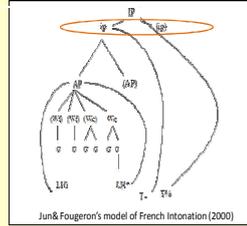


# SYNTACTIC AND LENGTH EFFECTS ON FRENCH PROSODIC PHRASING

## Introduction

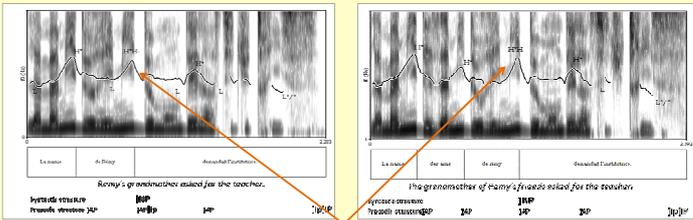
In most of the studies, prosodic constituency is viewed as a hierarchy of domains.  
 As in English, an **intermediate phrase (ip)** is postulated for French (Jun and Fougeron 2002).

But Jun & Fougeron's ip definition is restricted to specific syntactic constructions and unclear phonetics and phonological properties.



Recent studies show phonological evidence for the intermediate phrase in French (ip)  
 D'Imperio & Michelas 2010, Michelas & D'Imperio 2010

An ip right boundary appears at a major syntactic break when the ip is sufficiently long ( $\geq 2$ APs)



The ip boundary is durationally and tonally marked (by a return to the register level set by the first LH\* of the IP)

## Methodology

### Stimuli

Investigation of the phonetic cues associated with the prosodic boundaries within subject NPs

### Corpus variables:

- 1- Length of the subject NP (1AP / 2 APs / 3 APs / 4 APs / 5 APs)
- 2- Length of each AP within the NP subject (short APs / long APs)

Length of the Subject NP	Short APs within the Subject NP (3 syllables/AP)				
	1 AP	"La <b>mairie</b> a été entièrement rénové à l'arrivée du nouveau maire."			
2 APs	"La <b>mairie</b> de <b>Paris</b> est un magnifique édifice datant du 18ème siècle."				
3 APs	"Le <b>parvis</b> de la <b>mairie</b> de <b>Paris</b> est envahi par les militants."				
4 APs	"L'arrondi du <b>parvis</b> de la <b>mairie</b> de <b>Paris</b> permet d'accueillir beaucoup de touristes."				
5 APs	"Le <b>joli</b> arrondi du <b>parvis</b> de la <b>mairie</b> de <b>Paris</b> a été élargi."				
Length of the Subject NP	Long APs within the Subject NP (5 syllables/AP)				
	1 AP	"Le <b>gorgonzola</b> est un fromage de vache fabriqué en Italie."			
2 APs	"Les <b>macaronis</b> au <b>gorgonzola</b> sont très rapides à préparer."				
3 APs	"Les <b>macaronis</b> au <b>gorgonzola</b> de <b>Catania</b> sont vraiment délicieux."				
4 APs	"Les <b>macaronis</b> au <b>gorgonzola</b> de la vieille <b>mairie</b> de <b>Catania</b> sont vraiment délicieux."				
5 APs	"Les <b>macaronis</b> ou les <b>spaghettis</b> au <b>gorgonzola</b> de la vieille <b>mairie</b> de <b>Catania</b> sont vraiment délicieux."				

### Measures

- Duration of target syllables (normalization: target/VV1 ratio)
- F0 height of target syllables (normalization: target/H1 ratio)

### Task

- 2 French native speakers read the 96 sentences 4 times (384 sentences)

### Statistical analyses

Mixed models

## Issues

Do the phonetic cues associated to the ip-break reflect the phonological structure?

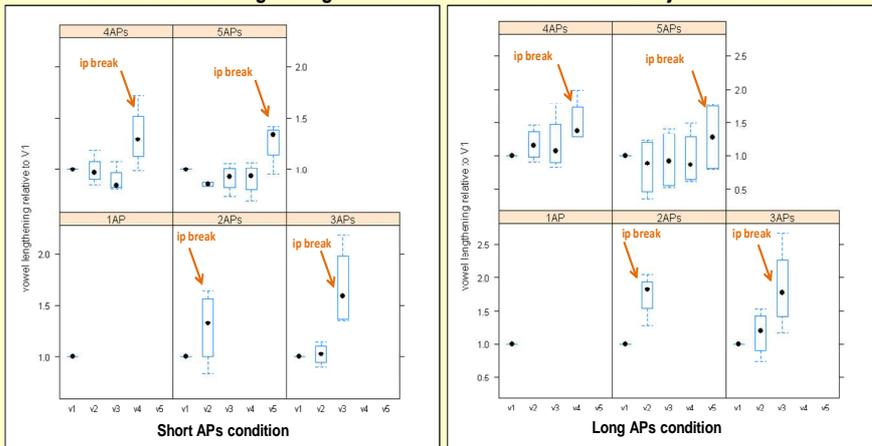
If we manipulate the number and the length of the constituents within the ip, does this manipulation affect the strength of the phonetic cues associated to the ip-boundary?

### PREDICTIONS

- Same preboundary lengthening associated to the ip-break independent of number and the length of the APs in the Noun Phrase
- Same preboundary lengthening associated to the APs-break within the ips

## Results

### Ratios of vowel lengthening of each AP-final vowel within the Subject Noun Phrases



Duration cues associated to ip-break are always greater than the ones associated to AP-breaks  
 Independent of size of each AP and of number of APs within the NPs

Duration ratios of the ip-break are independent of both NP and AP length

## Discussion

### Prosodic length does not seem to affect ip-phrasing in French

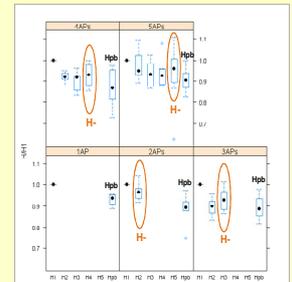
- Durational cues at the ip-break not affected by NP and AP length

### Additional evidence for an ip discrete boundary: tonal cues

Ratios of f0 values of each AP-final vowel relative to f0 in first LH\* for both AP-length conditions

The ip-final syllables are reset relative to the first AP-final LH\* of the utterance

Hpb= First LH\* after the ip boundary



The ip-break reflects the phonological structure  
 Discrete (and not gradual) phonetic cues associated to AP & ip breaks

## Conclusions

- Prosodic length does not seem to affect phonetic cues of ip-phrasing in French
- APs belonging corresponding to a maximal syntactic projection are grouped within a single ip
- Discrete phonological cues associated to the ip-boundary level

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# Syntactic and Length Effects on French Prosodic Phrasing

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One of the theoretical problems related to prosodic phrasing (independent of the language observed) concerns the hierarchical nature and the number of potential constituents. Most of the studies referring to prosodic constituency have been conducted within the classic Prosodic Phonology framework in which prosodic constituency is viewed as a hierarchy of domain types such that, at any given level of the hierarchy, a constituent consists exclusively of one or more constituents at the next lower level (Strict Layer Hypothesis, Selkirk, 1984). In French generally two levels of phrasing (IP, Intonation Phrase and the AP, Accentual Phrase) have been postulated (Jun and Fougeron, 1995, 2000, 2002). The IP boundary (signaled through a H%) and the AP boundary (signaled through a LH\*) are also marked by duration cues since the duration of the IP-final syllable is significantly longer than the AP-final syllable, and the AP-final syllable is in turn significantly longer than unaccented syllables (Jun and Fougeron, 2000). Moreover, recent studies (D'Imperio and Michelas, 2010; Michelas and D'Imperio, 2010a, 2010b) show evidence for the existence of an intermediate level of phrasing (ip, intermediate phrase), which appears to be both tonally and durationally marked. Specifically, an ip right edge appears to occur within broad focus utterances at a major syntactic break (such as the one between a subject NP and a VP), when the subject is sufficiently long (2 APs).

However the question of the nature (discrete/gradual) of the phonetic cues associated to this kind of break arises. If these cues reflect phonological structure, such as the presence of an intermediate level of phrasing, such cues should not vary in relation to the number or length of the constituents composing the ip. In other words, though we know that length constraints do affect the placement of prosodic boundaries (Ghini, 1993), we can test the hypothesis that they would also affect the "relative strength" of the phonetic cues associated with the boundaries themselves (Gee and Grosjean 1983). In this study we hence investigated the phonetic cues (duration cues and  $f_0$  values) of both Subject and Object NP within SVO broad focus utterances. We manipulated (i) the length of the Subject NP in terms of number of words (in order to obtain a sequence of either 1, 2, 3, 4 or 5 APs) and (ii) the length of each AP within the Subject NP in terms of number of syllables (short AP=3 syllables, long AP=5 syllables). In order to normalize speech rate variation, vowel duration for each AP-final vowel was also measured as a ratio of the duration of the first AP-final vowel in the utterance (V1).

If the ip-break phonetic and phonological cues are independent of both the length of the subject NP and the length of each AP within the Subject NP, we would find the same degree of preboundary lengthening for the ip-final vowel in all items. On the contrary, if the ip-break is gradually cued by duration cues which are stronger or weaker depending on constituent length, we would find different duration values for the same position.

Our results show that the duration ratio values for the ip-break are indeed independent of both NP and AP length. These results clearly support the hypothesis of the presence of an ip-boundary at the NP/VP boundary which is independent from length constraints. Duration results appear to be reinforced by tonal values for the ip-final syllable, which are reset relative to the first AP-final LH\* of the utterance (see also D'Imperio & Michelas, 2010).

We conclude that prosodic length does not seem to affect phrasing in French, and that a constraint of the type WRAP-XP (Truckenbrodt, 1999) is responsible for grouping APs belonging to a maximal projection, such as the Subject NP, in contrast with other Romance languages such as Catalan (D'Imperio et al. 2005, Prieto 2005, Frota et al. 2007) where constituent length is active highly ranked phrasing constraint.

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