Phonological acquisition in CLIL- and non-CLIL-education

Laurent Rasier, Université de Liège
Philippe Hiligsmann, Université catholique de Louvain

Laurent.Rasier@ulg.ac.be
Philippe.Hiligsmann@uclouvain.be
Outline of the talk
1. The Belgian linguistic landscape
2. CLIL vs. non-CLIL in Belgium
3. L2 phonological acquisition (L1 French > L2 Dutch)
4. Research outline
5. Results
6. Discussion and conclusion
1. The Belgian linguistic landscape

Belgium =
3 unilingual areas &
1 bilingual area

- Flemish community: 60% of population
- French-speaking community: 40% of population
- German community: less than 1% of population

Principle of territoriality

Brussels: 1 million inhabitants
2. CLIL- vs. non-CLIL (in Belgium)

- **Content and Language Integrated Learning (CLIL)** = the teaching of some curricular subjects such as history, geography, and science, through the medium of a new target language

- Long history in Canada (first introduced in the 1960’s), but much more recent phenomenon in the Belgian context (first school: Lycée de Waha in Liège 1989, official recognition in 1998)
2. CLIL- vs. non-CLIL (in Belgium)

- Huge success: ± 300 schools, ± 30000 pupils
- In the Belgian context, CLIL coexists with traditional education (= non-CLIL)
  - More than 60% pupils choose Dutch as CLIL language, 39% English, and 1% German
  - More than 60% non-CLIL pupils follow English as L2, about 35% follow Dutch as L2 (Dutch is compulsory in Brussels)
- Differences in terms of organisation, methods, goals
<table>
<thead>
<tr>
<th><strong>Non-CLIL-education</strong></th>
<th><strong>CLIL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Starting age</strong></td>
<td><strong>Starting age</strong></td>
</tr>
<tr>
<td>- End of primary school or beginning of secondary school</td>
<td>- Nursery school, primary school, secondary school</td>
</tr>
<tr>
<td><strong>Amount of teaching time</strong></td>
<td><strong>Amount of teaching time</strong></td>
</tr>
<tr>
<td>- 2h/week (last two years of primary school)</td>
<td>- 50-75% of L2 curriculum</td>
</tr>
<tr>
<td>- 4h/week (secondary school)</td>
<td>- Early vs. late immersion</td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
<td><strong>Teachers</strong></td>
</tr>
<tr>
<td>- Non-native speakers with specific training</td>
<td>- Native speakers (curricular subjects)</td>
</tr>
<tr>
<td></td>
<td>- Non-native speakers (French, L2 support)</td>
</tr>
<tr>
<td><strong>Methods</strong></td>
<td><strong>Methods</strong></td>
</tr>
<tr>
<td>- Communicative approach focussing on skills (rather than knowledge)</td>
<td>- Curricular subjects taught in L2 and L1 + traditional L2 acquisition classes (support)</td>
</tr>
<tr>
<td><strong>Goal</strong></td>
<td><strong>Goal</strong></td>
</tr>
<tr>
<td>- Functional bilingualism (B1)</td>
<td>- Additive bilingualism</td>
</tr>
</tbody>
</table>
2. CLIL- vs. non-CLIL (in Belgium)

- Results of CLIL vs. non-CLIL in terms of L2 proficiency:
  - More specific results:
    - Receptive skills: (near-)native (Genese 1987)
    - Productive skills: more erratic results (Ruiz de Zarobe 2011)
      - Global scale: more fluent in L2
      - Formal aspects: still (largely) non-native
2. CLIL- vs. non-CLIL (in Belgium)

• Still not totally clear to what extent and in what respect(s) CLIL learners show increased language gains compared to non-CLIL learners (Dalton-Puffer 2011, Lasagabaster 2008).

• The reason why in recent years, voices have even started downplaying the conclusions drawn from CLIL research (see Bruton 2011, Ruiz de Zarobe 2011).
3. Phonological acquisition in CLIL- and non-CLIL L2 learners (L1 French > L2 Dutch)

- Despite its high communicative potential, phonology is not a popular subject in L2 teaching, especially in the context of L2 Dutch in Belgium

- Poor results as far as non-CLIL-learners are concerned:
  - Individual sounds (Hiligsmann 1998)
  - Voice assimilation (Baelen 2011)
3. Phonological acquisition in CLIL- and non-CLIL L2 learners (L1 French > L2 Dutch)

- Few comparative data available on the L2 acquisition of phonology in CLIL, especially in the context of L2 Dutch

- Dalton Puffer (2008: 5, 2011: 187) claims that CLIL has little or no influence on L2 learners’ phonology
4. Research outline

- Starting from Dalton Puffer’s hypothesis, we investigated three phonological variables in advanced francophone CLIL- and non-CLIL-learners of Dutch (L2):
  - Voice assimilation
  - Word stress
  - Pitch accent
- Those variables were chosen because they do not have the same behaviour in Dutch and French and are generally difficult for French-speaking L2 learners of Dutch (see Hiligsmann 1998, Hiligsmann & Rasier 2007 for overviews of the phonological problems of francophone learners of Dutch)
4. Research outline

• Specific research questions:
  - Is it really the case that CLIL has no influence on the L2 learners’ acquisition of phonology?
  - Do we find the same types of phonological difficulties among CLIL- and non-CLIL learners of L2 Dutch?
  - Are there differences between segmental and supra-segmental/prosodic variables?
4. Research outline

- These issues are investigated in a series of case studies which relate to a larger ARC-project *Assessing Content and Language Integrated Learning (CLIL): Linguistic, Cognitive, and Educational Perspectives* (spokesman: Ph. Hiligsmann)

- Profile of the target populations of L2 learners:
  1) French-speaking learners of Dutch in a late immersion setting who have been learning Dutch for 5-6 years
  2) French-speaking learners of Dutch in a non-CLIL setting who have been learning Dutch for 5-6 years

- Both groups took a L2 proficiency test to estimate their proficiency level in Dutch (B1 in terms of the *CEFR*)
5. Results: study 1: voice assimilation

- Progressive voice assimilation: /f, υ, k, p, s, t, v, X, z/ + /υ, v, z/ → 2 voiceless consonants (= devoicing process)
- 20 participants (10 CLIL- and 10 non-CLIL-learners), last year of secondary school, i.e. L2 Dutch classes for 6 years
- Shadowing experiment (see also Baelen 2011)
  - The learners have to repeat a sentence they hear through headphones and in which the target phonemes are masked by noise, e.g. De prinses vist een boek uit haar tas
- 9 x 3 phonemes = 27 combinations which were placed in carrier sentences in which the progressive voice assimilation always takes place between the subject and the main verb.
5. Results: study 1: voice assimilation

- No significant difference between CLIL/non-CLIL
- Progressive voice assimilation is difficult for both CLIL- and non-CLIL-learners
5. Results: study 1: voice assimilation

• Hierarchy in terms of difficulty: \( \gamma < z < v \) as second phoneme
  – CLIL-learners get slightly better results for \( /\gamma/ \) and \( /v/ \) than non-CLIL-learners (\( /\gamma/ : 45,5\% \) vs. \( 40,6\% \); \( /v/ : 17,3\% \) vs. \( 9,1\% \)).

• Same general pattern in the two group of learners, although we also see a slightly different error distribution
5. Results: study 1: voice assimilation

**CLIL-learners**

- Most frequent types of errors:
  - **Hypercorrection** (48% vs. 42%): the learners produce the sounds according to the orthography and do assimilate (= devoice) C2
  - **Negative transfer** (15.5% vs. 16%): the learners assimilate in the regressive direction (= voicing of C2 instead of devoicing)
  - **Disfluency** (19% vs. 26%): the learners produce a pause between C1-C2

**Non-CLIL-learners**

- Contrary to what could be expected, negative transfer is not the main cause of errors in both groups of learners
5. Results: study 1: voice assimilation

- Progressive voice assimilation is difficult for CLIL- and non-CLIL-learners (27% vs. 23% of correct instances)
- Same hierarchy in terms of difficult phoneme combinations, i.e. ꞏ < z < v as target phoneme, although CLIL-learners do get slightly better results for /v/ and /γ/ than non-CLIL-learners
- Same causes of errors, but in slightly different proportions: hypercorrection, negative transfer, disfluency
- These results seem to confirm Dalton Puffer (2008, 2011)’s hypothesis that CLIL has no influence on phonological skills
5. Results: study 2: word stress
   • Word stress production in Dutch endocentric compounds, e.g. *aardappel, gevangenisstraf, toneelstuk*
   • 60 target words embedded in carrier sentences (question-answer pairs), always in a [+ focus]-position/context
   • 83 participants (40 non-CLIL- and 43 CLIL-learners) with the same profile and L2 proficiency level as in the previous study
5. Results: study 2: word stress

<table>
<thead>
<tr>
<th></th>
<th>CLIL</th>
<th>Non-CLIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct stress</td>
<td>48.42% (1249)</td>
<td>19.67% (471)</td>
</tr>
<tr>
<td>Correct word part, wrong syllable</td>
<td>4.41% (114)</td>
<td>1.05% (25)</td>
</tr>
<tr>
<td>Incorrect stress</td>
<td>47.17% (1217)</td>
<td>79.28% (1898)</td>
</tr>
<tr>
<td>Total</td>
<td>100% (2580)</td>
<td>100% (2394)</td>
</tr>
</tbody>
</table>

- Correct word part cq. syllable is stressed significantly more often by CLIL-learners than by non-CLIL-learners
- Despite their better results, the stress production of CLIL-learners cannot be characterized as ‘near-native’ or ‘nativelike’
5. Results: study 2: word stress

<table>
<thead>
<tr>
<th></th>
<th>CLIL-learners</th>
<th>Non-CLIL-learners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stress pattern in target word</td>
<td>Stress pattern in target word</td>
</tr>
<tr>
<td>1st part</td>
<td>Correct stress 46,96% (1151)</td>
<td>Correct stress 17,41% (396)</td>
</tr>
<tr>
<td></td>
<td>Correct word part, wrong syllable</td>
<td>Correct word part, wrong syllable</td>
</tr>
<tr>
<td></td>
<td>3,84% (94)</td>
<td>0,97% (22)</td>
</tr>
<tr>
<td>2nd part</td>
<td>Correct stress 75,97% (98)</td>
<td>Correct stress 62,50% (75)</td>
</tr>
<tr>
<td></td>
<td>Correct word part, wrong syllable</td>
<td>Correct word part, wrong syllable</td>
</tr>
<tr>
<td></td>
<td>15,50% (20)</td>
<td>2,50% (3)</td>
</tr>
<tr>
<td>Incorrect stress</td>
<td>49,20% (1206)</td>
<td>Incorrect stress 81,62% (1856)</td>
</tr>
<tr>
<td>Total</td>
<td>100% (2451)</td>
<td>Total 100% (2274)</td>
</tr>
</tbody>
</table>

- Same general pattern in both populations, i.e. stress on the 2nd part of the compound is easier than stress on the 1st part (> French)
- CLIL better than non-CLIL but still far from ‘nativelike’
5. Results: study 2: word stress

• Length of the compound
  – The longer the compound, the more mistakes non-CLIL-learners make > CLIL-learners = not necessarily more mistakes when they have to produce long(er) compound

• Types of errors
  – Same categories in the two groups of learners, though in slightly different proportions:
    • **Multiple stresses**, whereby the learners emphasizes two (or more) syllables in one and the same compound
    • **Stress shift**, whereby the main stress is shifted (1) from the left to the right or (2) from the right to the left
5. Results: study 2: word stress

### Multiple stresses

<table>
<thead>
<tr>
<th></th>
<th>CLIL</th>
<th>Non-CLIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 stresses</td>
<td>100% (89)</td>
<td>97.45% (662)</td>
</tr>
<tr>
<td>3 stresses</td>
<td>0% (0)</td>
<td>2.36% (16)</td>
</tr>
<tr>
<td>4 stresses</td>
<td>0% (0)</td>
<td>0.19% (1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100% (89)</td>
<td>100% (679)</td>
</tr>
</tbody>
</table>

### Stress shift

<table>
<thead>
<tr>
<th></th>
<th>CLIL</th>
<th>Non-CLIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st → 2nd part</td>
<td>99.03% (1117)</td>
<td>98.36% (1199)</td>
</tr>
<tr>
<td>2nd → 1st part</td>
<td>0.97% (11)</td>
<td>1.64% (20)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100% (1128)</td>
<td>100% (1219)</td>
</tr>
</tbody>
</table>

- Multiple stresses: rarely more than 2 stresses per word in both groups
- Stress shift: shift from the 1st to the 2nd part of the compound in both groups so that the stress lies on the last syllable of the final part (> French final stress) (± 73% of the cases in the two groups)
5. Results: study 2: word stress

- CLIL-learners outperform non-CLIL-learners as far as stress production is concerned
- CLIL-learners’ production of L2 Dutch stress does not reach (near-)native level

Factors influencing L2 production:
- Cognitive factors: L1 influence (cf. word final pattern)
- Linguistic factors: Type of stress pattern, word length
5. Results: study 3: pitch accent

- Pitch accent production and perception
  - Perception test: identification of accented words in a dialogue
  - Production test: pitch accent assignment in a reading task, a picture description task, and a discussion

- 25 participants (16 non-CLIL- and 9 CLIL-learners) with the same profile and L2 proficiency level as in the previous study
5. Results: study 3: pitch accent

- **Perception experiment:**
  - Higher identification rates for CLIL-learners than for non-CLIL-learners (see also Rasier 2011), L1 influence noticeable in both groups (final pattern)

- **Production experiment (picture description task):**
  - Tendency to produce a pattern with an accent in NP-initial and -final position (cf. French « arc accentuel »; see also Rasier 2006, 2011) but more variation among CLIL-learners than among non-CLIL-learners
  - Influence of pauses on non-CLIL-learners’ pitch accent assignment

- **Factors affecting L2 pitch accent**
  - Perception > production (both groups)
  - Production: little influence of the type of task on CLIL-learners’ production, non-CLIL-learners make more mistakes in the discussion and text-reading task than in the sentence-reading task
  - Link between the quality of the accentuation and the presence/absence of pauses in the NP (= fluency)
6. Discussion and conclusion

- In terms of production correctness, the CLIL-learners outperformed the non-CLIL-learners for the 3 phonological variables.
- The CLIL-learners do not reach native level of performance on any variable (Dalton Puffer 2008, 2011)
  - Even in an input-rich environment, native(like) level of L2 phonological performance is not achieved automatically
- Influence of various factors:
  - Cognitive factors: L1, hypercorrection (‘spelling pronunciation’)
  - Linguistic factors: disfluencies, word length, articulatory features of individual sounds
- More explicit and contrastive attention to (phonological) form is needed, even in CLIL (Kupfberg & Ohlstain 1996)
Thanks for your attention!

Contact:
Laurent Rasier: laurent.rasier@ulg.ac.be
Philippe Hiligsmann: philippe.hiligsmann@uclouvain.be


