Acquisition of word-level prominence in L2 English by Canadian French speakers

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In French, prominence is usually associated to the right edge of a phonological phrase (PPh) (Jun & Fougeron, 2000; Gussenhoven, 2004). In Canadian French (CF), however, some researchers have proposed that each phonological word (PWd) in the PPh is assigned (usually final) prominence (Walker, 1984; Paradis & Deshaies, 1990). Nevertheless, because stress is not contrastive in any variety of French, speakers are considered to be “deaf” to stress contrasts in other languages (Dupoux et al., 2001), a fact which may influence speakers’ production as well. Given that word-level prominence in French is unclear, constituency within the PWd level is also disputed: Whereas some authors argue that French has foot structure (e.g., Goad and Buckley, 2006), others argue that it has no such a constituent (e.g., Jun & Fougeron, 2000; Öžçelik, 2011). English, on the other hand, has word-level stress, which is phonetically correlated with pitch and duration (Fry, 1955; Lehiste, 1976; Beckman 1986). In this language, stress is influenced by syllable weight, and extrametricality plays an important role. With regard to word-level constituency, English is a trochaic language, and feet are built iteratively (Hayes, 1982).

Given the differences between CF and English, we investigate how CF speakers adapt to the stress and rhythmic patterns in English as a second language. Specifically, we report on an experiment that examines (a) whether CF has properties related to prominence and word-internal constituency and (b) how CF speakers whose L2 is English realize English stress and rhythmic patterns. We found no substantial evidence for PWd-level prominence in Canadian French, nor for constituency within the PWd. However, in a second language context, these speakers successfully modify their existing L1 prosodic representations to accommodate the prominence patterns in English (L2). The fact that CF speakers signal both primary and secondary stress in the L2 indicates that they have acquired word-level prominence as well as word-level constituency in English.

**METHODOLOGY:** We conducted two reading experiments (French and English). In both reading tasks, a target two-word or three-word phonological phrase (PPh) was placed in final or non-final position in carrier sentences. Participants (advanced L2ers, n=6; native English speakers (controls), n=2) were recorded in a sound-proof booth. In the CF version of the experiment, the target PPhs (n=48) were formed by adjective-noun, noun-preposition-noun, and adjective-noun-adjective combinations (example in (1)). In the English version of the experiment, the target PPhs (n=200) were formed by adjective-noun, noun-preposition-noun, and adverb-adjective-noun combinations (example in (2)). All vowels in the words at both left and right edges of the target phrases were considered.

(1) Elle a vu le nouveau bâtiment pendant la leçon

(2) She saw the decent presidents before class

**ANALYSIS:** English data were manually segmented. French data were force-aligned using Milne’s (2012) SPLaligner. Later, a random sample of aligned sentences was manually checked. Duration, intensity and pitch for all vowels in the target words were extracted using a Praat script and normalized in R. The data (including controls) were modelled with mixed-effects linear regressions (lm() in R), which included by-speaker and by-item random intercepts.

**RESULTS:** The French data suggest no clear correlation between intensity and word-final prominence, as both penult (V2) and antepenult (V3) vowels show an overall higher intensity than the word-final vowel (V1). Likewise, the pitch of V1 was not significantly different from V2 and V3 (e.g., V2: $\hat{\beta} = -0.35, p = 0.20$). The differences in duration between V1 and V2-V3 are only significant if V2 is short (V1: $\hat{\beta} = 0.82, p = 0.04$; see Fig. 1). Therefore, no consistent phonetic evidence for word-level prominence nor word-internal constituency is found in the French data. The English control data, on the other hand, are
(partially) consistent with previous studies, in that duration and intensity significantly correlate with stress (duration is shown in Fig. 2). In L2 English, duration (shown in Fig. 3) is the most robust correlate of stress. In words with final stress, V2 is significantly shorter than V1 even when we account for by-item and by-speaker variation (V2: \( \beta = -1.53, \ p < 0.0001 \)). In words with penult stress, V1 and V3 are significantly shorter than V2 (V1: \( \beta = -0.72, \ p < 0.0001 \); V3: \( \beta = -0.43, \ p < 0.01 \)). The same patterns apply to antepenult stress. Pitch differences were not significant. In the English data (control and L2), position in the target phrase is also not significant. Regarding the acquisition of prominence and word-level constituency, these results indicate that these L2 speakers rely on duration to accurately realize the rhythmic patterns that are absent from their first language. CF speakers’ rhythmic patterns in English (Fig. 3) clearly mirror those in Fig. 2. In both control and L2 data, prominence alternates. This indicates that L2ers not only acquired primary stress, but also adapted their L1 representation to accommodate word-internal constituency in the L2.

References