

# Durational Cues and Prosodic Phrasing in French: Evidence for the Intermediate Phrase

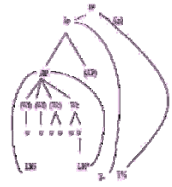
## INTRODUCTION

It is generally agreed there is two prosodic units in French:  
 - a larger unit: the **Intonation Phrase, IP**  
 - a smaller unit: the **Accentual Phrase, AP**

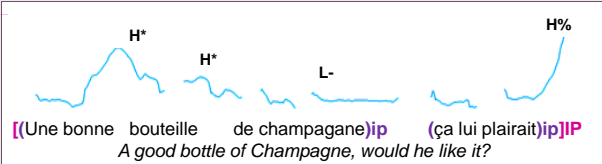
There is some evidence for a third level of phrasing in French  
 But the existence of this **intermediate phrase (ip)** is still controversial.

## THEORETICAL FRAMEWORK

**Jun & Fougeron's model of French intonation**  
 (Jun & Fougeron, 2000)



Jun & Fougeron proposed an intermediate level of phrasing (ip) to explain specific syntactic structures:



The ip definition of Jun & Fougeron is not sufficient:

- the ip distribution is restricted to specific structures
- the phonetic and phonological properties of the ip are still unclear

The question of the Noun Phrase/Verb Phrase break (NP/VP break) in French

- Delais-Roussarie (1995) proposed a constraint which aligns the right edge of an NP with the right edge of an IP in French.
- **HOWEVER:** No phonetic argument to justify that the NP/VP break corresponds to an IP boundary.

## ISSUES

- Is there an intermediate phrase in French?
- Are the boundaries cues gradual or categorial?

Amandine Michelas\* & Mariapaola D'Imperio\*

\*Aix-Marseille I & Laboratoire Parole et Langage, CNRS, Aix-en-Provence, France  
 michelas@lpl-aix.fr, mariapaola.dimperio@lpl-aix.fr,

## HYPOTHESES

- The ip is not restricted to specific structures
- The ip right boundary is aligned with a NP/VP break
- The ip right boundary is marked by stronger preboundary lengthening

## METHOD

### Stimuli

20 SVO utterances with the target syllables at 4 contexts:

Prosodic boundary condition	Sentences
1- at a PW boundary	Les <b>gre</b> na <b>di</b> ers de Marrakesh ne poussent pas... Pomegranates of Marrakesh do not grow up...
2- at an AP boundary	Le <b>sauna</b> <b>J</b> AP de Paolo deviendra... Paolo's sauna will become...
3- at an AP boundary which is also a NP/VP break	Le <b>sauna</b> <b>J</b> AP/ <b>X</b> P deviendra... The sauna will become...
4- at an IP boundary	Le <b>sauna</b> <b>J</b> IP, d'après ce qu'on m'a dit... The sauna, according to what I was told...

### Measures

Target syllable and vowel durations (in ms) in the 4 contexts

### Task

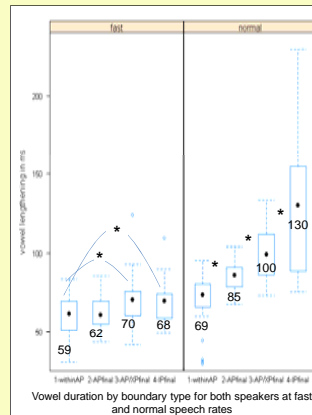
Two French native speakers read the sentences 4 times at normal and fast speech rates (for a total of 320 sentences)

### Statistics

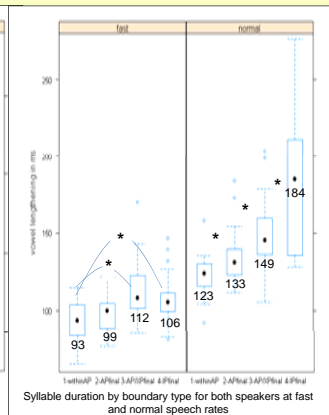
Two linear mixed models

## RESULTS

### Vowel duration in (ms)



### Syllable duration in (ms)



AP/XP final syllables are significantly different from AP and IP final syllables at normal speech rate

## FINDINGS

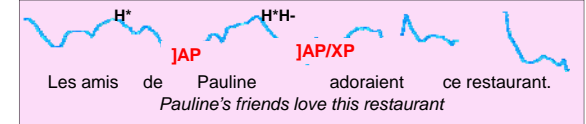
At normal speech rate

A syntactic constraint is responsible for the ip right boundary placement

ALIGN (XP,R;ip,R): align the right edge of a maximal syntactic projection with the right edge of an ip

At fast speech rate

Only IP and AP/XP vowels were significantly longer than within AP vowels

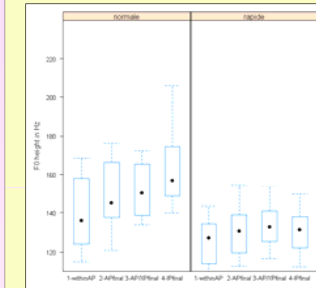


Despite the absence of lengthening, boundaries are tonally marked

## DISCUSSION

Is the syntactic constraint sufficient for the ip boundary placement?

### F0 Height in Hz



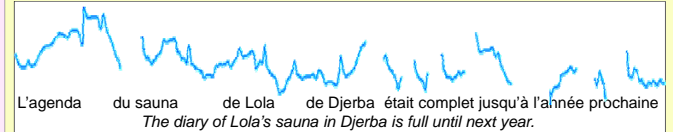
F0 values of AP/XP syllables are not significantly higher than AP final syllables



In the AP/XP condition, the NPs were always produced as a single AP

A length constraint might interact with the syntactic constraint

What is the nature of the boundary cues **discret**/**gradient**?



In a study to appear, Michelas & D'Imperio showed that the number of constituents did not affect the relative strength of phonetic cues associated to the ip boundary

## CONCLUSION

In French:

- AP/XP final syllables are significantly different from AP and IP final syllables
- A NP/VP break reinforces preboundary lengthening
- The results show a mixed marking for prosodic boundaries (compensatory effect between lengthening and tonal cues at fast speech rate)

### References

- Delais-Roussarie, E. Pour une approche parallèle de la structure prosodique: étude de l'organisation prosodique et rythmique de la phrase française. Thèse de Doctorat, Université de Toulouse Le Mirail.  
 - Fougeron, C. & Jun, S.A. (1998). Rate Effects on French Intonation: Phonetic Realization and Prosodic Organisation. *Journal of Phonetics*, 26, 45-70.  
 - Jun, S.A., & Fougeron, C. (2000). A Phonological Model of French Intonation, in *Intonation: Analysis, Modeling and Technology*, ed. By A. Botinis, Kluwer Academic Publishers, 209-242.  
 - Michelas, A., & D'Imperio, M. (to appear). Syntactic and Length effect on French Prosodic Phrasing.