Does initial/final accent facilitate the acquisition of rounded *vs* unrounded contrast in L2 French oral vowels?

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Introduction & Goals. The acquisition of L2 Prosody (intonation, accentuation, rhythm, etc.) and L2 segmentals (consonants and vowels) has mainly been studied separately. Most L2 phonology models such as [1] or [4] do not make clear predictions concerning the acquisition of segmentals via their interface with the prosodic structure. Yet, some studies report effects of the L1 prosodic hierarchy in the production of L2 English consonants (e.g., [3]). To the best of our knowledge, no research has studied whether prosody (via the production of accented syllables or boundary tones) has a positive/negative/null effect on L2 French vowels' accuracy. [2] claims that the production of accented syllables or final melodic contours (rising or falling) has positive effects for better perceiving and producing certain L2 French vowels. For instance, this author assumes that French vowel /y/ is better perceived and produced by L2 learners when it occurs in strong prosodic positions (when final rising/high pitch movements at the right boundaries of Accentual Phrases (AP) or rising final contours in yes-no neutral questions/major continuations are produced). However, no experimental research has been conducted in order to validate these pedagogical assumptions. In this paper, we focus on the production of L2 French rounded vs unrounded oral vowels /i/, /y/, /u/, /e/, /ɛ/, /ø/, /œ/ in two different prosodic conditions: accented vs unaccented. Our goal is to provide empirical evidence testing the alleged positive effects of prosody on the acquisition of these challenging sounds of L2 French.

Methods. We analyzed oral productions of 30 participants: 10 French native speakers (control group), 10 L2 French learners with L1 Spanish, and 10 L2 French learners with L1 English. Data comes from read aloud tasks of two different corpora designed for the analysis of L2 pronunciation [9]. We analyse different acoustic properties of 6.3k vowels. In order to examine the pronunciation accuracy of vowels, we compute the degree of acoustic overlap via *Pillai* scores [7] for the following pairs: /i/~/y/, /e/~/ø/ and /ɛ/~/œ/. *Pillai* scores allow us to estimate the amount of overlap of these vowel categories the acoustic space of participants. This metric was obtained by running MANOVAS on F1, F2, F3 and duration as dependent variables, as a function of group and prosodic condition (accented vs unaccented). For determining the presence/absence of an initial/final accent associated to left/right boundaries of AP in pre-nuclear positions, we use automatic prosodic labels provided by Polytonia and Prosogram [8] as illustrated in Fig. 1. Vowels associated to left/right boundaries of other higher prosodic constituents in French were not analysed.

Results & Discussion. In a global perspective, our results show that the production of initial/final accents at the AP's levels result in a smaller acoustic overlap of L2 French vowels. This observation suggests that prosodic strengthening observed in L1 [5] results in the production of more canonical L2 vowels as well, partially confirming claims by [2]. However, this positive effect is not observed across all vowel pairs. We found that /e/~/ø/ is better distinguished under the presence of AP's accents for two groups of learners, i.e. the rounded feature is hyper-articulated in accented positions compared to unaccented positions. However, in the case of Spanish learners, AP's accents do not seem to facilitate the distinction of /i/~/y/, contrary to English learners (cf. Figure 2). We discuss these differences under the light of the SLM [4], concerning the role of acoustic (dis-)similarity under different prosodic conditions, and the relevance of prosodic strengthening in the acquisition of new L2 features/sounds.
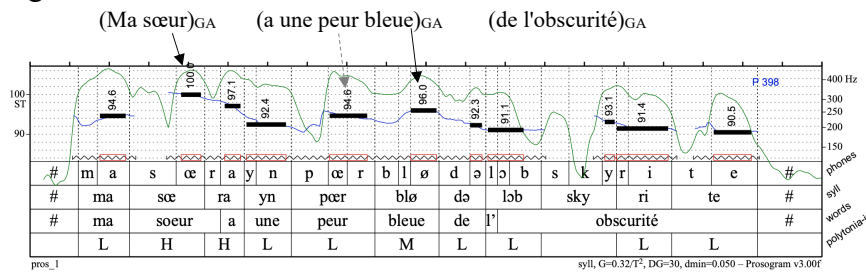
Figures

Figure 1. Prosodic annotations via Polytonia & Prosogram tools for the utterance *Ma soeur a une peur bleue de l'obscrutité* ('My sister is afraid of darkness') produced by àSpanish learner of L2 French. Initial/final accents of APs (GA) were detected for rising/high pitch contours reaching the median/high pitch range levels of speakers (H or M labels).
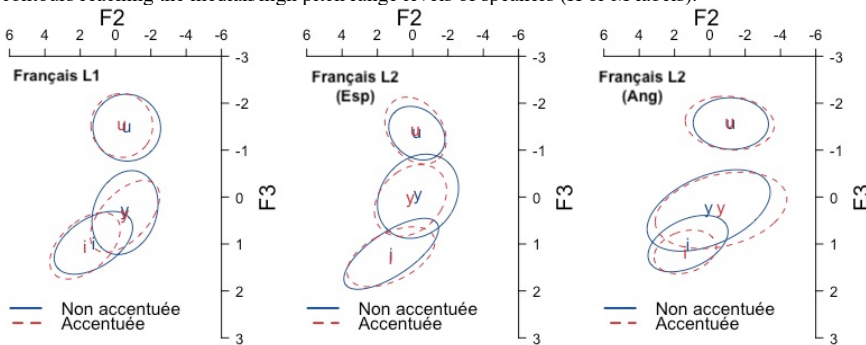

Figure 2. F2xF3 vowel charts for the set of vowels /i/,/u/,/y/ according to the three groups and the two prosodic conditions (*Non accentuée* =unaccented, *accentuée* = accented) . Ellipses account for 68% of vowel tokens dispersion.

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