

Stress Clash Resolution in the Light of French corpora

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Stress Clash in French

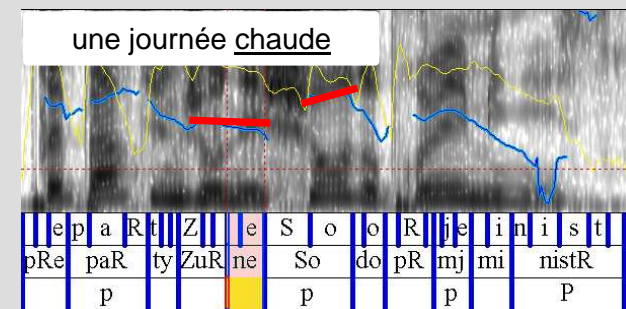
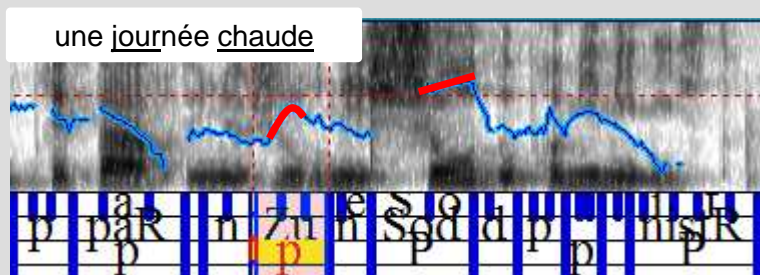
- In French, **Stress Clash** is traditionally defined as the occurrence of **two adjacent primary accents**
 - Il ne dort pas [Verluyten 1982: 123]
 - Un beau vase [Rossi 1979: 15]
 - La fille a pris des haricots verts [Dell 1984: 84]
 - Un soulier noir [Martin 1987: 927]

Stress Clash in French

- Since they violate the alternation between weak and strong syllables, **stress clashes** tend to be **avoided**, as in many other languages

Stress Clash Resolution in French

Strategy		Example	
Beat insertion	Silent pause	je n'étais <u>pas</u> # <u>apte</u>	
	Schwa	<u>Marc</u> @ <u>Blanc</u>	
Beat deletion	Stress shift	une <u>jour</u> née <u>chaude</u>	
	Deaccenting	une journée <u>chaude</u>	



Stress Clash Resolution in French

- In the literature, it has been claimed that **Stress Clash Resolution (SCR)** takes place in a **different extent** depending on the **unit** of the **prosodic hierarchy** the stress clash site is located

Stress Clash Resolution in French

prosodic level, predictions and previous studies

Condition	Prosodic Level	Example	Predictions
Type I	within a single Clitic Group	<u>ira-t-il</u> nous ne répondons <u>pas</u>	SCR obligatorily applies
Type II	within a single PP	une <u>vieille dame</u> les <u>mêmes villes</u>	
Type III	between two restr. PPs	une journée <u>chaude</u> un <u>restau sale</u>	SCR is optional

Stress Clash Resolution in French

prosodic level, predictions and previous studies

Condition	Prosodic Level	Example	Predictions	Post [2000]
Type I	within a single Clitic Group	<u>ira-t-il</u> nous ne répondons <u>pas</u>	SCR obligatorily applies	Not tested
Type II	within a single PP	une <u>vieille dame</u> les <u>mêmes villes</u>		100%
Type III	between two restr. PPs	une journée <u>chaude</u> un restau <u>sale</u>	SCR is optional	60%

Research questions

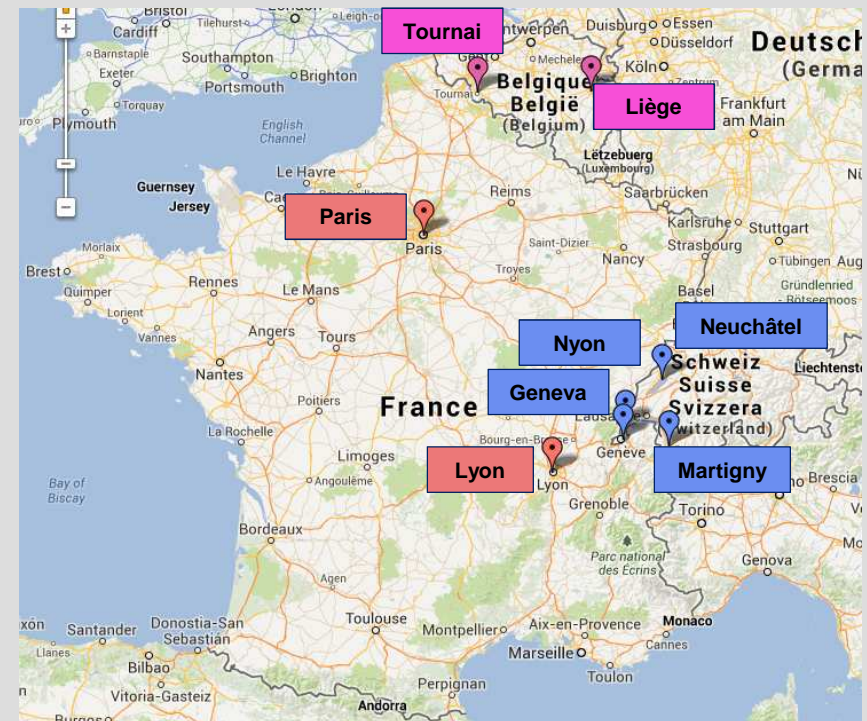
1. Are the results obtained in previous works dealing with SCR application in French still **valid** for **non-laboratory speech**?
2. Is stress clash resolution **sensitive** to **regional/stylistic variation**?

Material

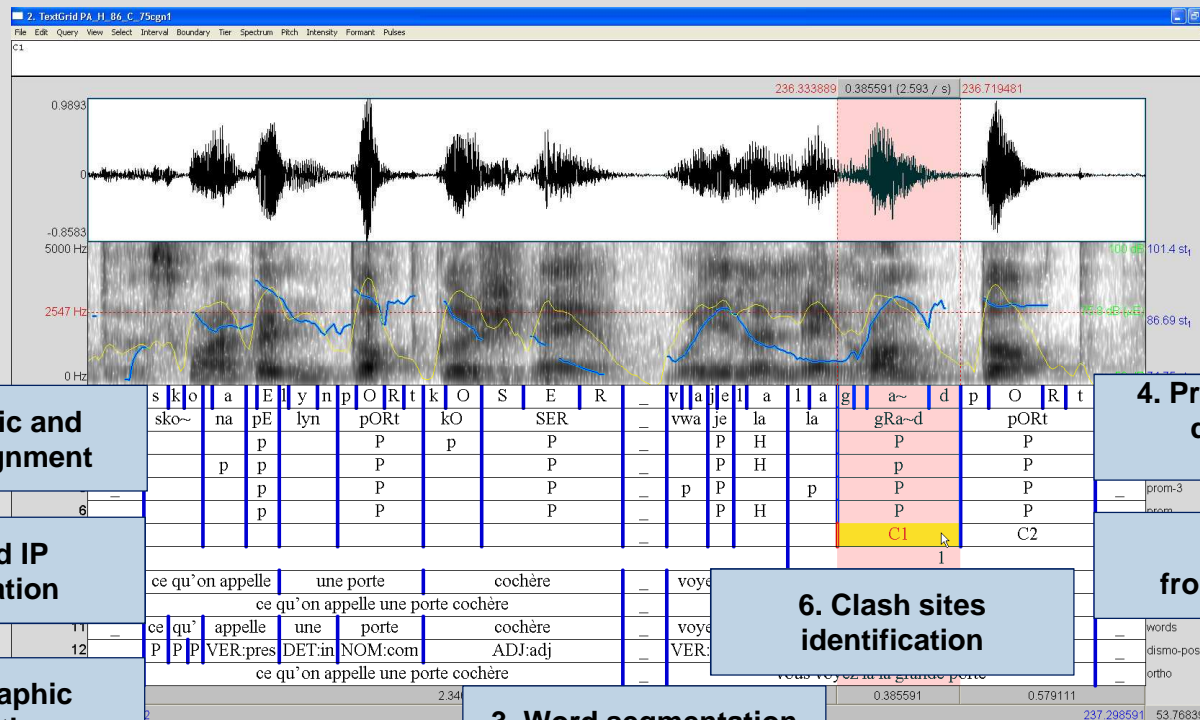


Data

- 7-hour database
 - 8 varieties of French (locales)
 - 8 speakers per locale (4m/4f)
 - 2 speaking styles (read/conv.) per speaker
- **Age** is a controlled variable
 - Locale (F (7, 48) = 0.214, n.s.)
 - Gender (F (1, 48) = 0.002, n.s.)
 - Locale*Gender (F (7, 48) = 0.117, n.s.)



Annotations



2. Phonemic and syllabic alignment

5. AP and IP segmentation

1. Orthographic transcription

3. Word segmentation and PoS Tagging

6. Clash sites identification

4. Prominences and disfluencies annotation

Fleiss K from 0.51 to 0.79



Stress clash in the corpus

Condition	Prosodic Level	Example	Nb. of sites					
			Read speech		Conv. speech		Total	
Type I	within a single CG	ira-t-il nous ne répondons pas	185	34.07%	111	32.55%	296	33.48%
Type II	within a single PP	une <u>vieille</u> <u>dame</u> les <u>mêmes</u> <u>villes</u>	126	23.20%	107	31.38%	233	26.35%
Type III	between 2 restr. PPs	une journée <u>chaude</u> la <u>moyenne</u> <u>d'âge</u>	232	42.73%	123	36.07%	355	40.15%
			543	61.43%	341	38.57%	884	100%

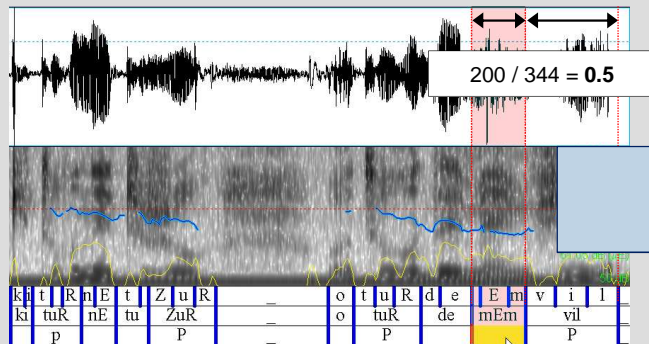
Stress clash in the corpus

acoustic analysis

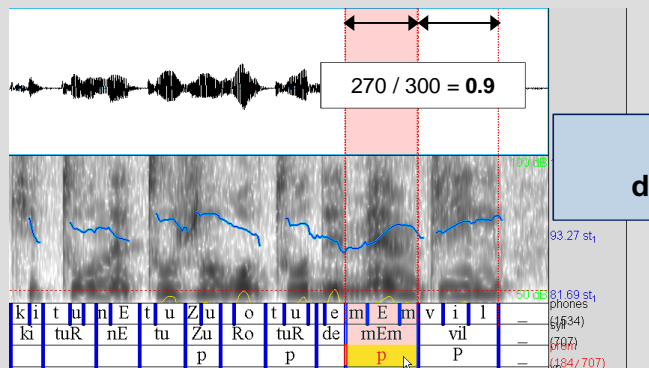
- The **identification** of stress clash sites was semi-automatically coded in a dedicated tier
- The response **respect/violation** for SCR was obtained on the basis of the identification of prominences performed by the annotators of the corpus
- To ensure the annotations were reliable, an **acoustic analysis** of the data was conducted
- Measurements regarding **duration** and **F0** were calculated and retrieved automatically for each site of clash of the corpus.

Stress clash in the corpus

acoustic analysis – duration measurement



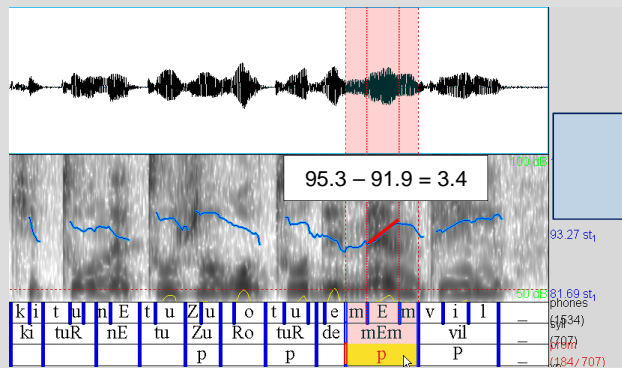
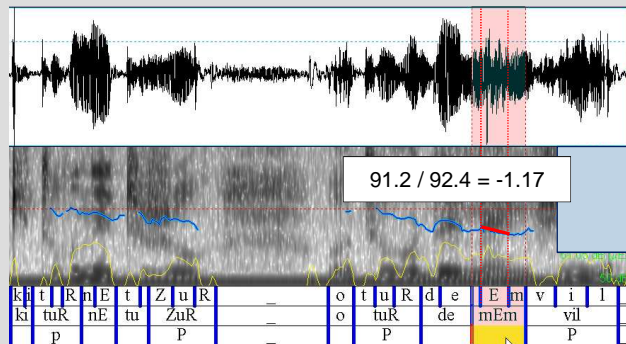
- Ratio Duration Fin_syll_{w1}/syll_{w2}
 - Calculated in **ms**



- Example
 - Young female speakers from Tournai (top) and Martigny (bottom), read speech
 - Autour des mêmes]_{w1} villes]_{w2}

Stress clash in the corpus

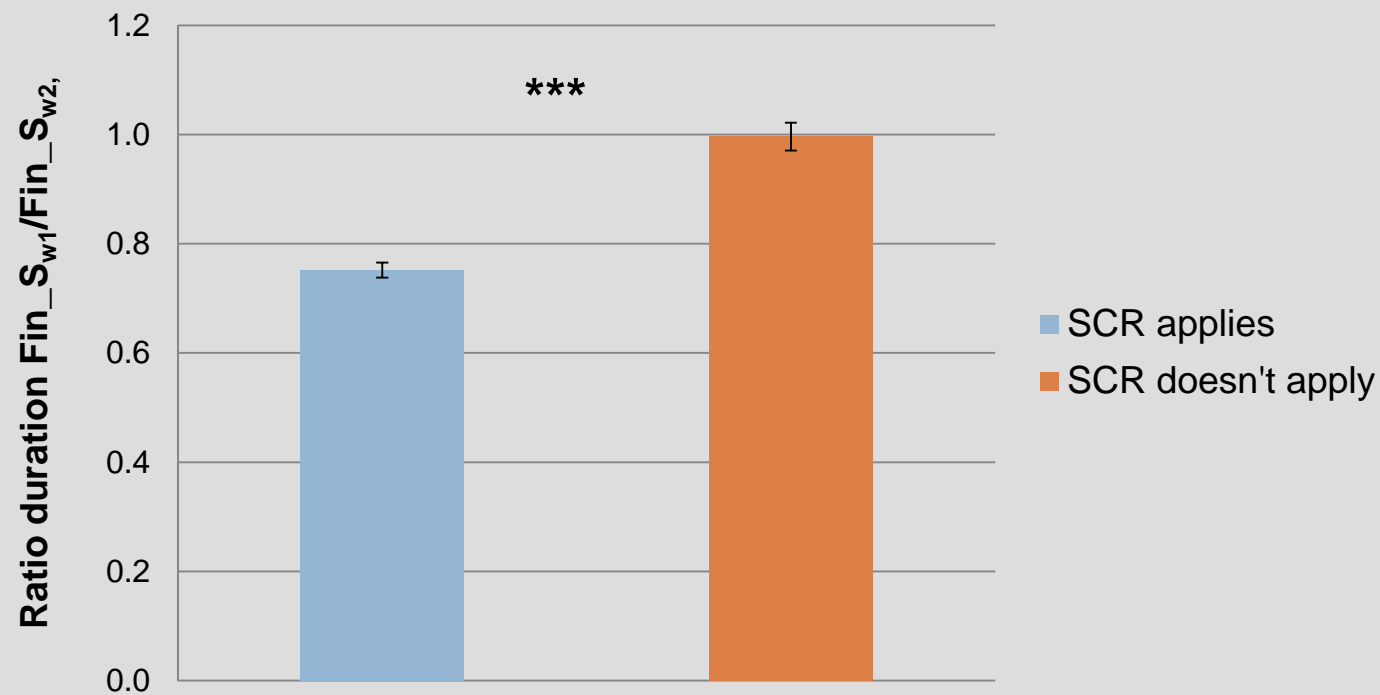
acoustic analysis – F0 measurement



- Diff_F0_Vowel_fin_syll_{w1}
 - Difference between the **last and first points of the vowel**, calculated in **semi-tones**
- Example
 - Young female speakers from Tournai (top) and Martigny (bottom), read speech
 - Autour des mêmes]_{w1} villes]_{w2}

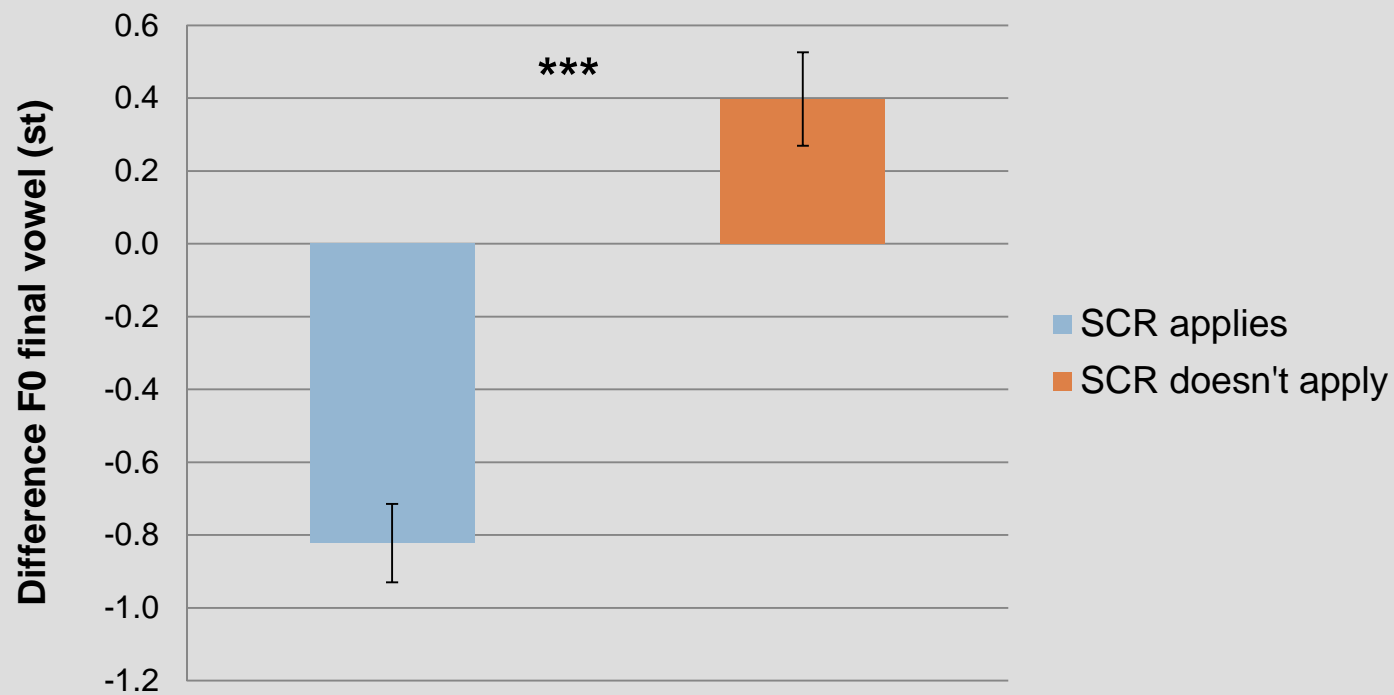
Stress clash in the corpus

acoustic analysis – duration results



Stress clash in the corpus

acoustic analysis – F0 results



Results

acoustic validation – summary

- Acoustic analyses confirm the annotation is reliable. Sites where SCR apply different prosodic cues compared with the sites where it does not apply
 - The **duration** of the last syllable of the first word of the clash is longer when SCRR does not apply than when the rule applies
 - Difference of **pitch movement** on the last syllable of the first word (rising when SCRR does not apply, falling when it applies)

Research questions

1. Are the results obtained in previous works dealing with SCR application in French still **valid** for **non-laboratory speech**?
2. Is stress clash resolution **sensitive** to **regional/stylistic variation**?

Analysis

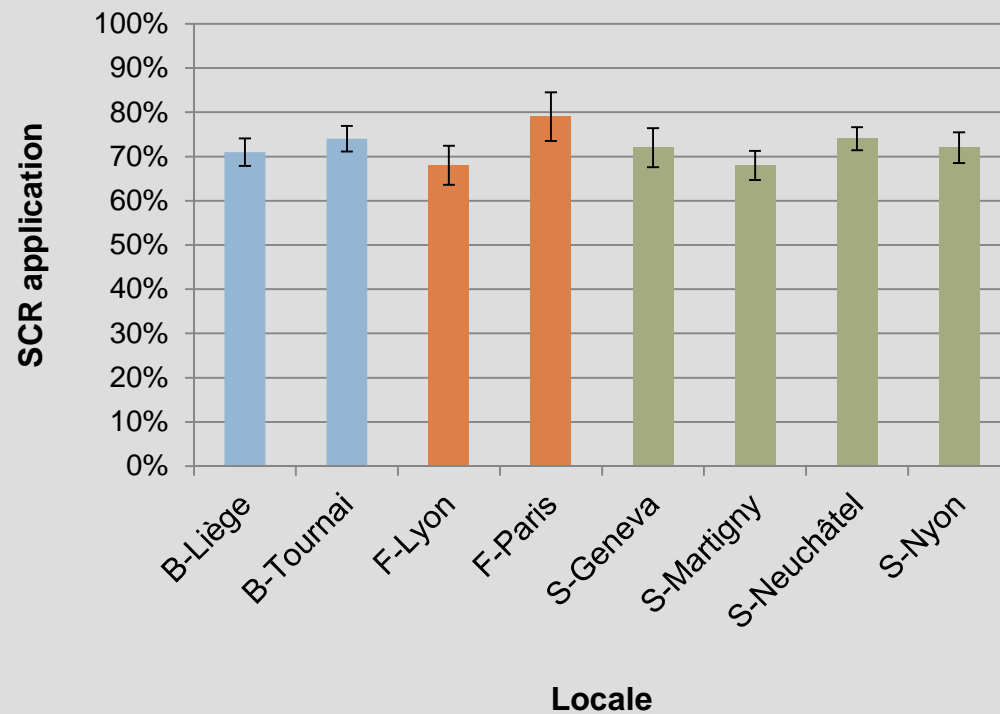


Statistics

- **Generalized Estimated Equations** with repeated measures were run with the **speaker** as a **random** variable, the **SCRR (yes/no)** as a **dependent** variable, and the following predictors as **independent** variables:
 - **Locale** (8 varieties)
 - **Speaking style** (read, conv. speech)
 - **Condition** (Type I, Type II, Type III)
 - **Local articulation rate** (mean duration of the syllables of the IP hosting the stress clash site)

Results

locale

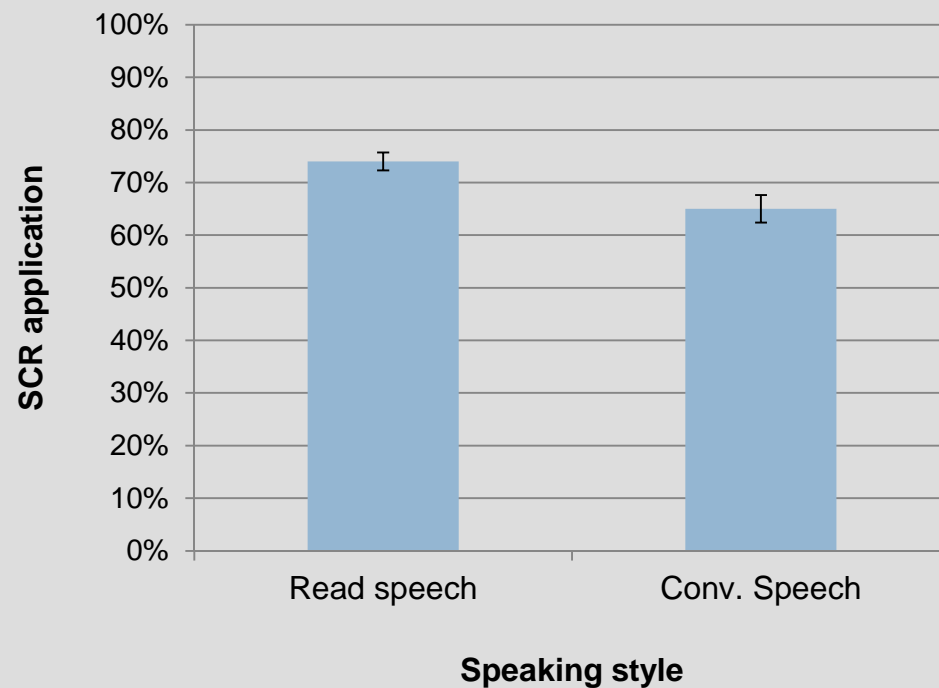


- No effect of locale
 - Locale is not implicated in any interaction

N = 884

Results

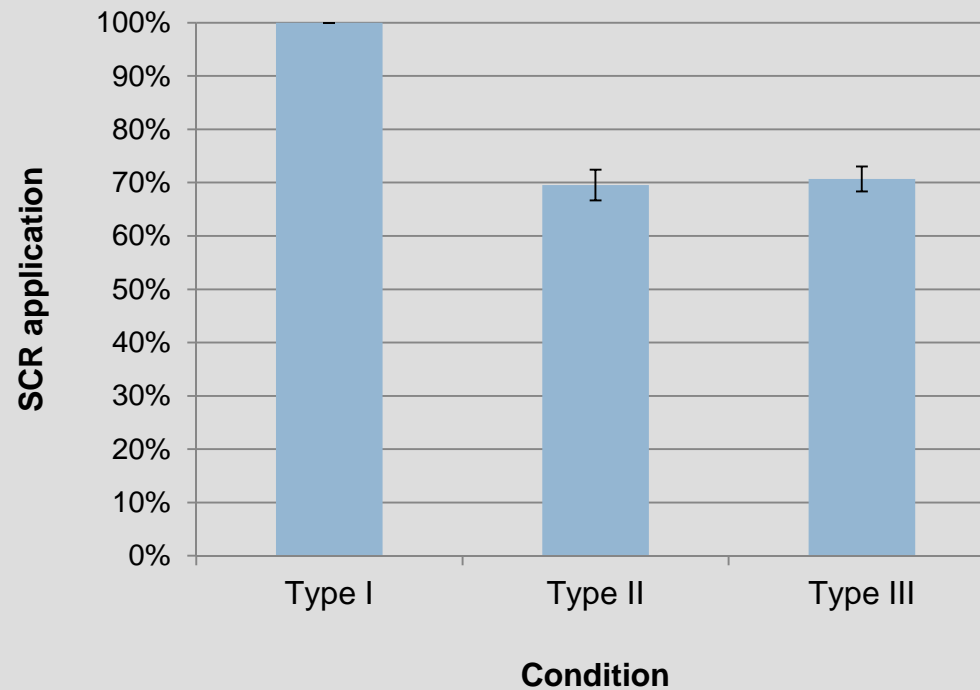
speaking style



- No effect of speaking style
 - speaking style is not implicated in any interaction

N = 884

Results condition



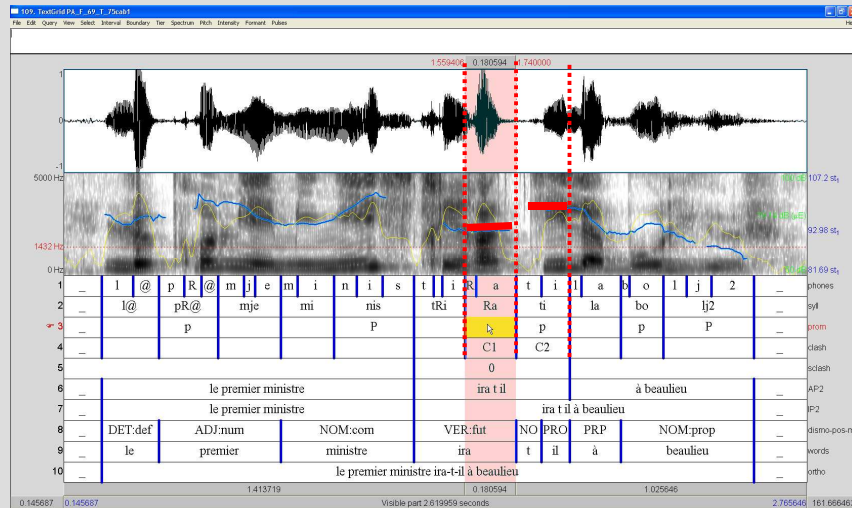
- Effect of condition ($p < 0.001$)
 - Condition is not implicated in any interaction

N = 884

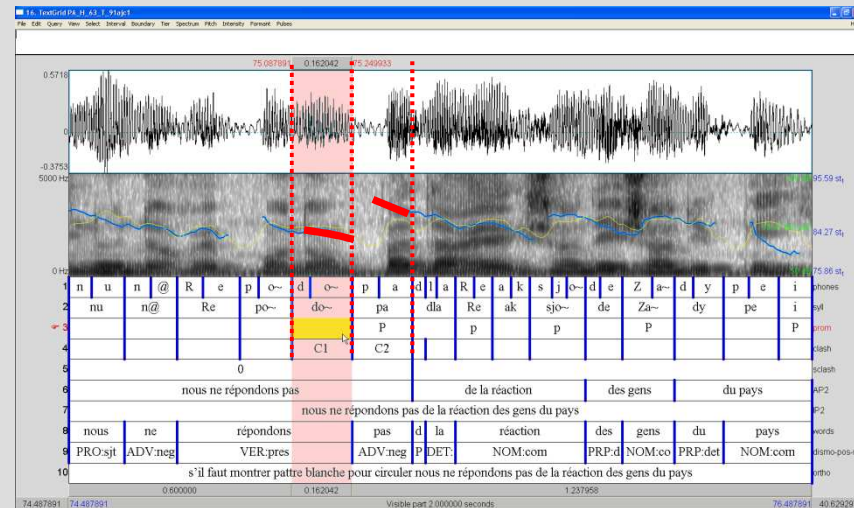
Type I illustration

Short Clitic Group

Long Clitic Group



Le premier ministre **[ira-t-il]_{CC}** à Beaulieu
Produced by a Parisian female speaker, read speech



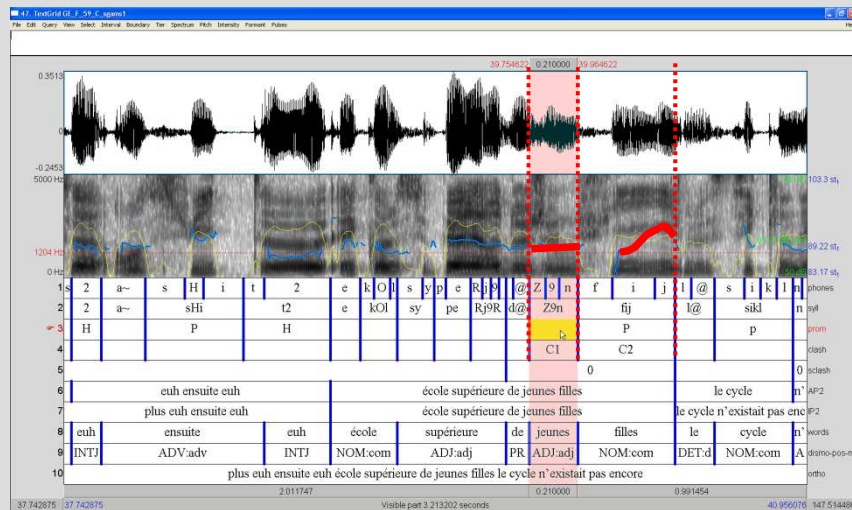
[nous ne répondons pas]_{CC} de la réaction [...]
Produced by a Parisian male speaker, read speech



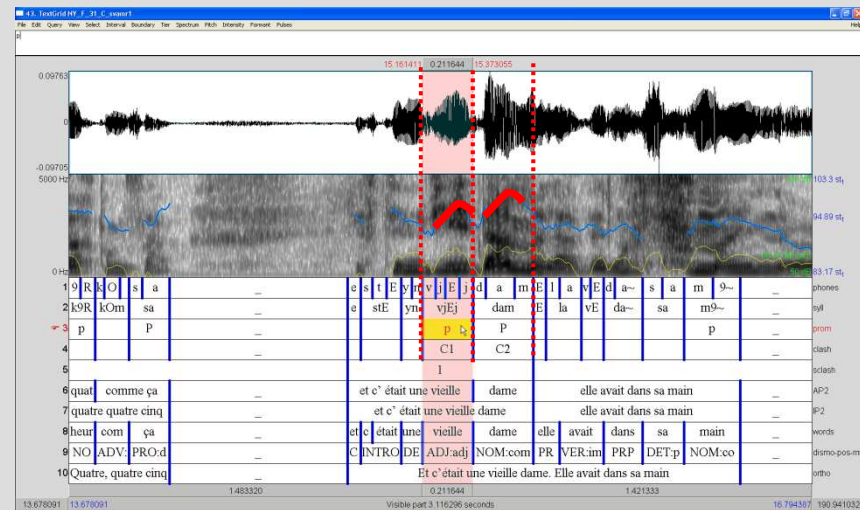
Type II illustration

SCR applies (70%)

SCR does not apply (30%)



euh ensuite euh école supérieure de **jeunes**_{Adj} **filles**_N
Produced by a Geneva speaker, conv. speech



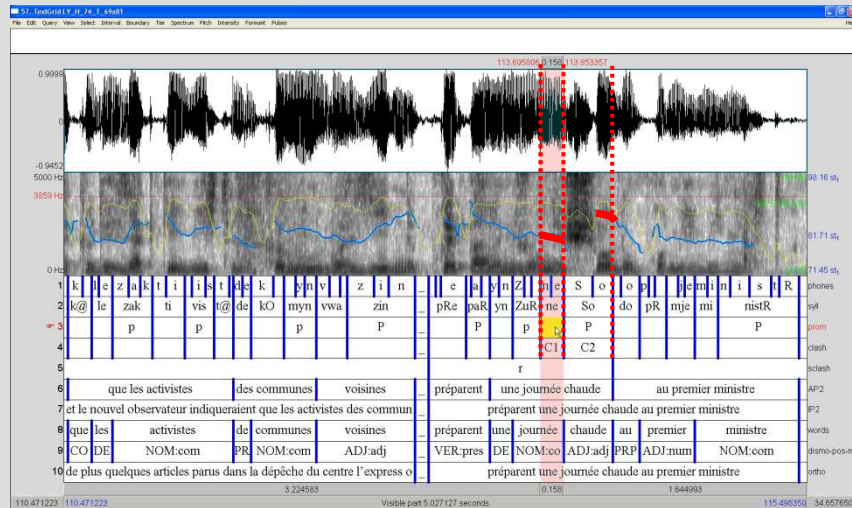
et c'était une **vieille**_{Adj} **dame**_N elle avait dans sa main
Produced by a Nyon speaker, conv. speech



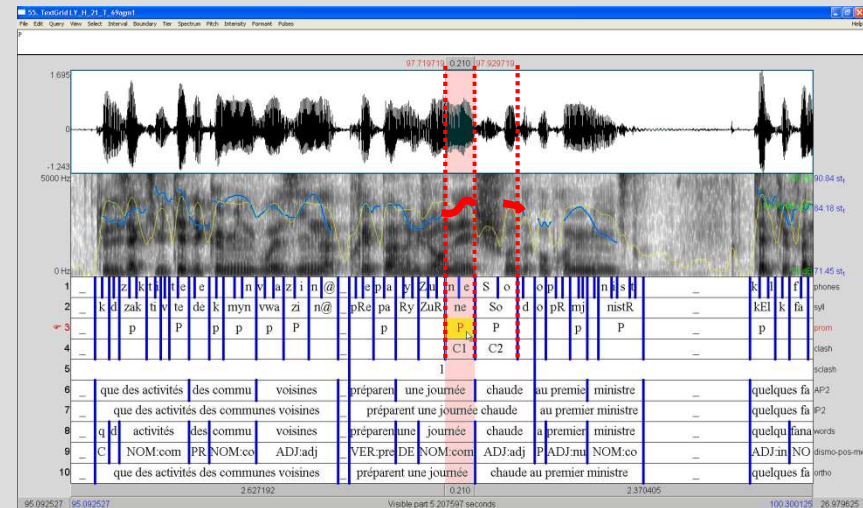
Type III illustration

SCR applies (71%)

SCR does not apply (29%)



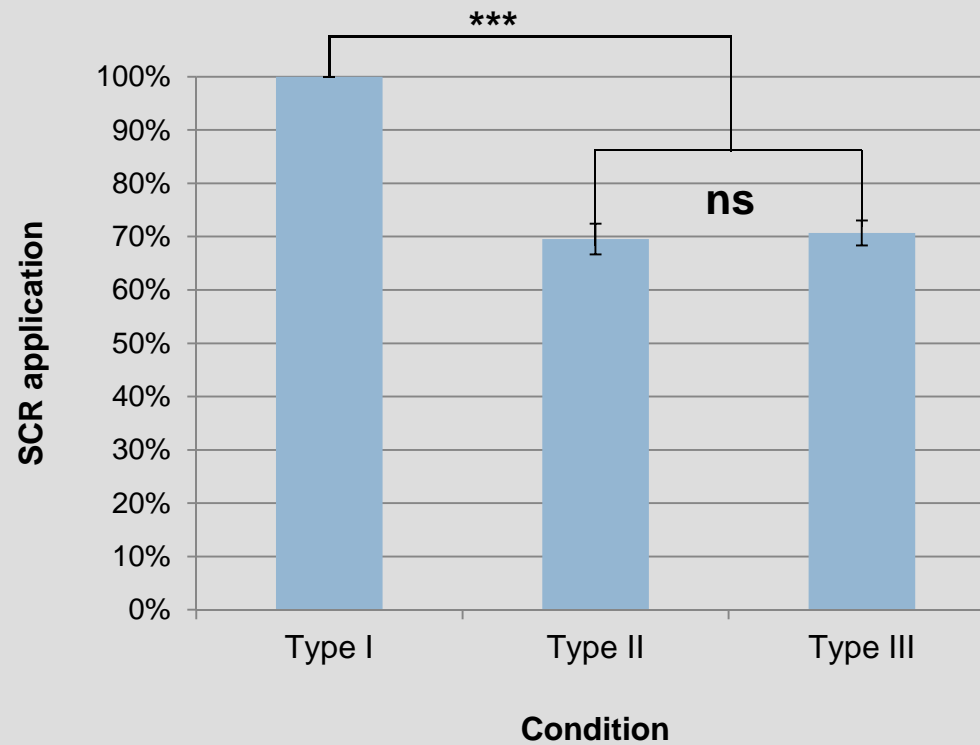
préparent une **journée_N chaude_{Adj}** au premier ministre
Produced by a Lyon male speaker, read. speech



préparent une **journée_N chaude_{Adj}** au premier ministre
Produced by a Lyon male, read. speech



Results condition

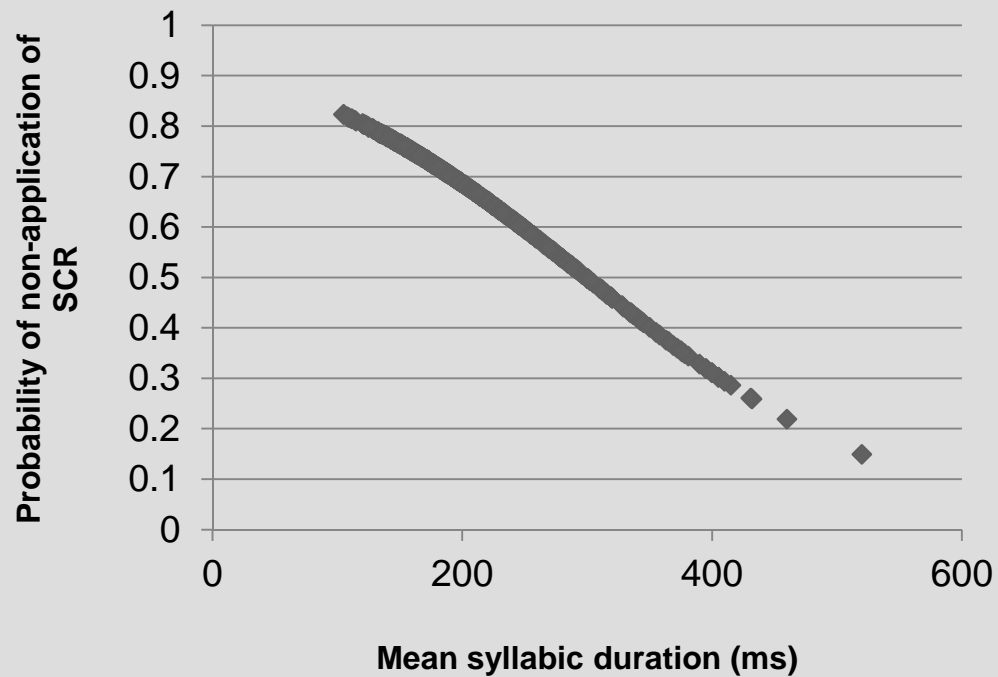


- Effect of condition ($p < 0.001$)
 - Condition is not implicated in any interaction

N = 884

Results

local articulation rate



- Effect of articulation rate
($p < 0.001$)
 - articulation rate is not implicated in any interaction

N = 884

Summary

Predictors	Effect on SCR application
Locale	n.s.
Speech style	n.s.
Condition	$p < 0.001$
Local articulation rate	$p < 0.001$

Discussion and Conclusion



Research questions

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Prosodic domain(s)

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Prosodic domain(s)

- **Phonological Phrase** is **not** the domain for SCR application
 - **Clitic Group** appears to be a more robust unit to predict SCR application
 - See also recent work on **liaison**
 - A monosyllabic PPs directly following another PP is not forbidden in French, even such a phenomenon is not that frequent (30%)
 - One can wonder whether the **position of the adjective** (before or after the lexical head of the NP) really has an impact on SCR, since no significant differences between Type II and Type III were found

Research questions

1. In which prosodic domain(s) stress clash resolution obligatory apply?
2. Is SCR **sensitive** to **regional/stylistic variation**?

Regional/Stylistic variation

- SCR does not vary as a function of **regional origin** of the speaker, neither as a function of **speaking style**
- Nevertheless, SCR appears to be sensitive to **tempo**: the faster the speaker articulates, the greater the chance for SCR not to apply

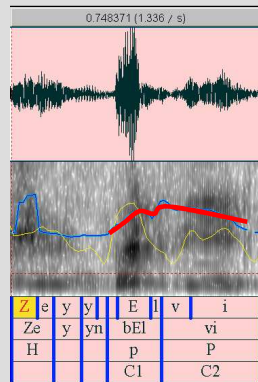
Perspective

- Future work should take into account:
 - The position within the **host IP** (prenuclear vs nuclear)
 - The **shape of the tones** (are the tones similar/different?)
 - The **morphological nature** of the items involved in the clash
 - The **frequency of the words** and their **collocation**

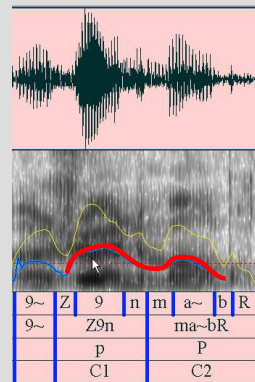
Perspective

Type II

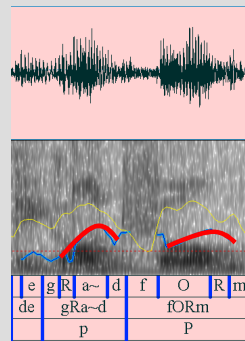
Type III



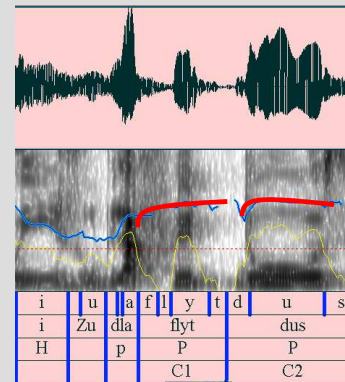
j'ai eu une belle]_{Adj} vie]_N



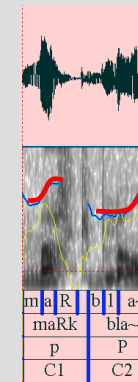
un jeune]_{Adj} membre]_N



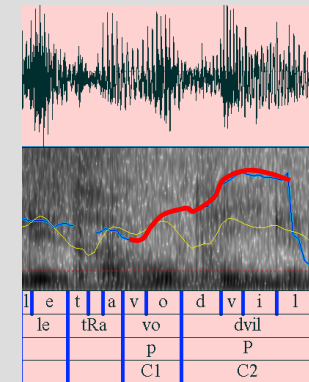
de grandes]_{Adj} formes]_N



il joue de la flûte]_N douce]_{Adj}



Marc]_N Blanc]_N



Les travaux]_N de ville]_{PP}

Thanks for your attention!



Aknowledgments

- This study was conducted with the help of Alice Bardiaux, Pauline Dubosson and Jean-Philippe Goldman
- Thanks to Elisabeth Delais for precious comment

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