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

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Introduction

Prominence in Canadian French (CF)

- Property of the phonological phrase (PHP) (like European French; e.g. [1])
- Each phonological word (PW) has final stress ([2]): [le `marais garç]on] ‘the bad boy’
- Inherently long vowels are prominent, regardless of position within PW ([2])
  - nasal vowels ([/n, ë, ð, 3]: [kled]i landi ‘Monday’
  - some oral vowels ([/a, o, r, ə]: [dœjri]normally ‘second’
  - vowels followed by /ŋ, r, v, ž:/ [zy3µni] ‘juggle’ ‘judgment’
- No evidence for alternating feet: (majority)
- Stress correlated with pitch ([3]) and duration ([3], [2])

Prominence in English

- Word-level stress is relatively predictable (e.g., [4]):
  - Nouns:
    - Default penult stress: quality, Canada
    - Heavy penultimate syllable → penult stress: agenda, Arizona
  - Complex final coda, light penultimate syllable → final stress: request, review
  - Adjectives and verbs:
  - Heavy final syllable → final stress: supreme, direct
  - No heavy final syllable → penult stress: tired, accomplish
  - Primary and secondary stresses: (a)ca(a)dic, (A)r(i)zona
- Stress correlated with pitch ([5]) and duration ([6])

Acquisition of English stress by francophones

<table>
<thead>
<tr>
<th>What we need to acquire</th>
<th>How they perform</th>
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<tbody>
<tr>
<td>– Different stress positions</td>
<td>– Preference for initial stress ([7])</td>
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<td>– Alternating rhythm</td>
<td>– Less accurate when stress is final ([8])</td>
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<tr>
<td>– Able to discriminate words based on stress (adv learners)</td>
<td>92.6% (SD = 3.8%)</td>
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</tbody>
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Objectives

- What we know: Advanced learners can accurately place English stress
- What we want to know:
  1. Do these learners acquire rhythmic patterns in English?
  2. Do they phonetically produce stress in a target-like manner?
  3. Do they transfer native CF patterns into English?

Methodology

- Two production experiments

CF experiment:

- Target phrases: adj + noun, noun + prep + noun, adj + noun + adj
- Initial and final words in target phrases were measured (n = 48)
- Carrier sentence: Elle a vu le candidat japonais (pendant la leçon) ‘She saw the Japanese candidate (during class)’
- Participants from Québec, ages 20-36 (n = 6)

English experiment

- Target phrases: adj + noun, noun + prep + noun, adv + adj + noun
- Initial and final words in target phrases were measured (n = 374)
- Target words with pre-antepenult (n = 34), antepenult (n = 136), penult (n = 106) and final (n = 98) stress
- Carrier sentence: She saw an adorable musician before class
- Two groups:
  - Advanced learners of English (same participants who did the CF experiment)
  - Native speakers of English (n = 2)
- Participants in a soundproof booth
- French data force-aligned with Milne’s SPLAligner [10] (manually checked)
- English data manually segmented
- All vowels in target words were measured for duration, F0, and intensity

Data and Results

- Accuracy in stress placement by learners: 92.6% (SD = 3.8%)
- Only accurately produced words were included in the analysis
- Data modelled using hierarchical linear regressions in R
- By-speaker random effects (vowel position) and by-item random intercept

L1 French

- Figure 1: Normalized duration of different vowels in target words – L1 French. ‘Long’ and ‘short’ refer to V2.
- Figure 2: Normalized pitch of different vowels in target words – L1 French.

L1 English

- Figure 3: Normalized duration of different vowels in target words by stress position – L1 English.

L2 English

- Figure 4: Normalized duration of different vowels in target words by stress position – L2 English.

Conclusions

- In our data, no evidence for any specific rhythmic patterns in L1 French, although pitch shows a trend
- Advanced learners of English are able to
  - Produce alternating rhythmic patterns
  - Use the same acoustic patterns as native speakers to signal stress (plus pitch)
- Learners adapt their prosodic representations to accommodate word-internal constituency in the L2

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References