I saw it but just like a really long [t]ime ago.

- **CS-ES** = pre-switch
  Kinda like you know how they [p]ut on esos aretes...

- **CS-SE** = post-switch
  ...no sé mucho like a lot of [k]ountries...
• Significant effect of stop (/p/ shorter than /t/ and /k/, p < 0.05).
• Cohen’s $d$ values show small to medium effect for /p/, $d = 0.38$.
• Significant effect of speaker.
VOT-English: Discussion

• At least for /p/, at code-switching boundaries there appears to be an effect of Spanish on productions.
• Lack of consistent results for /t/ and /k/ possibly due to nature of words.
• Task does not affect the degree to which the two phonologies overlap, but does increase frequency of switching.
Like-Duration and Vowel Quality

- Subjects spoke California American English.
- The word *like* was used in both monolingual and code-switching utterances.
- All tokens segmented from beginning of /l/ to end of vowel.
- Duration calculated and F1/F2 measured from midpoint of segment.
**Like: Coding**

- **E** = English
  
  He would just act really *like*, I don’t know.

- **S** = Spanish
  
  Me recuerdo uno es que *like* no sé quién.

- **CS-ES** = immediately before a switch to Spanish
  
  One of these barrels and *like* estaba adentro.

- **CS-SE** = immediately after a switch from Spanish
  
  Esto dos se casaron verdad *like* in real life.
Like: Results Duration

- Significant effect of language (English shorter than Spanish).
- Significant effect of speaker.
- Significant interaction of speaker and task.
Like: Results Duration

- English is significantly shorter than CS-SE.
- Spanish is significantly longer than CS-ES and
- Spanish is significantly longer than CS-SE.
Like: Results F1 by F2

- English significantly farther back than Spanish, CS-ES, and CS-SE.
- Significant effect of task for both F1 and F2.
- Significant effect of language and interaction of language and task for F2.
- Significant effect of speaker.
Like: Results F1 by F2 Control Task

- English significantly farther back than Spanish.
- Large effect size of English farther back than CS-ES ($d=-0.811$).
- Medium effect size of Spanish farther front than CS-SE ($d=0.624$)
Like: Results F1 by F2 Distracter Task

- English significantly lower than Spanish.
- Medium effect size of English farther back than CS-SE ($d=0.458$).
- Spanish significantly higher than CS-ES.
Like: Discussion

• The word *like* is an example of an utterance marker used both within- and between-languages.

• Code-switching *likes* were somewhere in between English and Spanish *likes*, both regarding duration and vowel quality.

• Whether the code-switches patterned more with the language before or after the switch depended on the task.
Conclusion

- This provides initial evidence that speech produced at code-switching boundaries is produced differently than in monolingual contexts.
- Differences affected both duration measurements and vowel quality.
- Effects were not the same across tasks.
- Both tasks were useful in eliciting different types of effects.
Future Work

- More rigorous definition of “code-switching utterance”; see if prosody plays a role in extent of bleeding effect.
- Measure Spanish VOT values for a direct comparisons.
- Examine other phonetic features different between English and Spanish.
- Add other types of tasks.
- Conduct perception studies to test the role this effect plays in speech intelligibility.
Thank you!
References