

The roles of stress and syllable number as a cue for Spanish speech segmentation

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It has been shown that English speakers are influenced by the tendency for stress to occur word-initially in English and exploit this knowledge when segmenting a speech stream (Cutler & Butterfield, 1992). But for Spanish speakers, it is unclear whether stress is used as a cue for segmentation. Spanish is classically defined as a “syllable-timed” language, however, stress is fairly predictable in the language. Most Spanish items exhibit penultimate stress (75-80%; Harris, 1983; Quilis, 1984) and are disyllabic (Pons & Bosch, 2010) or trisyllabic (Vitevitch & Rodriguez, 2004). This means that most disyllabic Spanish words contain initial stress while trisyllabic items contain medial stress. The reliability of this pattern suggests that the information should be of use as a segmentation cue. While previous literature suggests that Spanish speakers exploit stress when it is located in an initial or final syllable (Sebestián-Gallés & Costa, 1997; Soto-Faraco, et al., 2001), other work demonstrates that speakers do not make use of the cue when it occurs word-medially (i.e. trisyllabic penultimate stress items; Toro-Soto, et al., 2007).

In order to clarify the role of stress as a segmentation cue in Spanish, we created two-word phrases of low inter-word predictability of varying stress assignment and syllable number, embedded them in noise and required two groups of Spanish speakers (monolinguals: $n = 22$ and Spanish-English bilinguals: $n = 25$) to type what they thought they heard. (Items were embedded in noise in order to obscure phonotactic or semantic cues, but leave intact stress and word duration/syllable number.) We then analyzed the types of lexical boundary errors (LBE's; Liss et al., 1998) speakers made when parsing stimuli. In light of the predictability of stress patterns exhibited by Spanish, we hypothesize that Spanish speakers will use the reliability of stress as a cue for segmentation, and will be biased to produce LBE's which result in the two-syllable and three-syllable forms with penultimate stress so predominant in Spanish.

For both groups of speakers, we found that the largest category of responses were indeed two- and three-syllable two-item phrases with one or both items exhibiting penultimate stress. Chi-square analyses indicated that there were significantly more deletions of lexical boundaries before a strong syllable than expected ($p < 0.001$) and significantly more deletions before a strong syllable than before weak syllables ($p < 0.01$). There were also significantly fewer insertions of lexical boundaries before weak syllables than expected ($p < 0.001$) and fewer insertion errors than expected overall ($p < 0.001$). Taken together, these results suggest that Spanish speakers' segmentation errors resulted in responses which avoided initial strong syllables. Interestingly, this finding is consistent with corpus analyses of Spanish that indicate that only 13% of all Spanish items (regardless of syllable number) contain an initial strong syllable (Soto-Faraco, et al., 2001; Sebestián-Gallés, et al., 1996). Further research is required to clarify the use of stress and syllable numbers as cues in Spanish speech segmentation. Follow-studies to assess the interaction of stress and syllable number and their relative importance in speech segmentation are currently ongoing.