

4pSC4: The effect of clear speech on listener perception of nonnative speech

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Introduction

A nonnative accent is a communication difference characterized by phonetic and phonological features that differ systematically from those of native speakers. Even when intelligibility (the accuracy with which a message is received) is fairly high, native listeners may perceive non-native speech to be difficult to understand and/or strongly accented.

Clear speech (hyperarticulation) increases intelligibility in adverse listening conditions (e.g. Ferguson, 2012). It appears to be a promising accent management strategy, and may yield faster results than traditional speech therapy, which focuses upon pronunciation and prosody (Behrman, 2014, 2017). However, the gain in intelligibility achieved with clear speech may be less for nonnative speakers than for native speakers (Rogers *et al.*, 2010; Smiljanić and Bradlow, 2009). Furthermore, linguistic contextual effects (Behrman and Akhund, 2013) may strongly influence all three perceptual variables.

Research Questions

The present project was designed to address two research questions, **only the first of which is discussed here:**

1. What is the effect of clear speech on intelligibility, ease of understanding, and accentedness?
2. How does predictability of linguistic context influence the clear speech effect on these three variables?

These questions were studied in native Spanish speakers. Approximately 80% of all English-language learners in the United States are Hispanics (National Education Association, 2010).

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Methods and Procedures

Talkers

- **28 women** with no history of communication disorders
 - **14 Native English speakers:**
 - Monolingual speakers of NYC dialects of American English (ages 19-36)
 - **14 L2 English speakers:**
 - Native speakers of Caribbean or South American dialects of Spanish (ages 21-46) proficient in American English (NYC dialects) with moderate-to-strong Spanish accents

Listeners

- **56 young adults** (ages 18-34; 45 female)
 - Native speakers of American English and no history of communication disorders by self-report
 - Normal hearing as demonstrated by passing a puretone screening at 25 dB HL at 250-8000 Hz

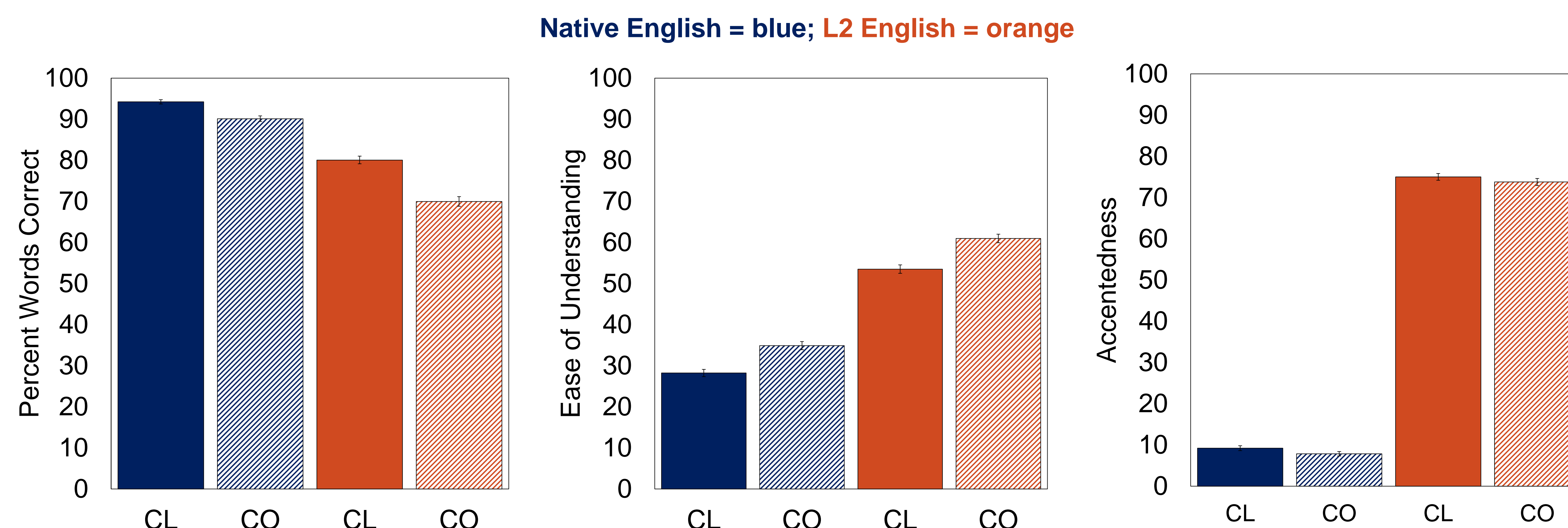
Materials

- **56 short phrases** comprised of 28 pairs of high- and low-probability phrases
 - e.g., “She made the bed with clean sheets” and “Dad talked about the sheets”
 - 9 American English vowels and 5 diphthongs each appeared as final word in two pairs (for later study)
- Talkers studied list of phrases and then read them aloud in **two styles:**
 - **Conversational:** Read “normally” in their “**usual, everyday speaking style**” as though speaking with someone “with whom they were very familiar.”
 - **Clear:** “**Speak much more clearly** – how you might talk to someone in a noisy environment or with a person with hearing loss. If your regular speech corresponds to a clearness of 100, you should aim for a clearness twice as good – a clearness of 200.”

Procedures

- Each listener heard and responded to conversational and clear phrases produced by **one Native English speaker** and **one L2 English speaker** (114 items) presented in random order at 70 dB SPL. Listeners went through the test block two times:
 - The first time,
 - Listeners heard the phrases **in a background of 12-talker babble** at a signal-to-noise ratio of **-5 dB**
 - They typed what they heard (**intelligibility**) and rated how easy the sentence was to understand on a scale of 0-100 (**ease of understanding**)
 - The second time,
 - Listeners heard the phrases **in quiet**
 - They rated how accented the speech sounded on a scale of 0-100 (**accentedness**)
- Phrases produced by each of the 28 talkers were heard by **4 listeners**, all of whom heard **different (pseudo-random) pairings of Native and L2 talkers**

Results and Preliminary Statistical Analyses



Intelligibility:

- Significant effects of **L1** ($\beta = 13.1$, $t = 4.48$, $p < .001$) and **style** ($\beta = 3.2$, $t = 4.23$, $p < .0001$)
- Significant **two-way interaction** ($\beta = 6.6$, $t = 6.2$, $p < .0001$)

Ease of understanding:

- Significant effects of **L1** ($\beta = 27.1$, $t = 5.97$, $p < .0001$) and **style** ($\beta = 6.17$, $t = 6.34$, $p < .0001$)
- NS two-way interaction ($\beta = 2.23$, $t = 1.9$, $p = .05$)

Accentedness:

- Significant effects of **L1** ($\beta = 66.0$, $t = 17.36$, $p < .0001$) and **style** ($\beta = 1.28$, $t = 2.3$, $p < .03$)
- NS two-way interaction ($\beta = .007$, $t = 0.09$, $p = .92$)

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