

Prosodic Organization of Spontaneous Spanish-English Bilingual Speech
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Despite the central role of speech prosody in human communication, the prosodic organization of naturally produced, conversational speech has received little attention and is not yet well understood. The study of prosodic organization may have been relatively neglected, in part due to the fact that the identification of prosodic breaks and prominences involves a certain degree of subjectivity. Even highly-trained transcribers show only moderate agreement when annotating certain prosodic events (cf. Escudero et al., 2012). In this study, we compare the prosodic organization of stretches of unilingual English, unilingual Spanish, and codeswitched spontaneous speech by using Rapid Prosodic Transcription (RPT, Cole et al., 2010) to leverage this inherent subjectivity and derive probabilistic measures of prosodic prominence and boundary strength. English and Spanish are typically classified as languages with sparse vs. dense pitch accents, respectively (see Igarashi, 2012). We investigate whether this difference in the density of tonal prominences manifests in spontaneous speech, and if so, how the different prosodic requirements for Spanish and English are accommodated in mixed language speech. In this abstract, we focus on the question of whether codeswitching in particular affects the perception of prosodic events. Our findings are consistent with the claim that codeswitching may act as narrow focus (Olson, 2012), and also suggest that recent findings concerning codeswitching-associated changes in speech rate (Fricke et al., in press) may in part be attributable to differences in prosodic organization.

Our investigation uses excerpts from the Bangor Miami Corpus (Deuchar et al., 2014), a large corpus of spontaneous conversations between Spanish-English bilinguals from Miami. We selected 127 utterances (i.e., clauses consisting of one main verb plus any subordinate clauses; 51 English, 33 Spanish, 22 English-to-Spanish, and 21 Spanish-to-English), produced by 37 unique speakers. The utterances are controlled for length (10-13 words) and other factors (e.g., audio quality, surrounding context, location and type of codeswitch, etc.). We report on preliminary findings from an RPT task with 13 highly proficient Spanish-English bilinguals who reported codeswitching on a daily basis and had no prior training in prosodic annotation. Participants listened to all 127 utterances, in a random order, and were asked to label prosodic prominences (“click on any words that sound highlighted or emphasized for the listener”) and boundaries (“place a boundary after any word that sounds like it’s the end of a chunk”) by clicking on an orthographic transcription (without punctuation) on a computer screen. Task order (prominences vs. boundaries) was counterbalanced across participants.

We describe the first analysis only briefly, as the results were only marginally significant. Listeners tended to perceive more prominences in Spanish than in English unilingual utterances, and more prominences in English-to-Spanish than in Spanish-to-English codeswitches (Figure 1, left panel), perhaps consistent with previous claims concerning the density of prominences in English vs. Spanish. Interestingly, listeners tended to perceive more boundaries in codeswitched than in non-codeswitched utterances (Figure 1, right panel), regardless of the direction of the switch.

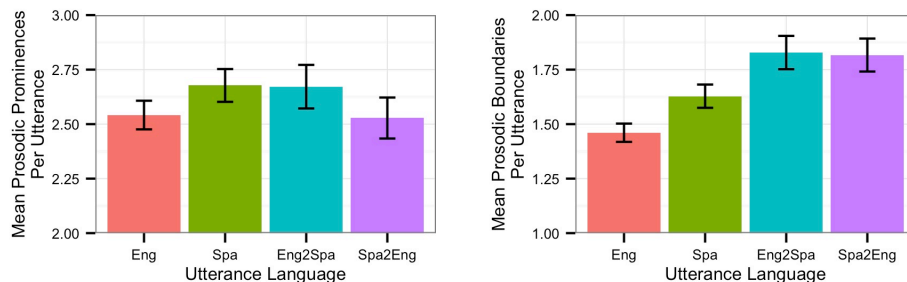


Figure 1

To further explore the location of perceived prominences and boundaries, we used mixed effects logistic regression to predict the probability that any given word would be perceived as prominent (or as the end of a prosodic constituent). These analyses included random intercepts by speakers, listeners, utterances, and words. There were significant main effects of syntactic category (prominences: $\chi^2(24) = 413.1, p < .0001$; boundaries: $\chi^2(24) = 255.7, p < 0.0001$) and codeswitching (prominences: $\chi^2(1) = 4.2, p < 0.05$; boundaries: $\chi^2(1) = 23.0, p < 0.0001$). These factors also interacted in complex ways. Figure 2 plots perceived prominence (left panel) and boundary strength according to syntactic category and codeswitch status, by calculating the proportion of words in each category for which listeners perceived prosodic events.

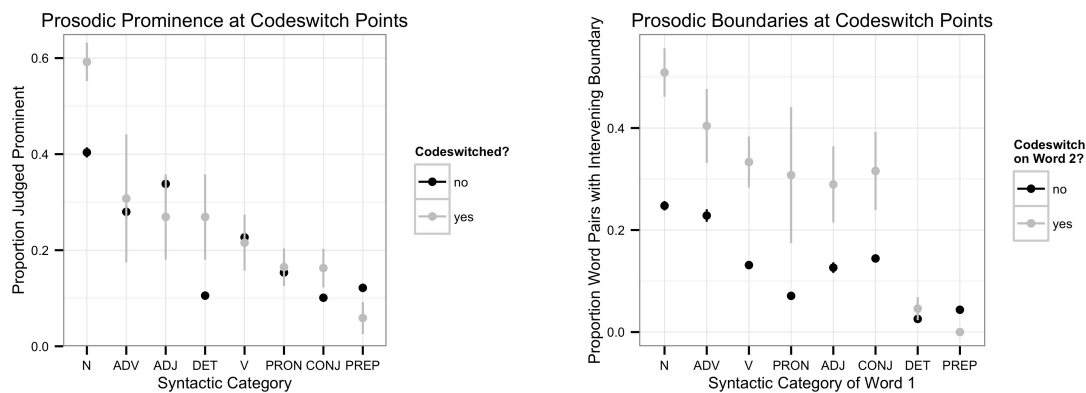


Figure 2

The finding that the effects of codeswitching were mediated by syntactic factors indicates that listeners' judgments were not based solely on the presence of codeswitching, but rather on some acoustic factors that tend to coincide with it. As illustrated in the left panel, only codeswitched determiners and nouns were perceived as having significantly greater prominence relative to their non-codeswitched counterparts, suggesting that spontaneous codeswitching may be used to effect narrow focus (Olson, 2012). Acoustic analyses are under way to determine which factors are most strongly associated with this perception, and whether these differ according to language. With respect to boundary strength, the right panel demonstrates that listeners tended to perceive boundaries as coinciding with codeswitch points, but again, only for certain syntactic categories. Ongoing analyses will determine whether the increased perception of prosodic breaks in this context may be related to recent reports of slowed speech rate leading into codeswitches (Fricke et al., in press). We will also address the relationship between prominence and boundary perception in this data set, as well as the association between corpus-based measures of word predictability and prosodic perception.

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