Abstract
The present research aims at examining whether native Spanish speakers transfer some accentual properties from Spanish to French L2. Given that the main accentual difference between French and Spanish lies in the stress domain (supra-lexical vs lexical; e.g. Quilis, 1993; Lacheret & Beaugendre, 1999), we studied the production of nouns in a stressed position within the accentual phrase and adjectives produced in an unstressed position. Then, as the syllabic structure might indicate the position of stress in Spanish (e.g. amo /'amo/ vs amar /a'mar/), we studied the realization of stimuli ending with open and closed syllables. Eight native speakers of French and 8 Spanish advanced learners of French produced French sentences in which pseudowords played the role of a noun in a stressed position (e.g. un certain poutila || piquait tous les touristes) or the role of an adjective in an unstressed position (e.g. un poutila pic || était très utile). Each CV.CV.CV pseudoword (e.g. poutila) was presented in its CV.CV.CVC counterpart (e.g. pouitilar). For each vowel of each sentence, we extracted the duration (in ms), the mean [...]

Reference

Available at:
http://archive-ouverte.unige.ch/unige:28677

Disclaimer: layout of this document may differ from the published version.
Acoustic correlates of French accentuation in advanced Spanish learners of French

Sandra Schwab
Université de Genève

New Sounds 2013
Concordia University, Montreal
May 17-19, 2013
Plan

- Introduction
- Accentual transfer from Spanish to French L2?
  - Goals
  - Method
  - Results
- Conclusion
Introduction
Accentual differences between French and Spanish

French:

- Fixed-stress language: stress on the final syllable of the accentual phrase
- Not distinctive but delimitating function
- Syncretism between accentuation and intonation

Example:

[Un certain moustique] [piquait tous les touristes].
(A mosquito bit all the tourists)

Jun & Fougeron, 2002; Vaissière, 2002; Lacheret-Dujour & Beaugendre, 1999; Rossi, 1979; Quilis, 1993
Accentual differences between French and Spanish

Spanish:
- Free-stress language
- Stress realized at the **word level**
- Distinctive function
  
  E.g. número ['numero] - numero [nu'mero] - numeró [nume'ro]
  
  *(number - I number - he/she numbered)*

Example:

Al**gu**na mu**jer** cruz**aba** la **calle**.

*(A woman crossed the street)*

Jun & Fougeron, 2002; Vaissière, 2002; Lacheret-Dujour & Beaugendre, 1999; Rossi, 1979; Quilis, 1993
Accentual differences between French and Spanish

Spanish:
- Position of stress
  - Written accent (e.g. número ['numeɾo])
  - Structure of the final syllable:
    - Closed syllable (CVC): stress on the final syllable
      E.g. papel (paper), hablar (talk)
    - Open syllable (CV) or –n/–s: stress on the penultimate syllable
      E.g. febrero (february), hablan (they talk), rosas (roses)

Jun & Fougeron, 2002; Vaissière, 2002; Lacheret-Dujour & Beaugendre, 1999; Rossi, 1979; Quilis, 1993
Accentual differences between French and Spanish

- Acoustic correlates of stress
- Changes or contrasts in duration, fundamental frequency (F0) and intensity

<table>
<thead>
<tr>
<th></th>
<th>French</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td></td>
<td>Duration</td>
</tr>
<tr>
<td>F0</td>
<td></td>
<td>F0</td>
</tr>
<tr>
<td>Intensity</td>
<td></td>
<td>Intensity</td>
</tr>
</tbody>
</table>

Delattre, 1938; Léon, 2007; Vaissière, 1991; Quilis, 1981; Garrido, et al., 1995; Listerri et al., 1995; Listerri et al. 2011
Accentual transfer from Spanish to French L2?
Goals

- To examine whether native Spanish speakers transfer some accentual properties from Spanish to French L2

- Two variables are taken into account:
  - Context in which the word appears in the accentual phrase (noun/adjective)
  - Structure of the final syllable of the word (CV/CVC)
Participants

- 8 native speakers of French from Geneva ("French")

- 8 native Spanish advanced learners of French (B2-C1) from Spain, living in Geneva ("Spanish")
18 trisyllabic French pseudowords CV.CV.CV (CV condition)

- Initial consonant: /p/, /t/, /k/
- Vowels: /i/, /a/, /u/
- Consonants in medial and final syllable: /p/, /t/, /k/, /m/, /n/, /l/

E.g. poutila, talicou, caloupi, etc.
Material

- 18 trisyllabic French pseudowords **CV.CV.CVC** (CVC condition)
  - Final consonant: /R/ or /l/

  E.g. *poutilar, talicour, caloupil*, etc.

⇒ 36 pseudowords
Material

• 6 carrier sentences (3 pairs)
  • Pseudoword = **noun**
    • Stressed position within the accentual phrase
      E.g. Un certain *poutila ||* piquait tous les touristes.
        (Some poutila bit all the tourists)
  • Pseudoword = **adjective**
    • Unstressed position within the accentual phrase
      E.g. Un *poutila pic ||* était très utile.
        (A poutila pick was very useful)

⇒ 72 sentences
Procedure

- Individual recordings
- Two parts: nouns and adjectives
- Presentation of the pseudoword in isolation and in the carrier sentence (on a computer screen)
- Reading at a natural rate
Data analysis

- Automatic alignment with EasyAlign and manual verification (Goldman, 2011)

- Exclusion of productions with a pause after the pseudoword (6% of the data)

- For each of the vowel, extraction of:
  - Duration (ms)
  - F0 mean value (Hz)
  - Intensity maximal value (dB)
Data analysis

- Normalization of the data with z-score values (within each sentence)

\[
z\text{-score} = \frac{\text{targetVowel} - \text{meanVowel}}{\text{standard deviation}}
\]

\[\Rightarrow\] Parameter expressed in standard deviations

- For each production, calculation of articulation rate in syll/sec
Data analysis

- Statistical analyses (mixed-effects models)
  - Separate analyses for Nouns and Adjectives
  - Predictors:
    - Vowel (V1, V2, V3)
      - Un certain p ou t i l a piquait tous les touristes.
      - Un p ou t i l a pic était très utile.
    - Syllabic structure (CV/CVC)
    - Group (French/Spanish speakers)
  - Control of articulation rate
Predictions

Context

Nouns
- French = Spanish
- panoukir = panoukir

Adjectives
- French ≠ Spanish
- panoukir ≠ panoukir

Separate analysis for Nouns and Adjectives
Predictions

Syllabic structure

CV

French ≠ Spanish
poutil ≠ poutil

CVC

French = Spanish
poutilar = poutilar

Interaction Syllabic structure x Vowel x Group
Results

- **Dependent variables:**
  - Duration
  - F0
  - Intensity

- **Predictors:**
  - Vowel (V1, V2, V3)
  - Syllabic structure (CV, CVC)
  - Group (French, Spanish speakers)
Results

- **Dependent variables:**
  - **Duration**
  - F0
  - Intensity

- **Predictors:**
  - Vowel (V1, V2, V3)
  - Syllabic structure (CV, CVC)
  - Group (French, Spanish speakers)
Results

- **Dependent variables:**
  - Duration
  - F0
  - Intensity

- **Predictors:**
  - Vowel (V1, V2, V3)
  - Syllabic structure (CV, CVC)
  - Group (French, Spanish speakers)
Duration – Nouns

- Main effects
  - Vowel \((F(2, 1569) = 809.22, p < .001)\)

- Interactions
  - Syllabic structure x Vowel x Group \((F(2, 1569) = 6.14, p < .01)\)
  - Vowel x Group \((F(2, 1569) = 7.48, p < .001)\)
  - Syllabic structure x Group \((F(1, 1569) = 13.03, p < .001)\)
Duration – Nouns

● Main effects
  ● Vowel \( (F(2, 1569) = 809.22, p < .001) \)

● Interactions
  ● Syllabic structure x Vowel x Group
    \( (F(2, 1569) = 6.14, p < .01) \)
  ● Vowel x Group \( (F(2, 1569) = 7.48, p < .001) \)
  ● Syllabic structure x Group \( (F(1, 1569) = 13.03, p < .001) \)
Duration – Nouns

Interaction Syllabic structure x Vowel x Group

The differences between French and Spanish speakers are not similar in CV and in CVC pseudowords
Duration – Nouns

Un certain poutila || piquait...

 Speakers

French

Spanish

 Duration (z-score)

v1

v2

v3
Duration – Nouns

Un certain poutila || piquait...

Speakers

Duration (z-score)
French and Spanish speakers present a progressive lengthening
Spanish speakers present a larger duration increase from V2 to V3 than French speakers.
Spanish speakers present a longer V3 than French speakers
Duration – Nouns

Un certain **poutilair** || piquait...

![Graph showing duration for nouns in French and Spanish speakers with z-scores.](image-url)
French and Spanish speakers present a progressive lengthening
French and Spanish speakers present a similar duration increase from V2 to V3.
Duration – Adjectives

- **Main effects**
  - Syllabic structure \( (F(1, 1592) = 5.78, p < .05) \)
  - Vowel \( (F(2, 1592) = 244.48, p < .001) \)

- **Interactions**
  - Vowel x Group \( (F(2, 1592) = 14.15, p < .001) \)
  - Syllabic structure x Vowel \( (F(2, 1592) = 3.32, p < .05) \)
The differences between French and Spanish speakers are similar in CV and in CVC pseudowords.
Duration – Adjectives

- **Main effects**
  - Syllabic structure \( (F(1, 1592) = 5.78, p < .05) \)
  - Vowel \( (F(2, 1592) = 244.48, p < .001) \)

- **Interactions**
  - Vowel x Group \( (F(2, 1592) = 14.15, p < .001) \)
  - Syllabic structure x Vowel \( (F(2, 1592) = 3.32, p < .05) \)
Duration – Adjectives

CV and CVC

Un poutilapoutilar pic || était …
Duration – Adjectives

CV and CVC

Un poutil/poutilar pic || était …

French and Spanish speakers present a progressive lengthening
Spanish speakers present a larger duration increase from V2 to V3 than French speakers
Spanish speakers present a marginally longer V3 than French speakers.
Duration – Summary

- Syllabic structure (CV/CVC) and Context (Noun/Adjective) do not have the expected different effect in French and Spanish speakers.

- In comparison with French speakers, Spanish speakers lengthen in a larger extent the pseudoword's final vowel (except in CVC nouns).
F0 – Nouns

- Dependent variables:
  - Duration
  - F0
  - Intensity

- Predictors:
  - Vowel (V1, V2, V3)
  - Syllabic structure (CV, CVC)
  - Group (French, Spanish speakers)
F0 – Nouns

- Main effects
  - Syllabic structure \( (F(1, 1581) = 5.91, p < .05) \)
  - Vowel \( (F(2, 1581) = 865.66, p < .001) \)

- Interactions
  - Vowel x Group \( (F(2, 1581) = 218.81, p < .001) \)
  - Syllabic structure x Group \( (F(1, 1581) = 10.49, p < .01) \)
  - Syllabic structure x Vowel \( (F(2, 1581) = 20.10, p < .001) \)
No interaction
Syllabic structure x Vowel x Group

The differences between French and Spanish speakers are similar in CV and in CVC pseudowords
F0 – Nouns

- **Main effects**
  - Syllabic structure \( (F(1, 1581) = 5.91, p < .05) \)
  - Vowel \( (F(2, 1581) = 865.66, p < .001) \)

- **Interactions**
  - Vowel x Group \( (F(2, 1581) = 218.81, p < .001) \)
  - Syllabic structure x Group \( (F(1, 1581) = 10.49, p < .01) \)
  - Syllabic structure x Vowel \( (F(2, 1581) = 20.10, p < .001) \)
F0 – Nouns

CV and CVC

Un certain poutila/poutilar || piquait…

Bar chart showing F0 (z-score) for French and Spanish vowels:

- F0 for French:
  - v1: 0.6
  - v2: 0.4
  - v3: 0.2

- F0 for Spanish:
  - v1: 1.8
  - v2: 1.6
  - v3: 1.4
French and Spanish speakers present a similar F0 pattern.
F0 – Nouns

CV and CVC

Un certain poutila/poutilar || piquait…

Spanish speakers present a larger F0 increase from V2 to V3 than French speakers
Spanish speakers present a higher F0 in V3 than French speakers.
F0 – Adjectives

- **Main effects**
  - Syllabic structure  \( (F(1, 1595) = 19.13, p < .001) \)
  - Vowel  \( (F(2, 1595) = 361.22, p < .001) \)

- **Interactions**
  - Vowel x Group  \( (F(2, 1595) = 44.97, p < .001) \)
F0 – Adjectives

No interaction
Syllabic structure \( \times \) Vowel \( \times \) Group

The differences between French and Spanish speakers are similar in CV and in CVC pseudowords.
F0 – Adjectives

- Main effects
  - Syllabic structure \( (F(1, 1595) = 19.13, p < .001) \)
  - Vowel \( (F(2, 1595) = 361.22, p < .001) \)

- Interactions
  - Vowel x Group \( (F(2, 1595) = 44.97, p < .001) \)
F0 – Adjectives

CV and CVC

Un poutila/poutilar pic || était …

![Graph showing F0 (z-score) for French and Spanish adjectives with different vowels (v1, v2, v3).]
French and Spanish speakers present a similar F0 pattern.
Spanish speakers present a smaller F0 decrease from V2 to V3 than French speakers.
F0 – Summary

- Syllabic structure (CV/CVC) and Context (Noun/Adjective) do not have the expected different effect in French and Spanish speakers.

- In comparison with French speakers, Spanish speakers produce a higher F0 on the pseudoword's final vowel in nouns (but not in adjectives).
Conclusion
Conclusion

- Syllabic structure (CV/CVC) and Context (noun/adjective) do not play a different role in French and Spanish speakers.

⇒ Absence of accentual transfer from Spanish to French L2
  ⇒ Advanced learners of French
Conclusion

- In comparison with French speakers, Spanish speakers tend to mark in a larger extent the pseudoword's final vowel.
  - Noun context (stressed): duration and F0
  - Adjective context (unstressed): duration
Conclusion

- Noun context
  
  *Un certain *poutil*a /// piquait tous les touristes.*

  $\Rightarrow$ Stress or prosodic boundary?

- Adjective context
  
  *Un *poutil*a *pic /// était très utile.*

  $\Rightarrow$ Word stress?
Advanced Spanish learners of French have **acquired** the knowledge that the position of stress is **fixed** in French (i.e. on the final syllable).

They have **not totally acquired** the knowledge that stress is realized in French at the level of the **accentual phrase**, and not at the word level, as in Spanish.
Conclusion

- Perspectives

  - Different impact of the syllabic structure on duration in French and Spanish speakers
    - Similar study in Spanish

  - Combination of the acoustic parameters

  - Competence in L2
Thanks to…

Maria Ángeles Barquero
Isabelle Racine
Françoise Zay

Mathieu Avanzi
Lorraine Baqué
José Maria Lahoz

Research funded by the Swiss National Science Foundation
(100012_132144/1, dir: I. Racine)