

# Can Accentual Phrase boundaries remove temporary lexical ambiguity in French?

## INTRODUCTION

It has recently been proposed that the prosodic organisation of speech into prosodic constituents might be crucial for lexical access strategies in French (Cristophe *et al.*, 2004). Specifically, it is hypothesized that:

1. In the first of the two sentences below will there be a temporary lexical ambiguity between *chat* "cat" /sɑ/ and *chalet* "cottage" /sɑlə/ since *chat* and *légendaire* are within the same **Phonological Phrase, PP**.
2. No temporary ambiguity **across** a **Phonological Phrase**, but only across **Prosodic Word** (PW) boundaries.

- a. Elle veut des renseignements [(sur ce CHAT)<sub>PW</sub> légendaire]<sub>PP</sub>**  
 "She wants information about this legendary cat"  
 Ambiguity between *chat* "cat" and *chalet* "cottage"
- b. Elle veut des renseignements [(sur ce CHAT)<sub>PW</sub> fabuleux]<sub>PP</sub>**  
 "She wants information about this fabulous cat"  
 No ambiguity \**chaf*
- c. Paul m'a dit que [(son CHAT)<sub>PW</sub> [léchait]<sub>PP</sub> tous ses invités**  
 "Paul told me that his cat licked all his guests"  
 Ambiguity between *chat* "cat" and *chalet* "cottage"

But in the Christophe *et al.*'s study:

- Target position within the sentence is not balanced **across prosodic conditions** (i.e., target words were mainly initial in the PW condition)
- Target duration is not properly factored out of the reaction time data
- Prosodic units are only defined according to syntactic algorithms (Nespor and Vogel, 1986)

## THEORETICAL FRAMEWORK

Two complementary approaches to prosodic constituency :

### 1- The syntax-based approach of Prosodic Phonology

(Selkirk, 1984)

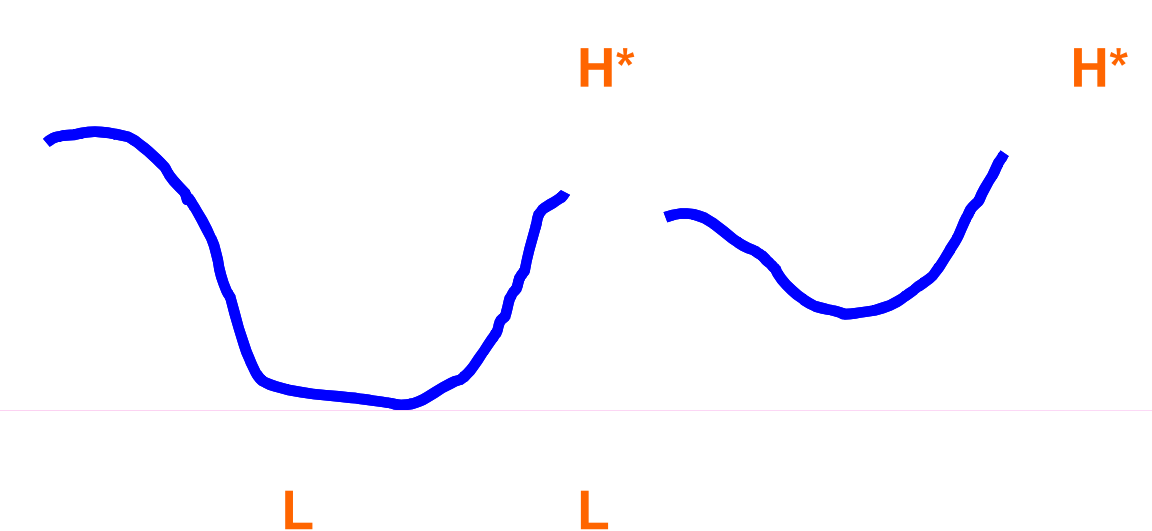
[le CHAT grincheux]<sub>PP</sub> [buvait]<sub>PP</sub>  
 [ ] NP [ ] VP  
 "The fussy cat drank"

[(le CHAT)<sub>PW</sub> (grincheux)<sub>PW</sub>]<sub>PP</sub> [buvait]<sub>PP</sub>  
 "The fussy cat drank"

Prosodic units: PP and PW  
 Defined by: syntactic algorithms

### 2- The tonal approach

(Pierrehumbert, 1980; Ladd, 1996)



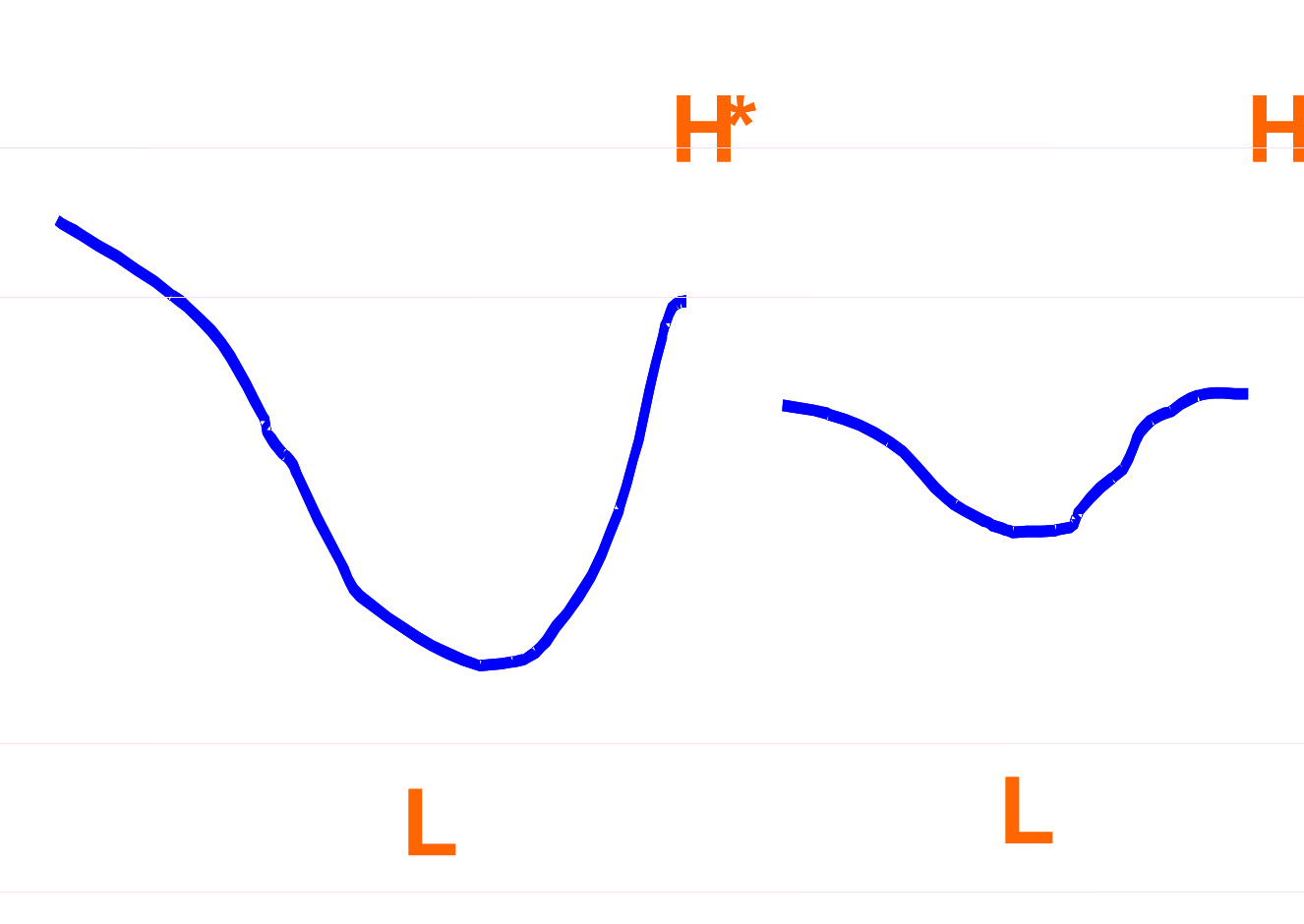
[le chat grincheux]<sub>AP</sub> [buvait]<sub>AP</sub>  
 "The fussy cat drank"

Prosodic unit: Accentual Phrase (AP)  
 Defined by: LH\* + vowel's lengthening

AP an PP boundaries do not need to overlap since AP boundaries strictly depend on the number of final rises (LH\*) produced by the speaker



[le chat grincheux]<sub>PP</sub>  
 [le chat grincheux]<sub>AP</sub>  
 "The fussy cat"



[le chat grincheux]<sub>PP</sub>  
 [le chat]<sub>AP</sub> [grincheux]<sub>AP</sub>  
 "The fussy cat"

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## ISSUES

1- How does target duration interact with reaction time measures?

2- Do PP and AP boundaries show the same effect in removing temporary lexical ambiguity?

## METHOD

### Stimuli

For each experiment, 24 pairs of experimental sentences (only one member showed a local lexical ambiguity). In addition, ambiguity was crossed with a different prosodic condition in each experiment:

### Experiment 1

	PW boundary	PP boundary
<b>Ambiguous</b>	... [sur ce chat légendaire] PP	... [son beau chat] <sub>PP</sub> [léchait] <sub>PP</sub>
<b>Non Ambiguous</b>	... [sur ce chat fa*buleux] PP	... [son beau chat] <sub>PP</sub> [mo*rdait] <sub>PP</sub>

### Experiment 2

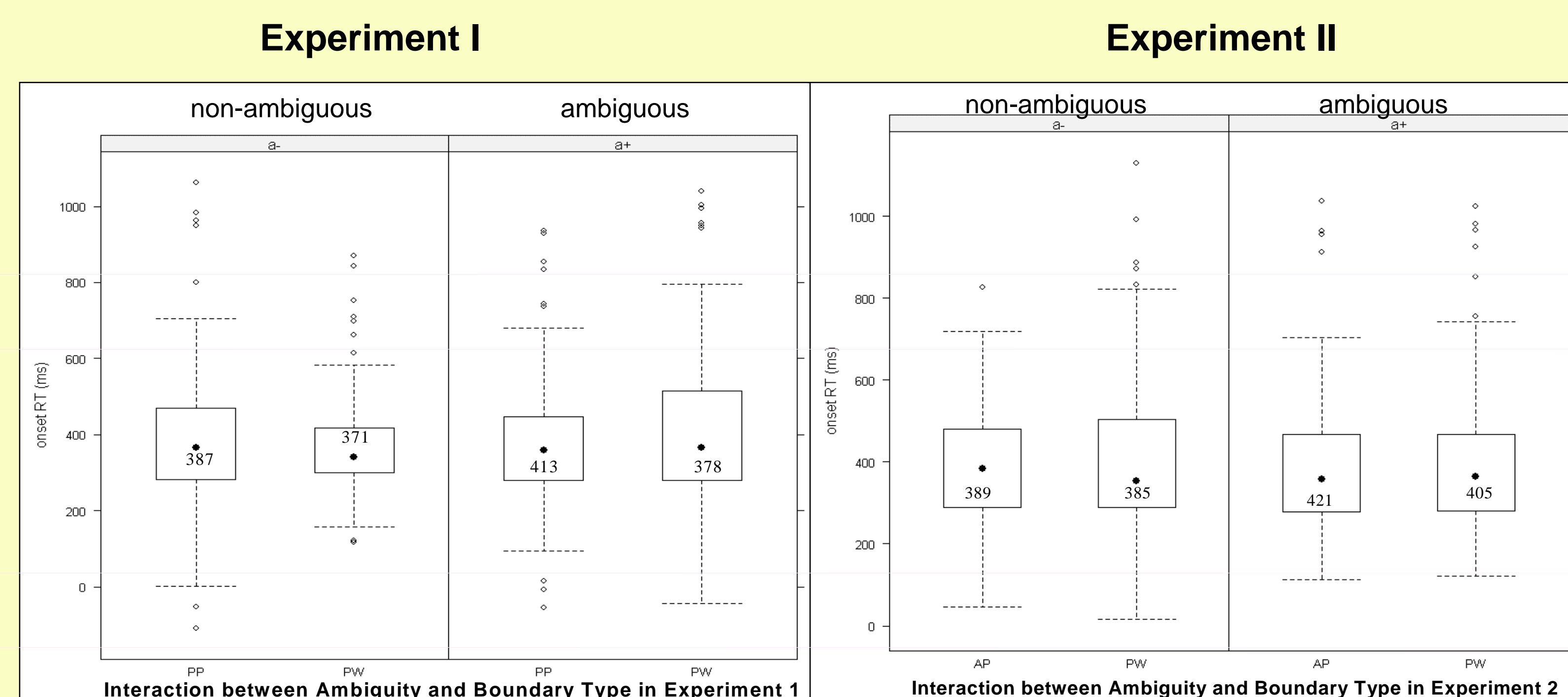
	PW boundary	AP boundary
<b>Ambiguous</b>	... [sur ce chat légendaire] PP	... [sur ce chat] <sub>AP</sub> [légendaire] <sub>AP</sub>
<b>Non Ambiguous</b>	... [sur ce chat fa*buleux] PP	... [sur ce chat] <sub>AP</sub> [fa*buleux] <sub>AP</sub>

(\*) The sequences *chafa* and *chamo* do not exist in French. Position within the sentence and diphone probability at target sequence boundary was controlled.

### Participants and Procedure

- 40 native speakers of French took part in both experiments
- Cross-modal word-monitoring task
- Reaction times measured from **target word onset**

## RESULTS I

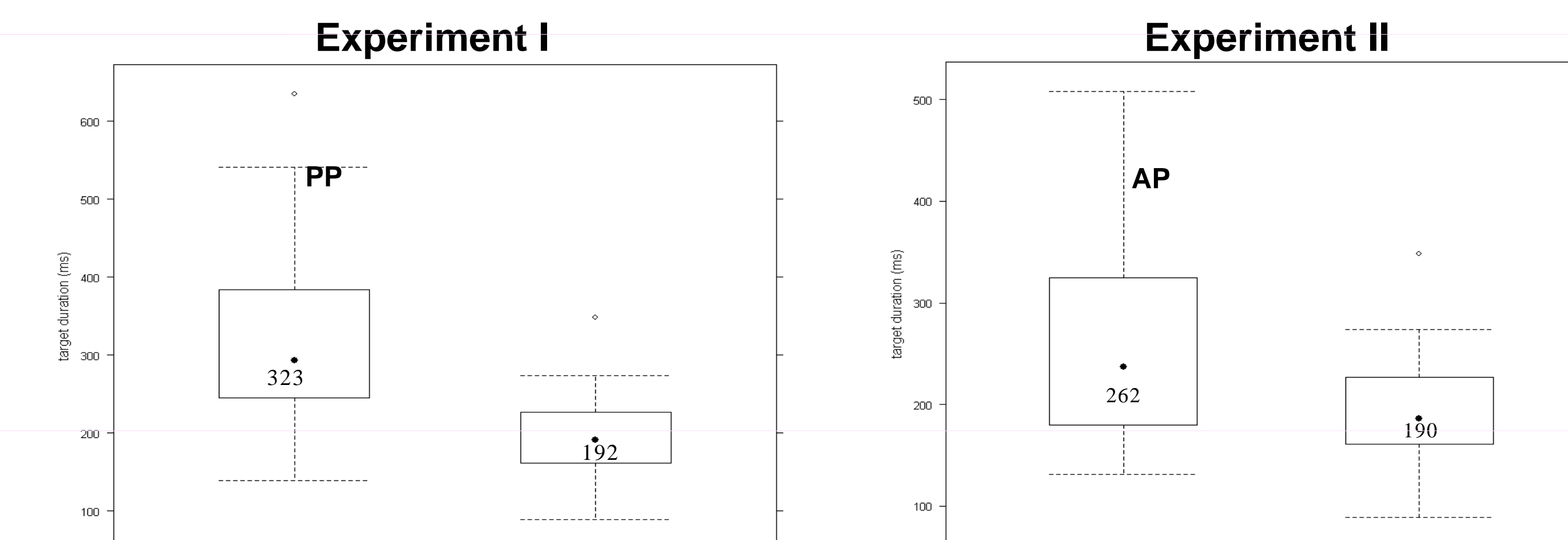


No significant effect of temporary lexical ambiguity nor of prosodic boundary type

But: **target word duration** could explain the pattern of results

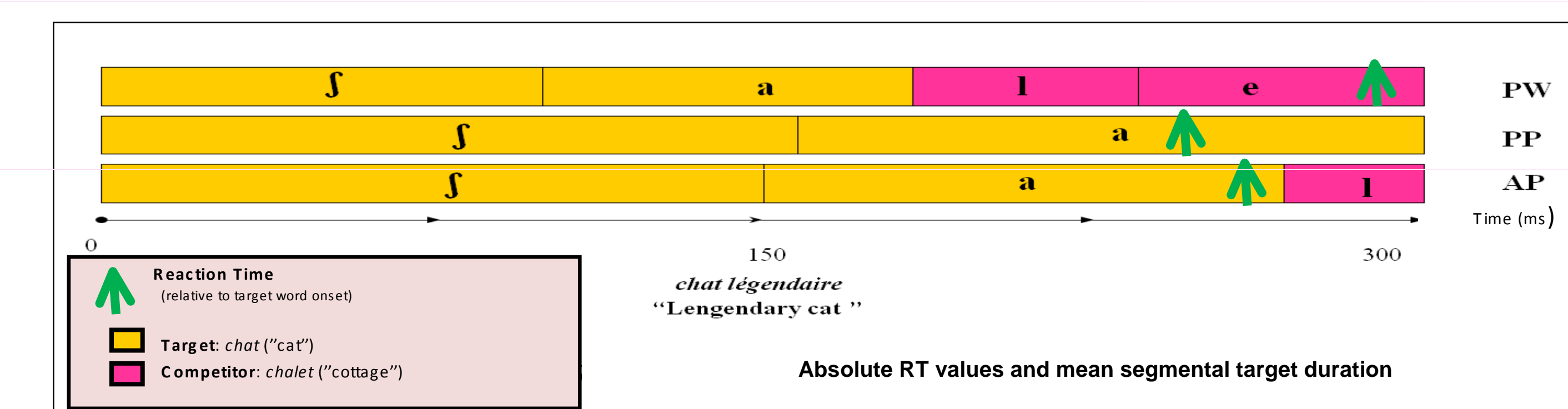
## RESULTS II

Target word duration



Target word duration (ms) depending on prosodic conditions in Experiment 1 Target word duration (ms) depending on prosodic conditions in Experiment 2

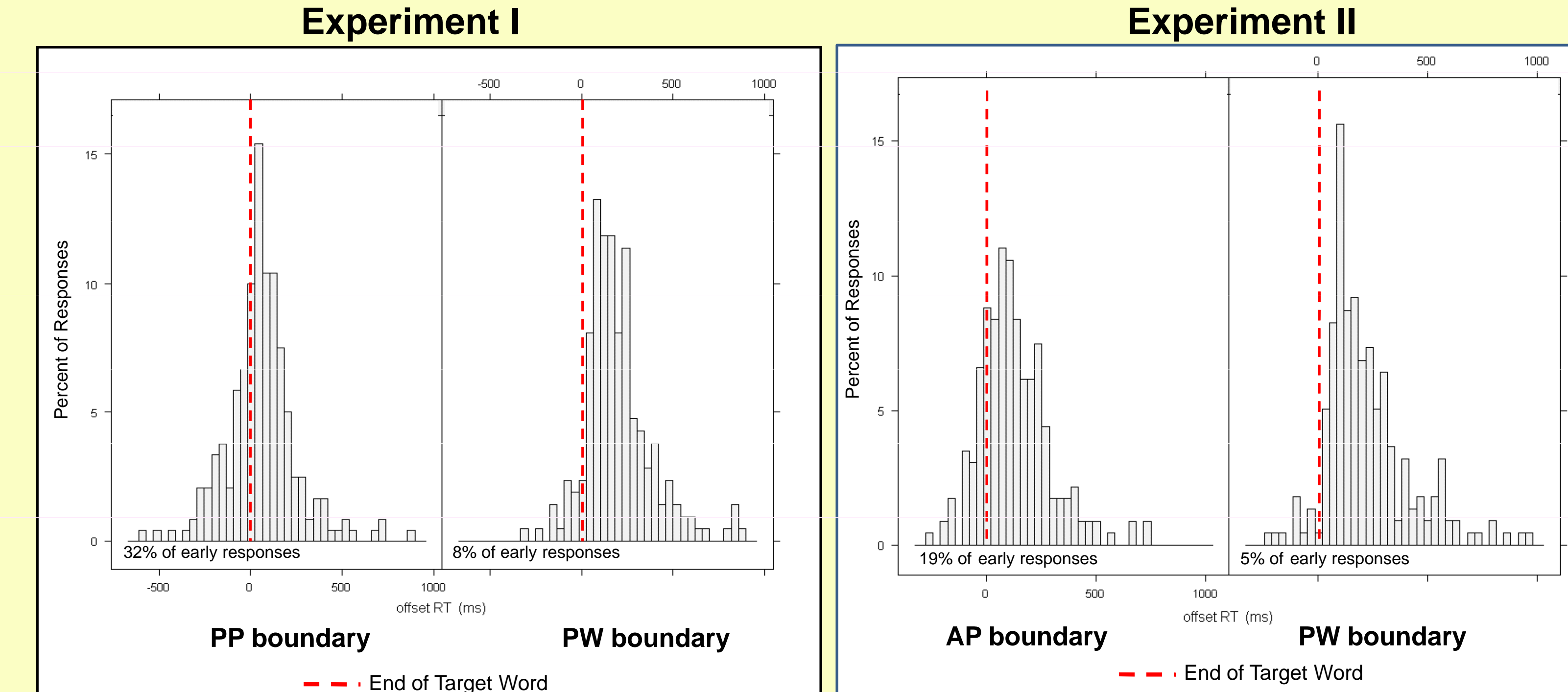
Strong preboundary lengthening for the target word before both PP and AP boundaries



Since **target word duration** is different depending on prosodic condition, need to evaluate pattern of responses relative to target word offset

## RESULTS III

Rate of early responses (at or before word offset)



There was a significant effect of PP and AP boundaries on response pattern

Participants responded relatively earlier (at or before word offset) for both PP and AP boundary conditions than for PW condition

effect size for PP:140ms - effect size for AP:96ms

## CONCLUSION

- As in Christophe *et al.*'s study, prosodic phrases influence lexical access on-line: PP boundaries speed up lexical decision task if target duration is taken into account.
- However, no local ambiguity effect within prosodic condition.
- AP boundaries induce the same effect as PP boundaries. Hence, tonal and acoustic cues are relatively independent of syntax in signalling phrasing.

### Acknowledgments

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### References

- Christophe, A., Peperkamp, S., Pallier, C., Block, E., Mehler, J. (2004). « Phonological phrase boundaries constrain lexical access I. Adult data », *Journal of Memory Language*, 51, 523-547.  
 Pierrehumbert, J. (1980). The phonetics and phonology of English intonation. Unpublished Ph.D. thesis, MIT.  
 Selkirk, E. O. (1984). *Phonology and Syntax: The relation between sound and structure*. Cambridge, MA: MIT Press