

Multilevel Modelling of Initial Rise in French

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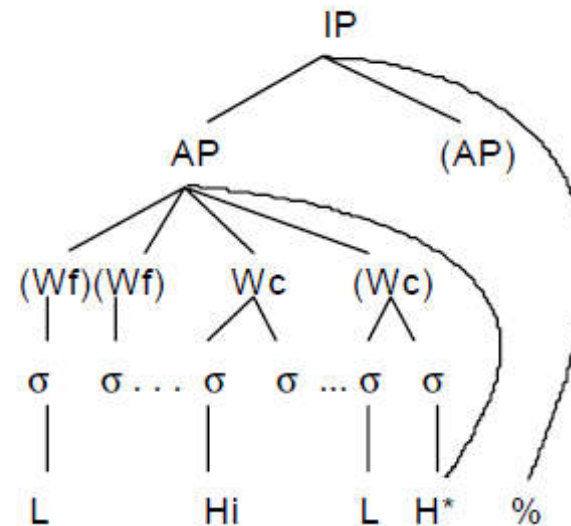
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Introduction

- In French, the minimal prosodic unit is the **Accentual Phrase (AP)**. It minimally consists of one content word (Wc) and its dependent function words (Wf).
- An AP is tonally marked by a high pitch movement associated with its rightmost full syllable (**LH***) and an optional high tone (Initial Rise, **LHi**) aligned with a syllable on its left side.



IP: Intonation Phrase AP: Accentual Phrase
Wf: function word Wc: content word
σ: syllable %: Intonation phrase boundary

Schematics of underlying tones in AP
(LHiLH*) and their affiliation
(Jun & Fougeron, 2000 : 214)

Issues and hypotheses

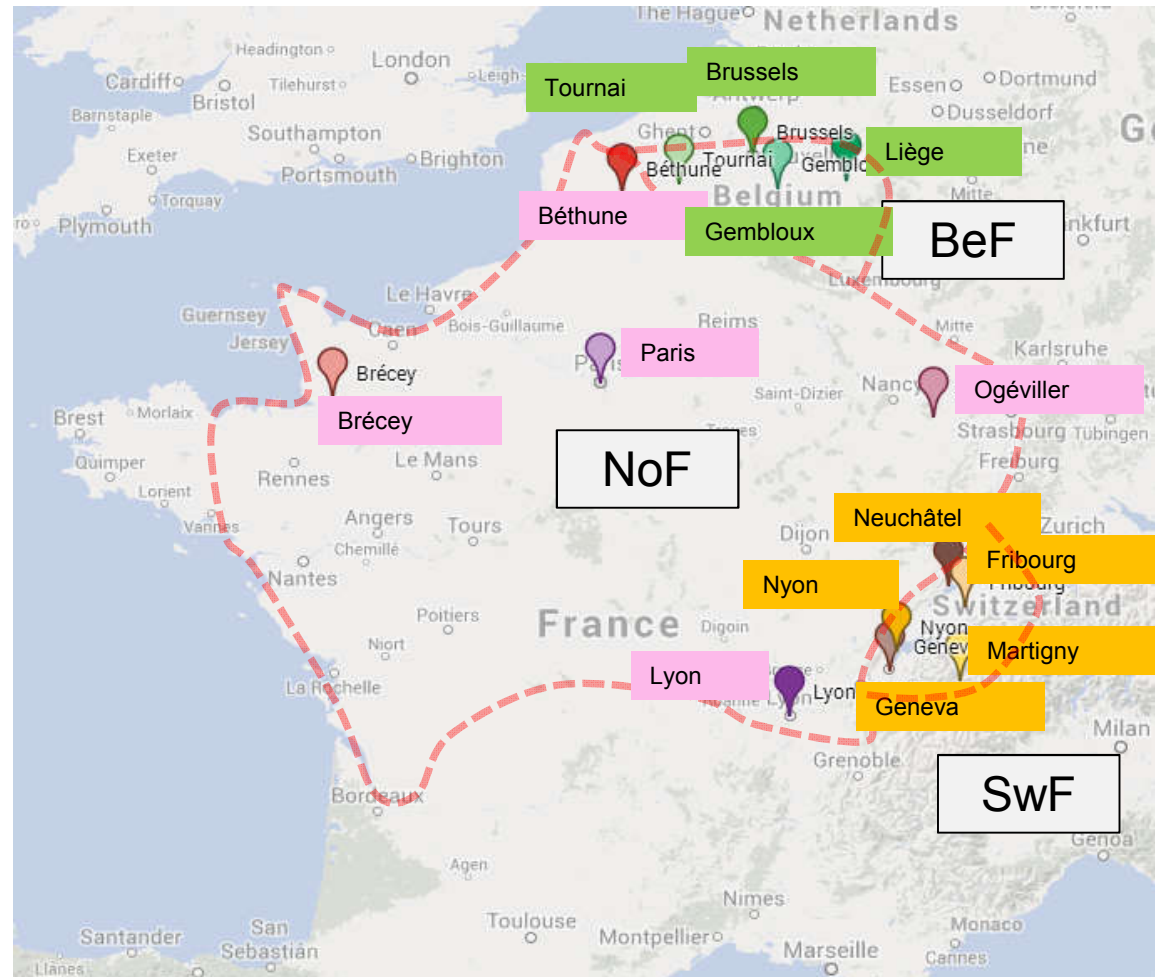
- The **phonological status** of initial rises (IR) is still a question open to debate, and the factors favouring its realisation (and their interaction), are more poorly understood.
 - The IR **does not have a fixed position** in the AP: it can fall on any non-final syllable of the AP, even if it has been shown that it preferentially falls on the first syllable of content words;
 - Its realisation is influenced by **speaking rate** (the faster one talks, the smaller the chances for an IR to be realized) and **constituent length** (the longer the AP, the greater the chances for an IR to be realized);
 - It is influenced by **speaking styles** (reading favours IR realisation) and **regional origin** of the speaker (e.g. speakers from Switzerland would tend to produce more IRs than speakers originating from other French-speaking areas).

Aim of the study

- To our knowledge, the way these constraints interact to define initial rise distribution in French remains unknown.
- The aim of this paper is to provide a multilevel modelling of initial rise realisation in spontaneous French,
- By evaluating the weight and the interactions of several factors mentioned before, based on corpus evidence.

Data

	Locales	Age (years)	
		Min.-Max.	Mean (sd)
BeF	Brussels	27-65	44 (15)
	Gembloux	22-76	42 (21)
	Liège	21-76	48 (24)
	Tournai	19-82	44 (26)
NoF	Béthune	21-89	46 (25)
	Brécey	19-80	47 (22)
	Lyon	21-74	42 (21)
	Paris	24-86	50 (22)
	Ogéviller	23-93	58 (24)
SwF	Fribourg	20-82	43 (24)
	Geneva	21-61	41 (18)
	Martigny	22-80	49 (28)
	Neuchâtel	25-78	53 (24)
	Nyon	30-70	46 (17)

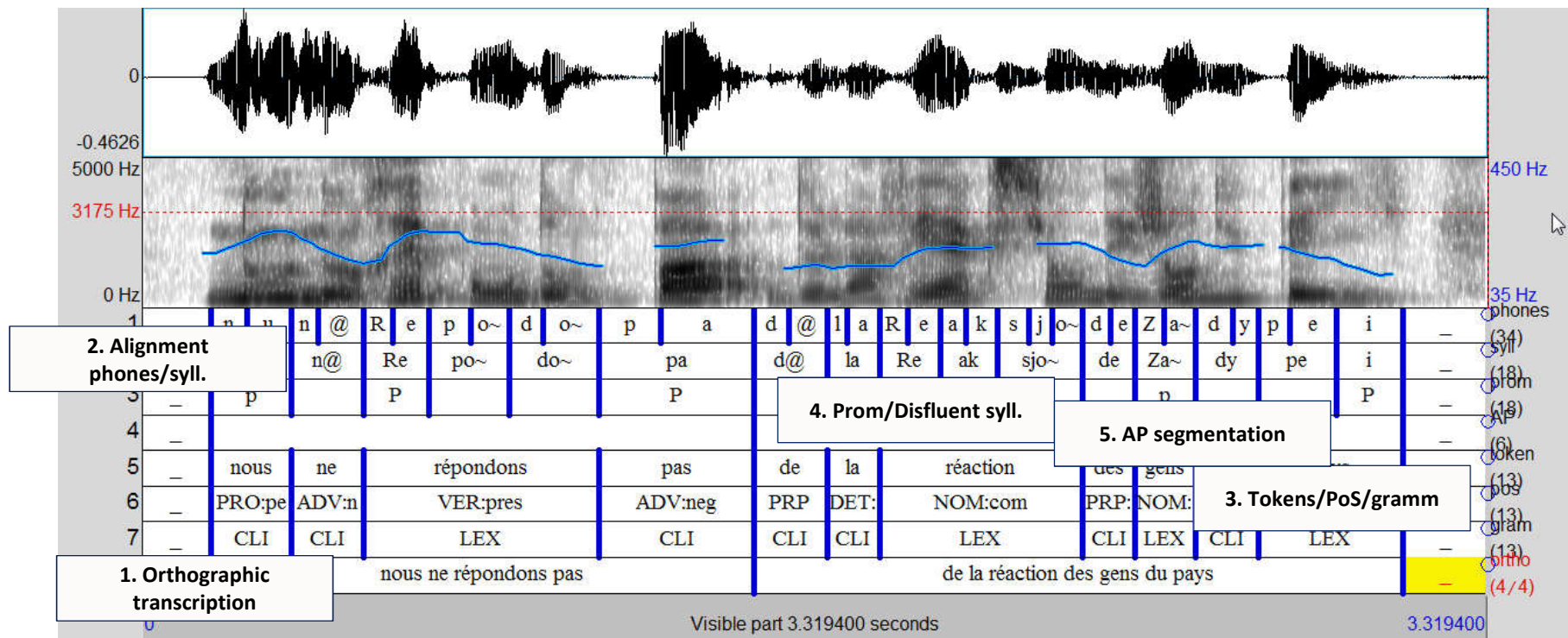


- **8 speakers per locale**
 - 4 male/4 female

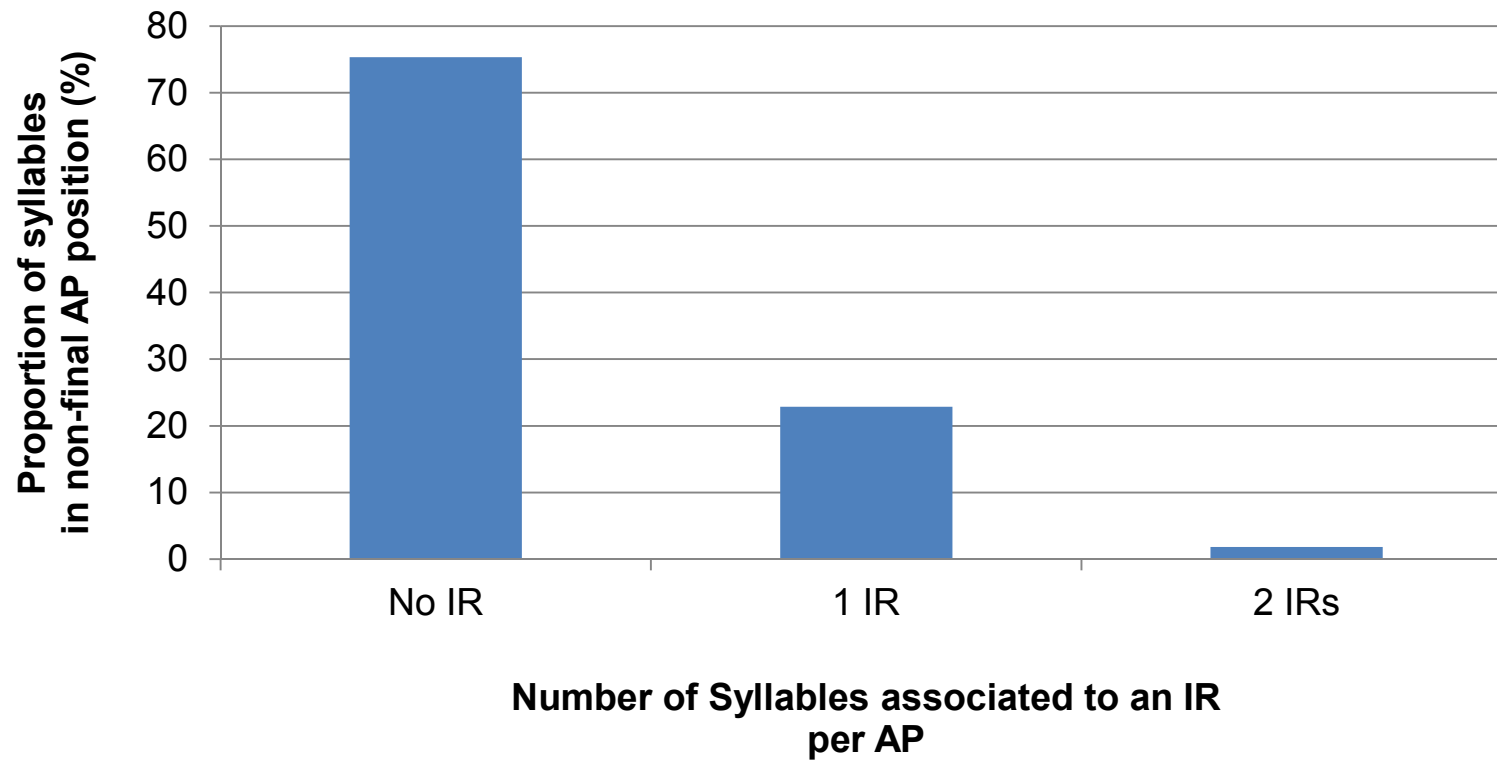
- **2 speaking styles**
 - Conversation (200 sec)
 - Read speech

- **Total**
 - **112 speakers**
 - **11 hours of speech**

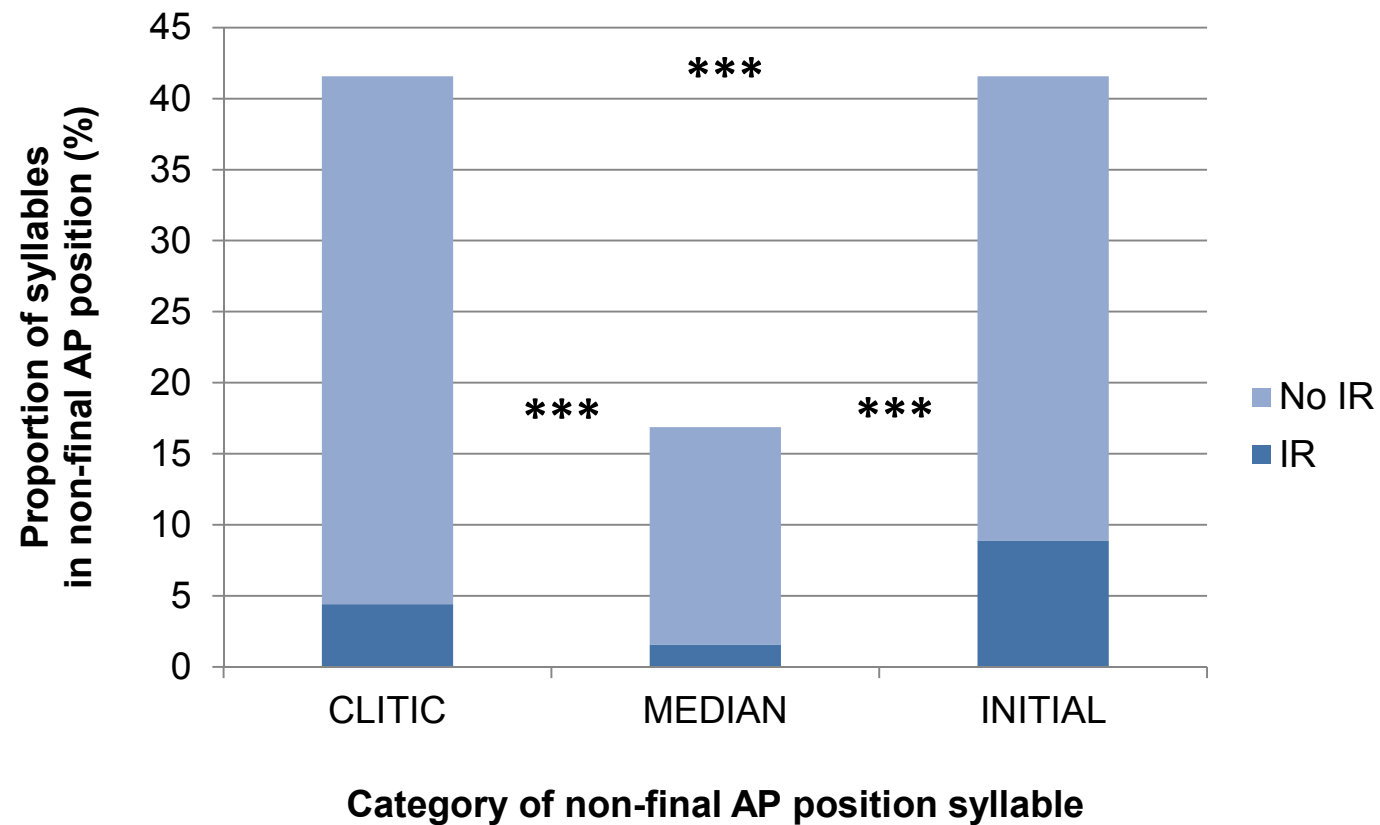
Labelling



IR rate and distribution



IR rate and distribution



Analysis

- APs containing a single IR, falling on the left edge of a Wc, are the most numerous in our corpus:

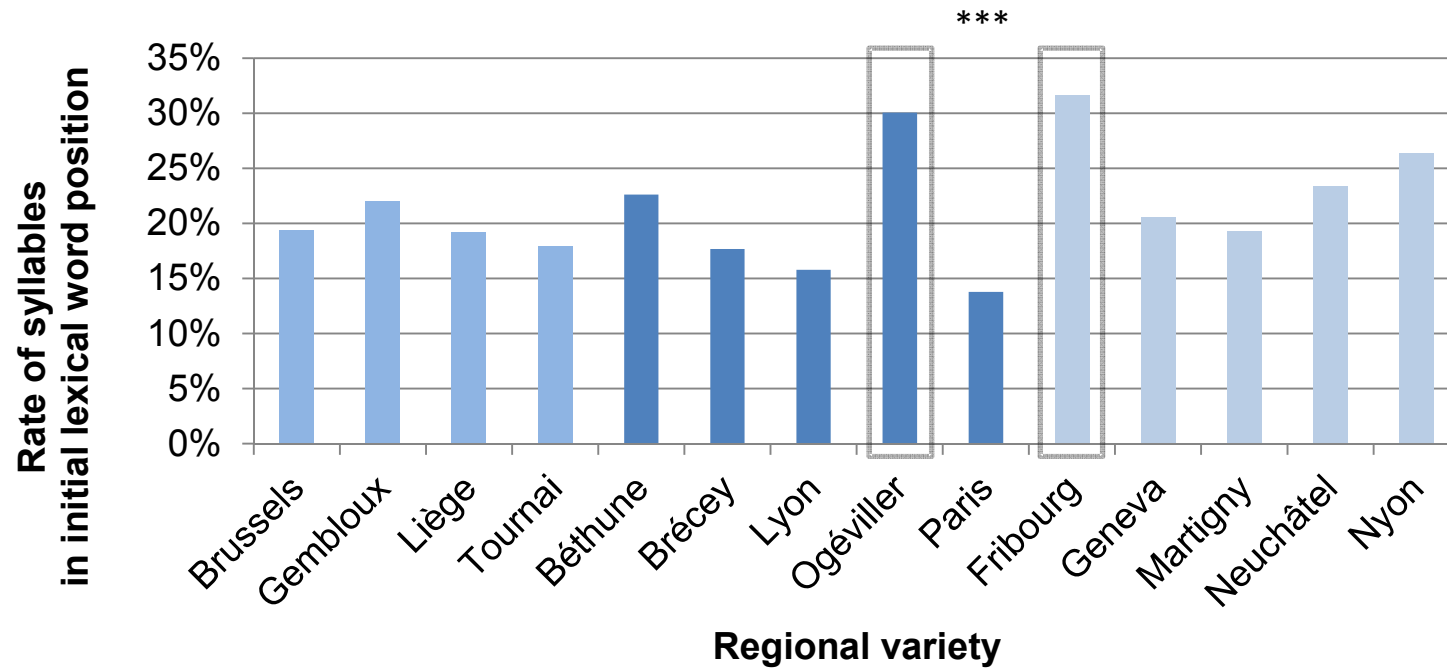
Ex. La nationnalité]_{AP} des habitants]_{AP}

- We isolated all these sites (N= 32'565) and tested the influence of various effects on IR distribution.

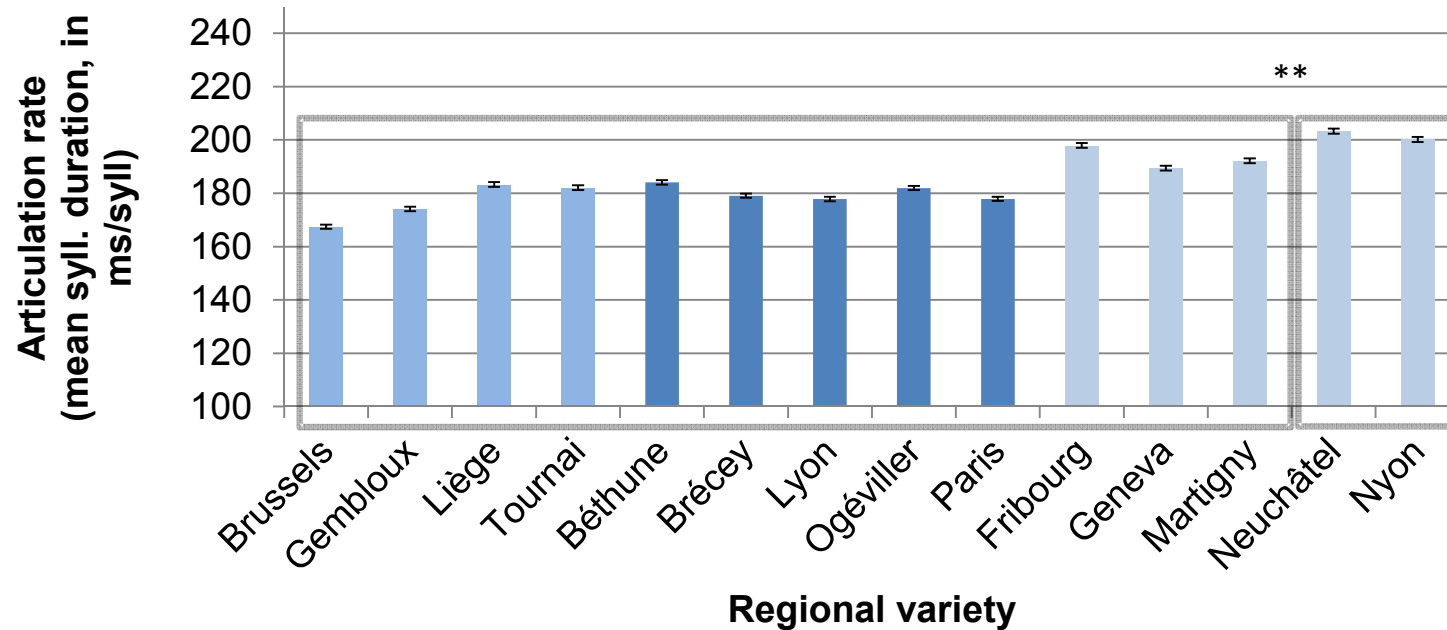
Analysis

- Generalised Estimating Equations (GEE) with repeated measures
 - Speaker as a random variable
 - Status of the syllable (associated with IR or not) as the dependent variable
 - Independent variables:
 - Regional Variety (x14)
 - Speaking Style (read speech vs conversational speech)
 - AP Length (nb of syllables/AP)
 - Local Articulation Rate (mean syllabic duration per AP)
 - Position of the syllable within the AP

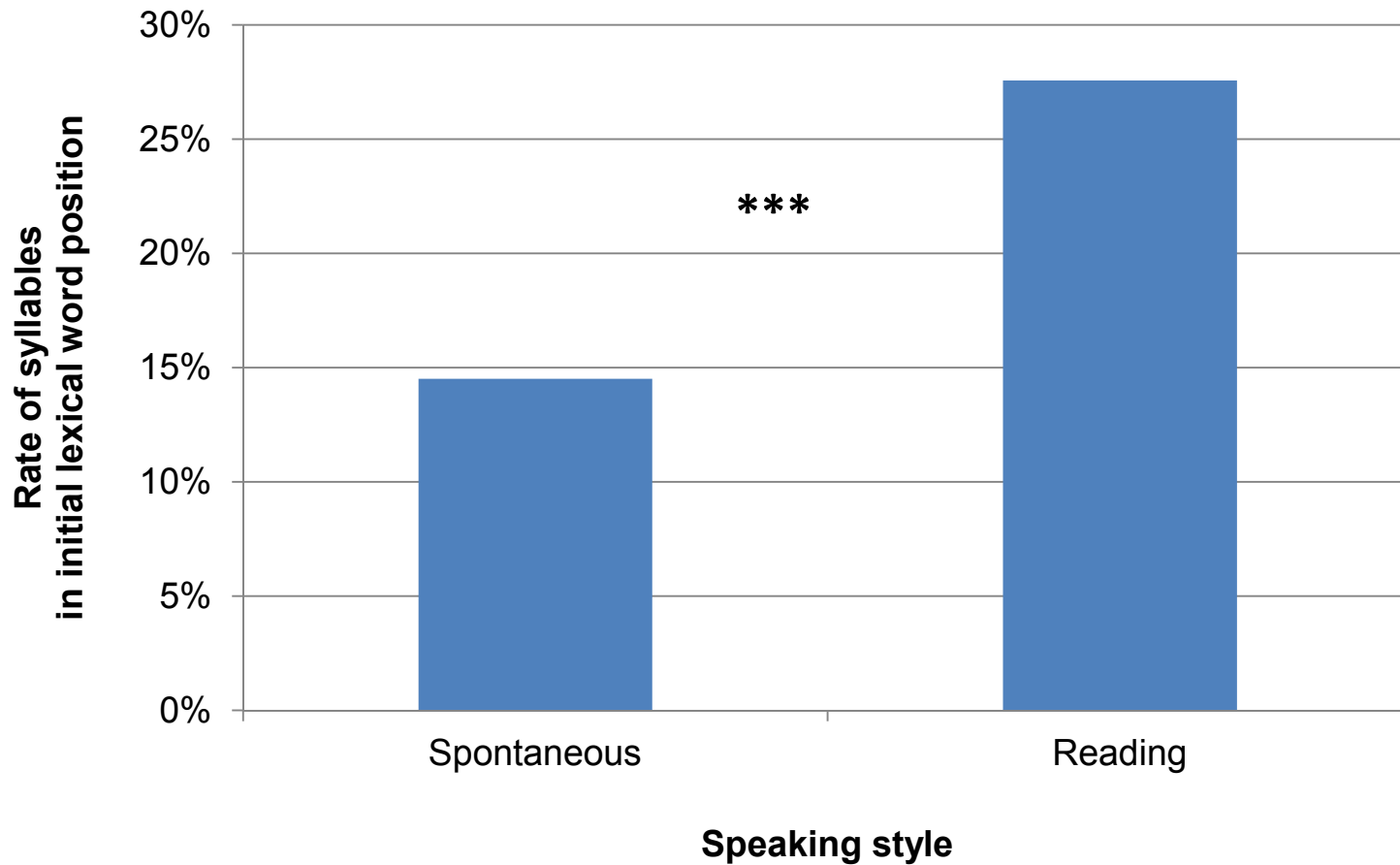
Effect of Regional Variety



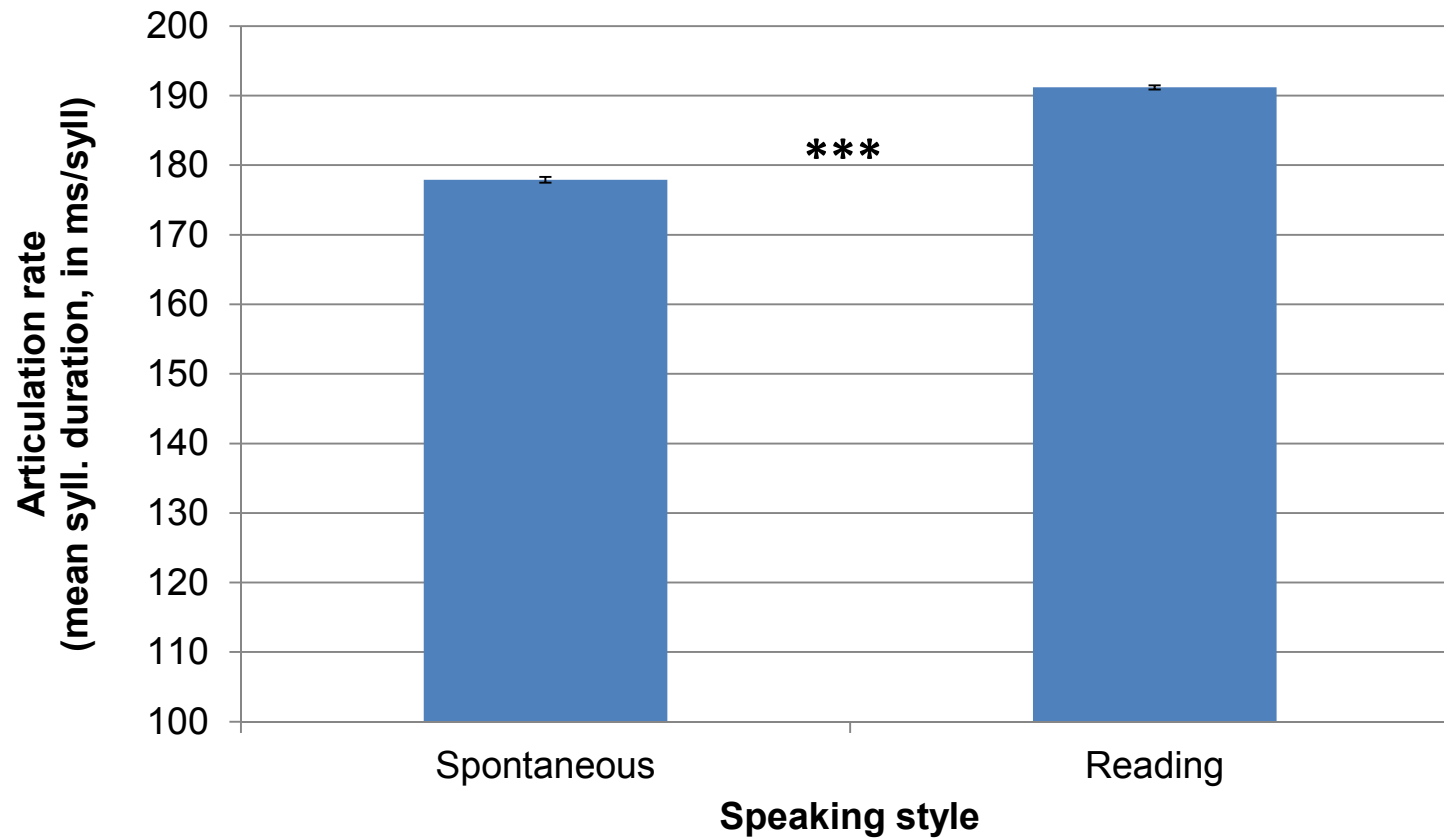
Effect of Regional Variety



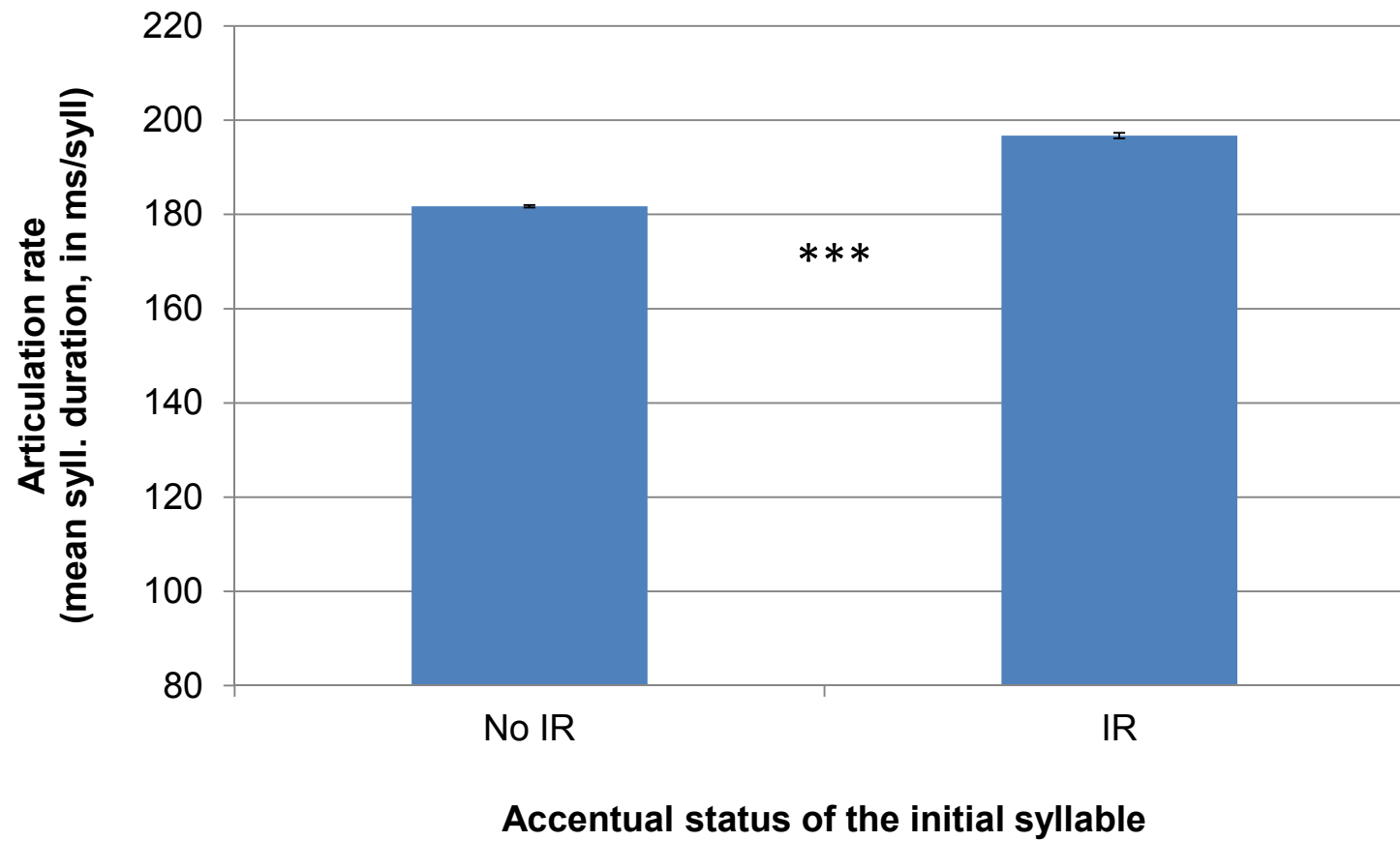
Effect of Speaking Style



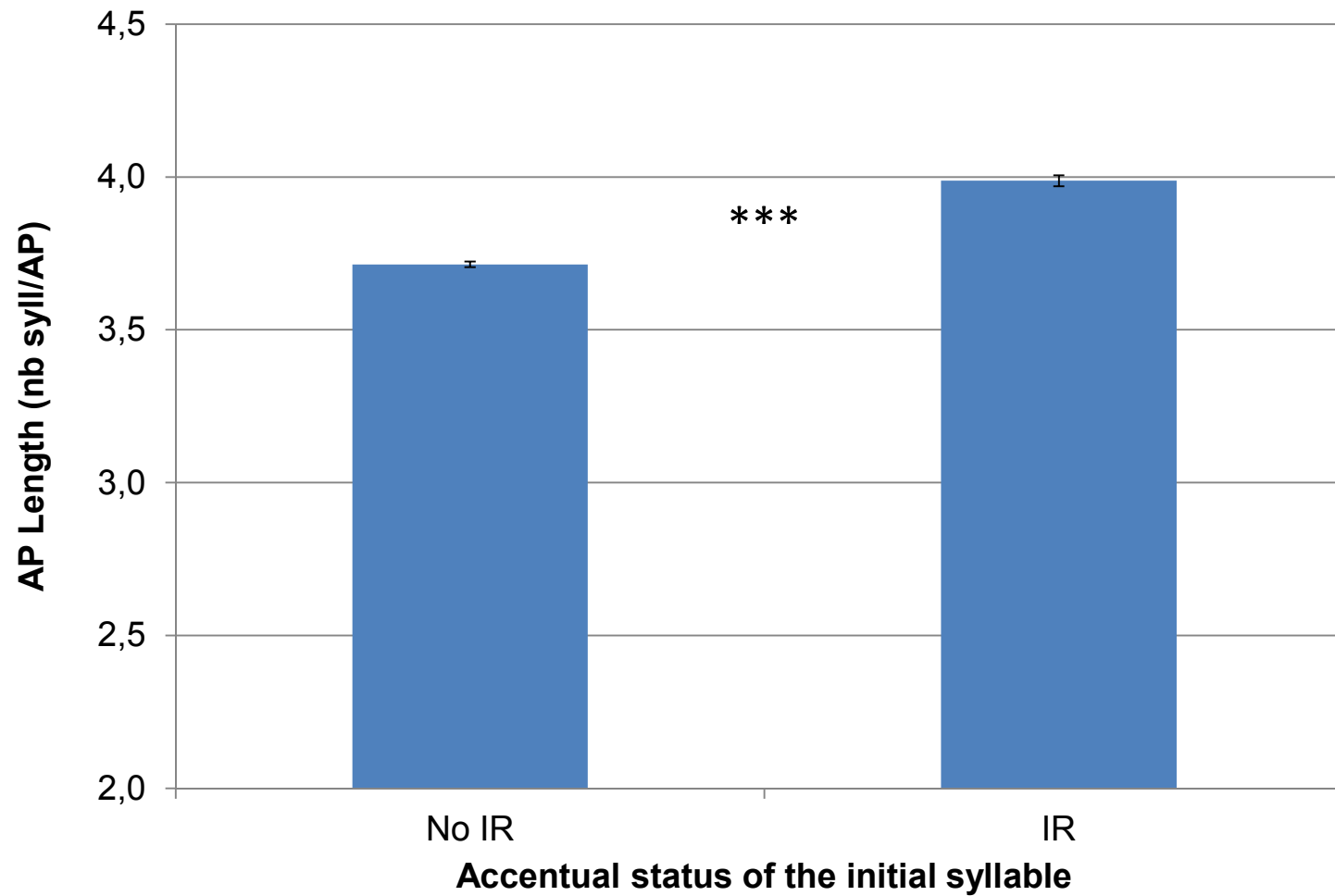
Effect of Speaking Style



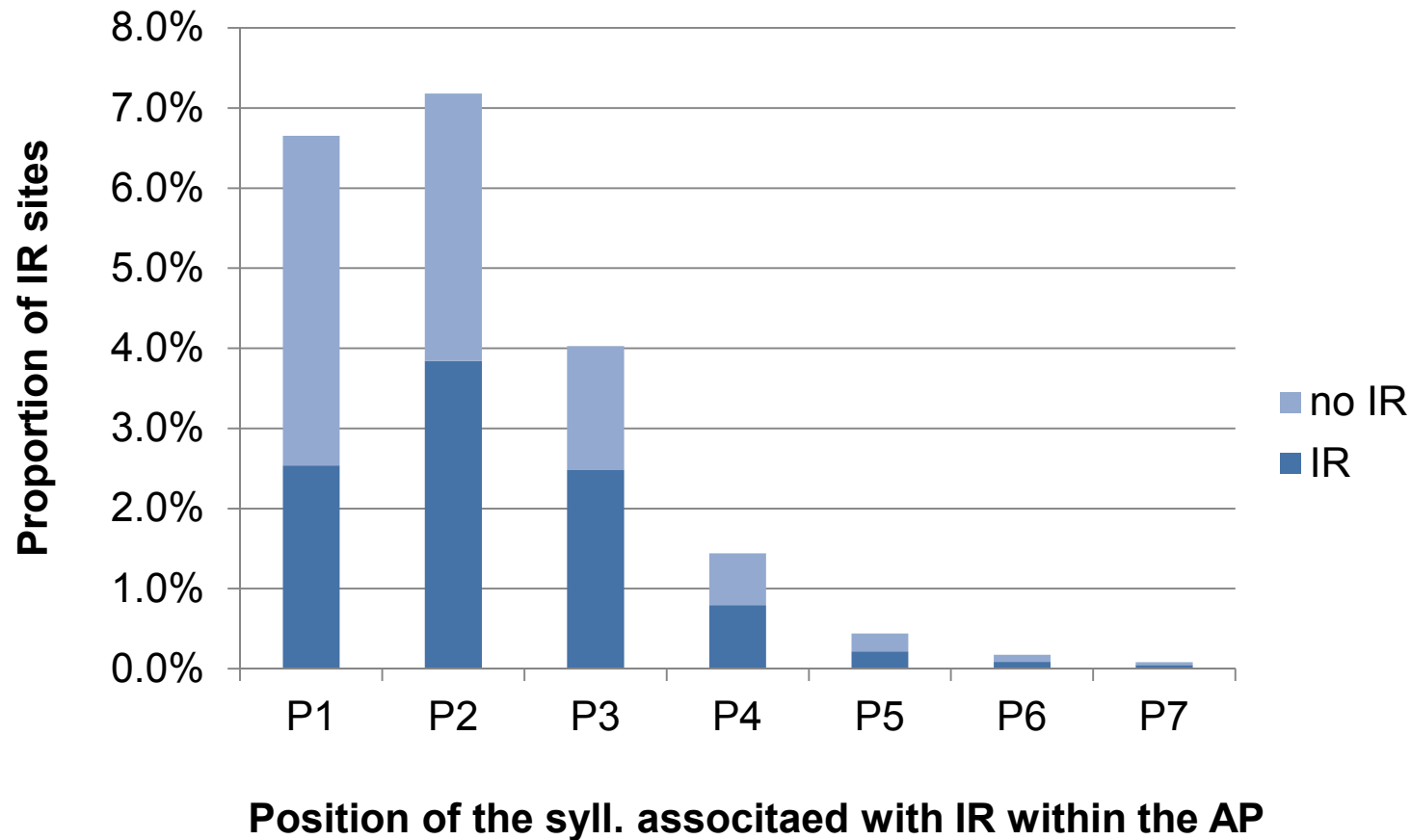
Effects of Articulation Rate



Effects of Constituent Length



Effects of the position of the syllable within the AP



Summary

- The main results can be summarised as follows:
 - IR can fall on any non-final syllable of an AP, but it preferentially associates with the leftmost syllables of content words;
 - The content word carrying the initial rise is not necessarily the first one of the AP;
 - The fact that an AP may contain two IRs confirms that IR is used not only to signal the left boundary of a constituent; it also has a rhythmical balance function;
 - IR rate is constrained by the regional origin of the speaker, as well as by speaking style, articulation rate and constituent length (either measured in terms of the number of syllables per AP or per Wc).

Conclusion

- Further research and discussion is needed regarding:
 - The phonological status of the IR (edge tone or pitch accent?);
 - The status of the Phonological Word in French;
 - The use of spontaneous speech for prosodic analysis.

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Discours
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Variationl



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