The Use of Stress in Lexical Access in Early and Late Bilinguals

Lexical activation is fined-tuned to the acoustic-phonetic detail in the speech signal, and depends on vowel duration, phonological context, and lexical stress, among other factors (see McQueen, 2005, for a review). Lexical stress is the relative prominence of a given syllable with respect to the other syllables in a word, and influences the degree of activation of words (see Cutler, 2012, for a review) in languages where stress is useful for lexical disambiguation, such as Spanish (e.g., Soto-Faraco et al., 2001) and English (e.g., Cooper et al., 2002). Though lexical stress is phonologically contrastive in Spanish (*numéro* "I number" vs. *numeró* "s/he numbered") and English (*óffense* vs. *offénse*), Spanish is syllable-timed (i.e., each syllable has roughly the same duration) (Hualde, 2005; Colantoni et al. 2015), whereas English is stress-timed (i.e., the interval between stressed syllables has roughly the same duration, unstressed syllables vary) (Dauer, 1983;, Ladefoged, 2001). We use eye-tracking and gating methods to determine whether constraints of lexical stress on lexical access are language-specific or universal, and if they are language-specific, whether there is a critical period to acquire them (deficit accounts) or not (accessibility accounts). Specifically, we investigate how early and late English-Spanish bilinguals and Spanish monolinguals use lexical stress to predict verb endings in Spanish.

Twenty-five Spanish monolinguals, 27 English-Spanish HSs, and 28 English-Spanish L2 learners completed a background questionnaire, a Spanish proficiency test adapted from DELE, an oral eye-tracking task, an oral gating task, and a letter-number sequencing WM test. All groups were homogeneous in working memory and the two bilingual groups in the DELE. In the eye-tracking and the gating tasks, participants read two words on a screen, listened to sentences in Spanish, and pressed a key when they recognized which word it was. The eye-tracking task included 66 sentences: 18 practice, 32 fillers, and 16 experimental (8 per condition: paroxytone, (*canta* "s/he sings"), oxytone (*cantó* "s/he sang") (e.g., *La señora canta/cantó la canción* "The woman sings/sang the song"). The gating task contained 114 sentences: 18 entire sentences (familiarization phase), and 96 sentences cut at onset of suffix.

Growth curve analysis was used to analyze the time course fixation for lexical stress (Paroxytone, Oxytone targets) for each group (Monolinguals, Early learners, Late learners) in the eye-tracking task. The analyses revealed that all participants were accurate selecting the correct word before hearing the target suffix; however, the monolingual controls fixated on the correct target earlier in the time course and at a faster rate than the learners. The early learners fixated on the target earlier and at a faster rate than the late learners in the paroxytone condition. GLMMs with a logistic link function were used to analyze the gating data. And revealed that, while all groups predicted the target above chance, the early learners were less accurate in the paroxytone condition. These findings suggest that lexical stress is language-specific, that it can be acquired post-puberty, and that WM is associated with the use of lexical stress for lexical access.

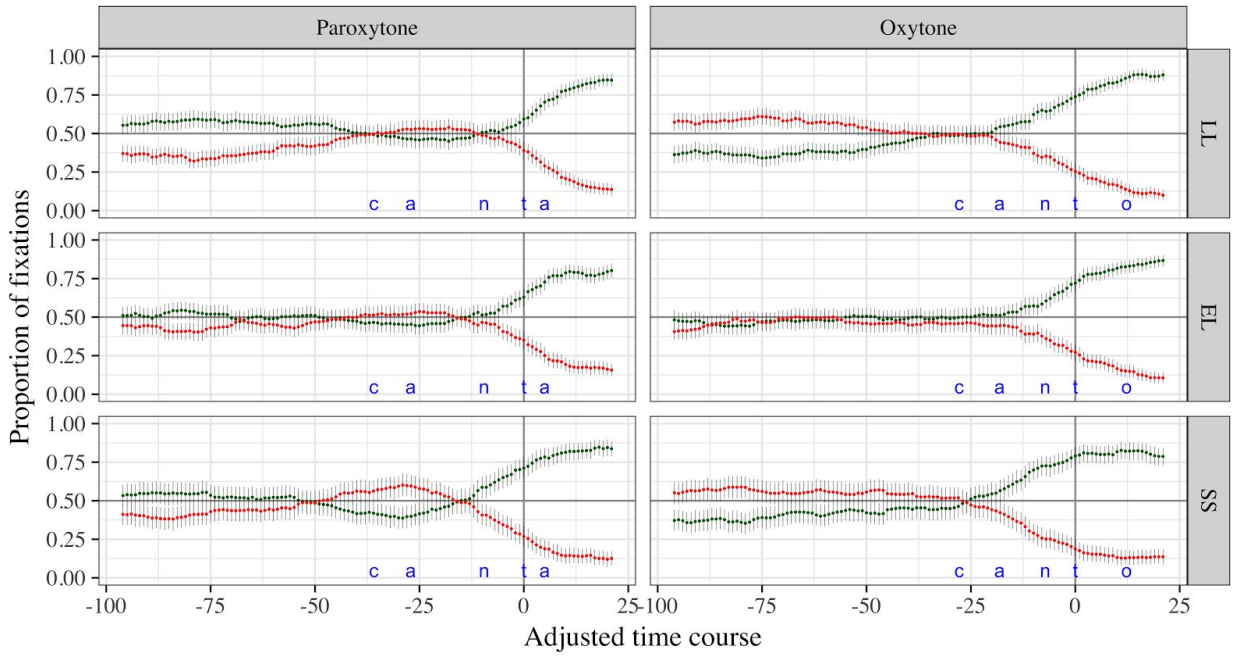

Figure 1: Proportion of fixations as a function of time (ms) for paroxytone and oxytone targets for late (LL) and early (EL) learners, as well as monolingual controls (SS). Fixations on the target are plotted in green. Distractor fixations are plotted in red. Errorbars represent 95% bootstrapped confidence intervals.