

Musicians vs. non-musicians: who produces sentence stress better?

Analysis of fundamental frequency and syllable duration in a negative sentence among French-speaking learners of Dutch

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1. French vs. Dutch

FUNDAMENTAL PROSODIC DIFFERENCES (STRESS PATTERNS)	
FRENCH (demarcative function)	DUTCH (contrastive function)
Post lexical stress at the end of words and at the end of syntactic constituents (<i>accent primaire</i> ; Di Cristo, 2000: 28)	Lexical word stress change the meaning of a word (Rietveld & Van Heuven, 2016: 284)
	Sentence stress produced on contrasted or important word(s) in sentence (Rasier & Hilgsmann, 2007: 50)

Main acoustic correlates

- **Post lexical stress** (in French): increase in fundamental frequency (F_0) & syllable duration
- **Sentence stress** (in Dutch): F_0 -increase of more than 4 semitones, 10% to 15% longer syllable duration, greater intensity (Van Heuven, 2018: 31-32)

Interphonology

Prosodic errors linked to transfer from L1 to L2

- (Rasier & Hilgsmann, 2007: 43-44) are e.g.,
- Inappropriate use of prosody and in wrong context
 - Erroneous phonetic realisation

Interlanguage L1 FR L2 NL

Tendency to **stress the end of a (negative) sentence** (Hilgsmann & Rasier, 2007: 161)

- (1) L1 French: *Je ne sais pas.*
- (2) L1 Dutch: *Ik weet het niet.*
- (3) L2 Dutch: **Ik weet het niet.* (English translation: 'I don't know')

2. Musical training and prosody

Music and prosody:
• share acoustic features (e.g., frequency, duration, intensity; Degraeve, 2021)
Music :
• helps in the prosody acquisition of a foreign language

Stress perception

- Positive effect of a melody or pulsation use (Degraeve, 2022)
- Musicians or learners with musical aptitude score better than the others (Kolinsky, et al. 2009; Degraeve, 2022)

Stress production

- Better reproduction of musical rhythms as predictor of more successful production of (unknown) L2-prosody (Cason, et al., 2020)
- BUT** musicians do not pronounce word stress significantly better than non-musicians (Hooreman, 2023)

3. Research question

Do French-speaking musicians pronounce sentence stress acoustically better than French-speaking non-musicians in the Dutch negative sentence *Ik weet het niet* ('I don't know')

4. Methodology

Participants

18 musicians + 17 non-musicians

- Conditions:
- have taken at least 5 years of music lessons at a music school;
 - still play (or sing) music regularly.

Material

Picture description task of 9 geometrical figures (Rasier & Hilgsmann, 2007; Dejangs & Degraeve, 2022)

- 7 elicited noun phrases across 4 informational contexts (NN, CG, GC, CC)
- **2 fillers** eliciting *Ik weet het niet* 'I don't know' (**70 sentences in total**)
 - 36 sentences (musicians)
 - 34 sentences (non-musicians)

Acoustic analysis

Through **Prosograms** (Mertens, 2022) on **PRAAT** (Boersma & Weenink, 2025)



5. Results & Discussion

Fundamental frequency (F_0)

Step 1: Looking for increase in F_0 (more than 4 semitones)

- Musicians = 7 observations
- Non-musicians = 8 observations

Step 2: Looking for intrasyllabic increase in F_0 (more than 4 semitones)

- Musicians = 1 observation
- Non-musicians = 5 observations

Step 3: Looking for intrasyllabic increase in F_0 (more than 4 semitones) on the verb form (2nd syllable)

- No observation in both groups
- **In ALL observations, negation (4th syllable) is stressed**

Syllable duration

Looking at the intrasyllabic increase in F_0 (more than 4 semitones) on the 4th syllable

- **In ALL observations, 4th syllable is 10% to 15% longer**

	Syllable 1 (ms)	Syllable 2 (ms)	Syllable 3 (ms)	Syllable 4 (ms)
Non-musician	0,182	0,196	0,183	0,422
Non-musician	0,148	0,129	0,139	0,345
Non-musician	0,213	0,179	0,173	0,381
Non-musician	0,17	0,15	0,181	0,417
Non-musician	0,188	0,121	0,133	0,461
Musician	0,158	0,149	0,163	0,33

In the present dataset the French-speaking musicians do not acoustically better pronounce the negative sentence *Ik weet het niet* ('I don't know') than the French-speaking non-musicians. All observations of intrasyllabic F_0 -increase in more than 4 semitones stressed the negation *niet* 'not' (4th syllable) instead of the expected verb form *weet* 'know' (2nd syllable), but the syllable duration of the former is well 10% to 15% longer.

6. References

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