

Syllable weight effects on L2 Portuguese stress identification may be sonority-driven

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Background: Word-level prominence in Mandarin Chinese is predicted by the durational difference between syllables, which correlates with the tone carried by the syllable ($T0 < T3 < T1/T2/T4$), rather than the syllable types (CV and CVN) (Qu 2013, Wu & Kenstowicz 2015). When acquiring the lexical stress of a novel weight-sensitive language, one would expect L1-Mandarin learners to transfer this durational cue and to be blind to syllable types in the early stages of their interlanguage. Surprisingly, in an experimental study, we found that both durational cues and syllable type (weight) seem to play a role in the perception of Portuguese stress by naïve L1-Mandarin listeners.

Experimental Study: Twenty one L1-Mandarin native speakers with moderate English proficiency (mean LexTALE score 30, SD = 7.23; 0–100 scale) and no knowledge of Portuguese participated in an auditory stress identification task with disyllabic pseudo-words in Portuguese displaying final or penultimate stress ($n=60$). 10 stimuli had two light syllables (LL), 10 ended with a nasal coda (LHn), and 10 had a final diphthong (LHvv). Since Portuguese is weight-sensitive (Garcia 2017), this study aims to test L1-Mandarin learners' accuracy locating stress in Portuguese on the basis of syllable weight in the target language. We predicted that L1-Mandarin participants would perform better with Portuguese final stress if the final syllable were heavy (i.e., duration as an acoustic correlate of prominence; Qu 2013, Garcia 2020). Meanwhile, their identification accuracy on penultimate stress would be diminished with the presence of a final heavy syllable.

Results & Discussion: A maximal Bayesian mixed-effects regression found two interaction effects, confirming L1-Mandarin listeners' gradual sensitivity to Portuguese syllable weight. As seen in Figure 1, the heavier the final syllable, the more accurate at locating final stress participants were ($b_{LL:stressU} = -1.21$, 95% HDI [-2.05, -0.41]; $b_{LHvv:stressU} = 0.63$, 95% HDI [-0.01, 1.22]). These results indicate that syllable duration indeed helps L1-Mandarin listeners identify Portuguese stress (LL vs. LH), but it alone does not account for the gradual weight effect (LL < LHn < LHvv) observed in the data. This is because syllable duration does not seem to reliably cue the difference between LHn and LHvv in the stimuli, as shown in Figure 2. Further, this effect cannot be attributed directly to their previous linguistic knowledge: syllable type does not correlate with word-level prominence in Mandarin, as previously mentioned. Finally, in their English L2, the final syllable is extrametrical (Hayes 1982). Thus, the question is what leads L1-Mandarin listeners to perceive stress in final LHvv syllables with higher accuracy than LHn. Our speculation is that sonority can be playing a role. It has been shown in many languages that sonority affects stress assignment (Kenstowicz 1994; McCollum 2020; cf. Shih and de Lacy 2019). It seems that sonority, which may be grounded in the perceived resonance (Clements 2009), might function as one of the universal perceptual biases that shape (L2) speech perception (e.g., Bohn 1995; Bohn & Best 2012). When acquiring a non-native language, learners show sensitivity to sonority early on and will further explore its exact role in the target language (e.g. stress assignment and phonotactics) with increased experience.

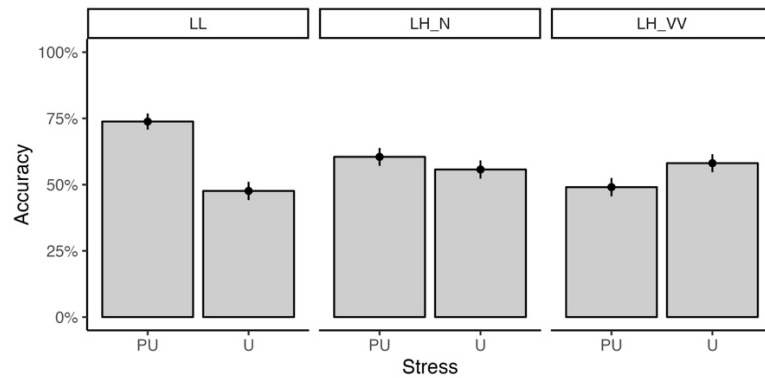


Figure 1: Main results: accuracy (y-axis) by stress and weight profile (error bars represent bootstrapped 95% confidence intervals). Gradient weight effect in final (U) syllables positively affects accuracy.

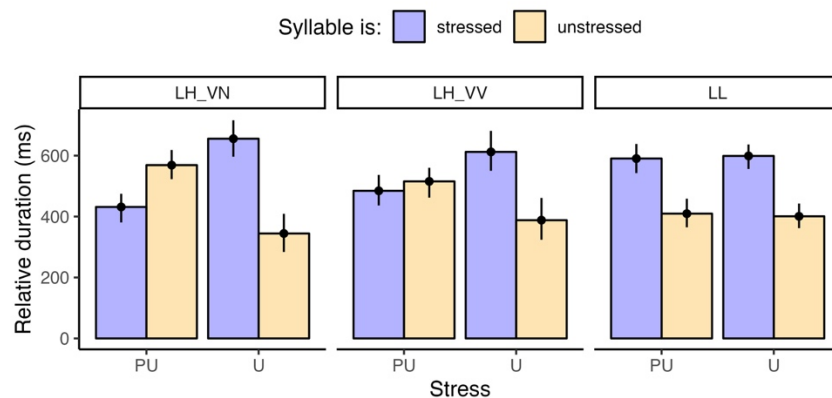


Figure 2: Durational difference of auditory stimuli.

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