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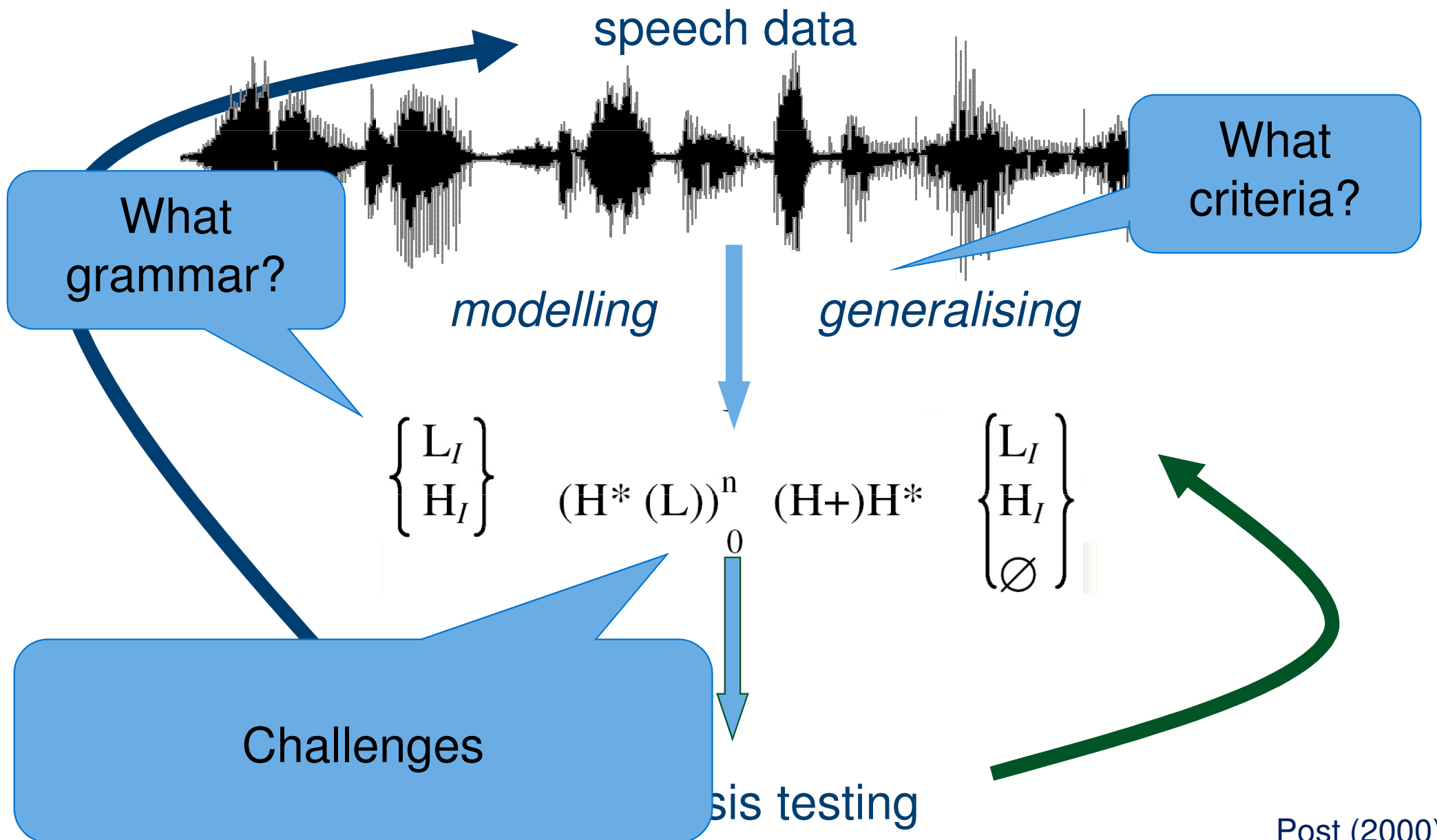
800 YEARS  
1209 ~ 2009

# An Autosegmental-Metrical grammar of French intonation

Brechtje Post

RCEAL

# This talk



# Not in this talk

- Alternative approaches:
  - historical perspective: non-AM precursors
  - comparison with other A(M) accounts: Jun & Fougeron, DiCristo & Hirst
  - It's a grammar, not an annotation system!
- Discussion of why alternative pitch accent and boundary configurations were rejected (i.e. failed the criteria)
  - e.g. why %L ... H\* is a better generalisation than L+H\* for a rising pitch movement at the beginning of an Intonation Phrase
- 'non-neutral' intonation (e.g. contrastive focus)
- The mapping between form and meaning



# Intonational phonology

- Intonation refers to
  - the use of suprasegmental features
  - to convey sentence-level pragmatic meanings
  - in a linguistically structured way (Ladd 1996)
- In the analysis, distinguish between
  - phonological structure and phonetic implementation
  - identification of distinctive patterns and the phonological organisation of their component units (primitives)

 Different theoretical traditions

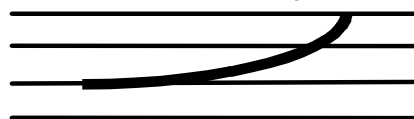


# What grammar? - Contours (& levels)

Delattre (1966)

**Rising:**

*Question (2-4<sub>+</sub>)*



*Implication (2-4<sub>.</sub>)*



*Continuation majeure (2-4)*

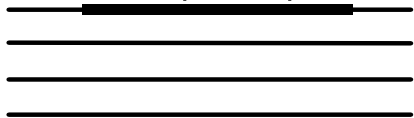


*Continuation mineure (2-3)*

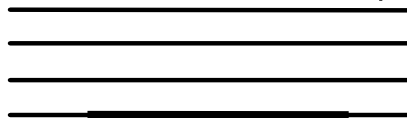


**Level:**

*Echo (4-4)*

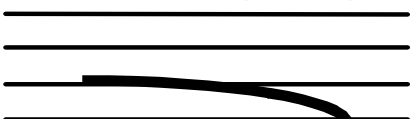


*Parenthèse (1-1)*



**Falling:**

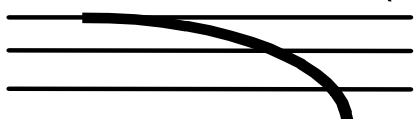
*Finalité (2-1)*



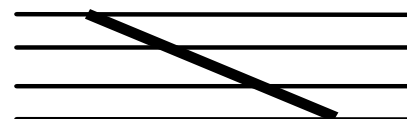
*Interrogation (4-1)*



*Exclamation (4-1)*



*Commandement (4-1)*



# What grammar?

French tonal grammar

$$\left\{ \begin{array}{l} L_I \\ H_I \end{array} \right\} (H^* (L))_0^n (H+)H^* \left\{ \begin{array}{l} L_I \\ H_I \\ \emptyset \end{array} \right\}$$



Autosegmental approach (AM framework)

# The AM framework

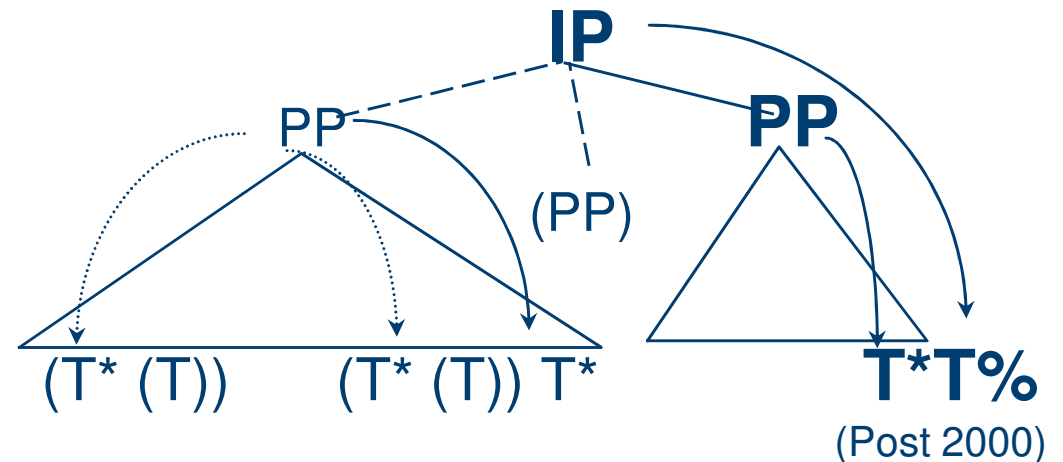
- Intonation independently carries linguistic meaning
  - conveyed by abstract phonological (categorical, discrete) elements, which are
  - physically instantiated during phonetic implementation
- Contours are analysed in terms of high and low turning points which align with specific locations in the segmental string: stressed syllables and prosodic boundaries
  - Turning points are represented as tones in the phonology
  - Tones combine in inventory of pitch accents and boundary specifications; only some configurations are contrastive

(Pierrehumbert 1980, Bruce 1977)

# Tune-text association: Tonal distribution

- PP is domain of pitch accent distribution: morpho-syntax, metrical structure and constituent length interact to determine pitch accent placement within the PP

(Post 1999; cf. Verluyten 1982, Delais 1994)



- Tonal structure is tightly constrained by phrasing at different levels of Prosodic Hierarchy
  - Location of pitch accents and boundary tones is restricted by mappings between morpho-syntactic, semantic/informational, metrical and intonational structure
  - Choice and realisation of intonation patterns is restricted by resulting prosodic structure

# AM grammar of Post (2000)

Primitives:

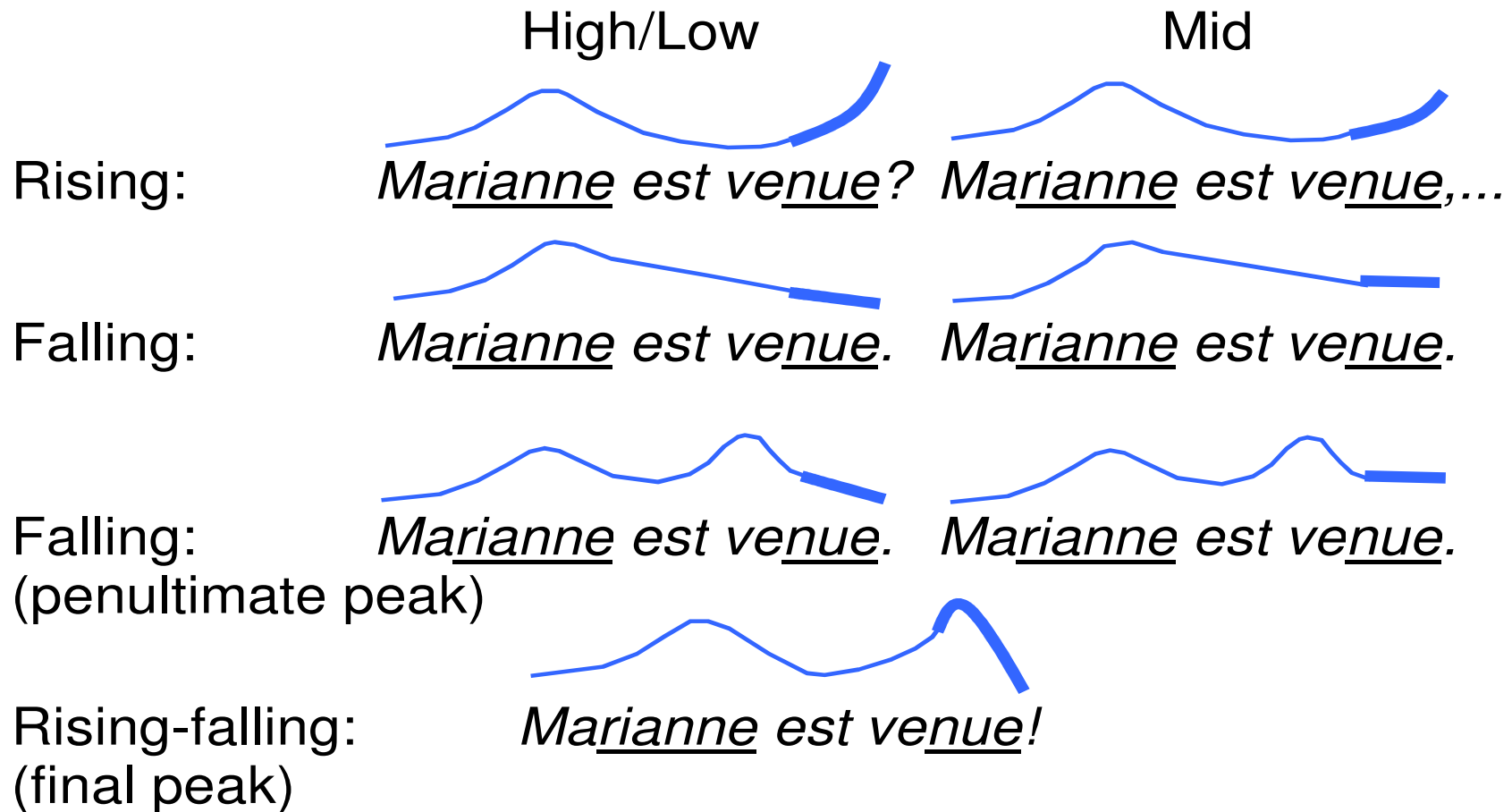
- Underlying pitch accents:  $H^*$ ,  $H+H^*$
- Boundary specifications:  $H$ ,  $L$  or  $0$
- Optional  $L$ :



Combinatory grammar:

$$\text{The IP: } \left\{ \begin{array}{l} \%L \\ \%H \end{array} \right\} (H^*(L))_0^n \left\{ (H+)H^* \right\} \left\{ \begin{array}{l} L\% \\ H\% \\ 0\% \end{array} \right\}$$

# Grammar sets out to describe: IP-final contrasts



# Grammar sets out to describe: IP-internal contrasts



*Marianne est venue?*



*Marianne est venue?*



*Tu sais que Marianne est venue.*

# AM grammar of Post (2000)

## French tonal grammar

$$\left\{ \begin{array}{l} L_I \\ H_I \end{array} \right\} (H^* (L))_0^n (H^+)H^* \left\{ \begin{array}{l} L_I \\ H_I \\ \emptyset \end{array} \right\}$$

An initial High or Low tone can be followed by

any number of H\* accents (optional)

and an L-tone, but only if it's preceded by H\* (also optional)

the final pitch accent can be monotonal H\* or bitonal H+H\*

and the IP ends in a High or a Low tone, or there is no specification after (H+)H\*

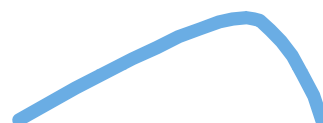
# IP-final contrasts

- Rise versus rise-fall:



*Marianne?*

%L H\* H%



*Marianne!*

%L H\* L%

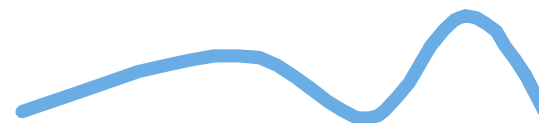


- Rising (-falling) versus falling: L-insertion



*T'as vu Marianne.*

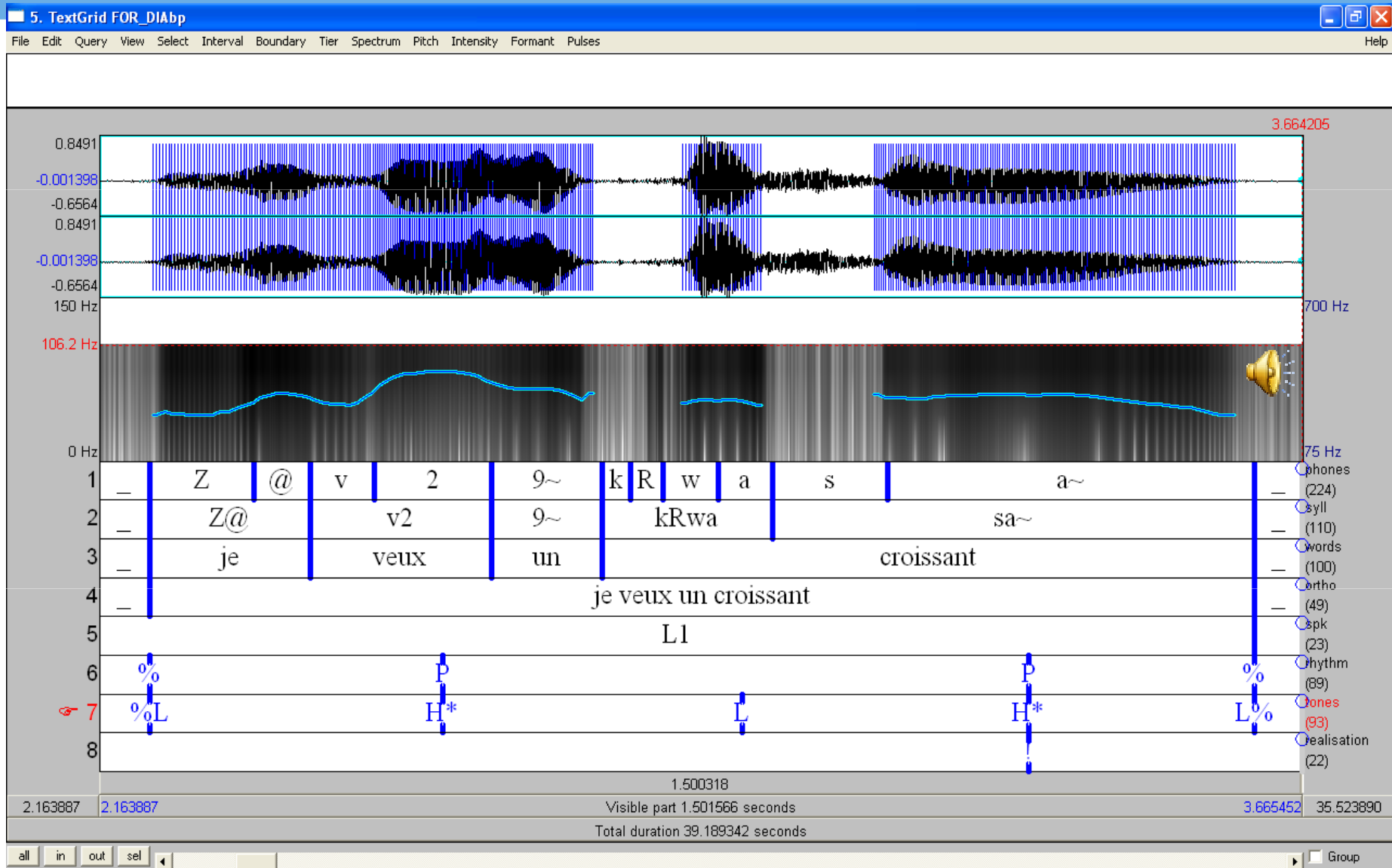
%L H\* H\* L%



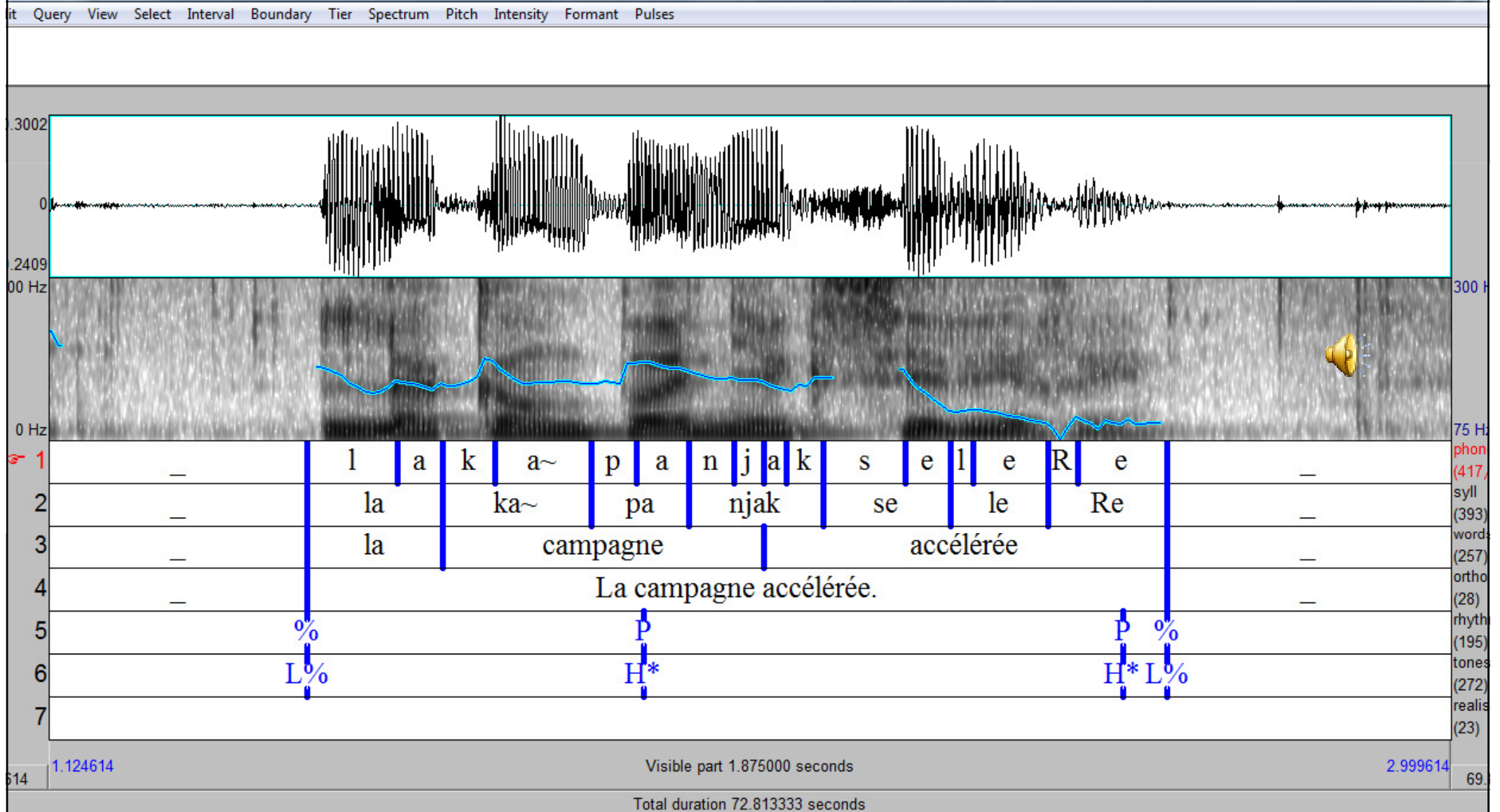
*T'as vu Marianne!*

%L H\* L H\* L%

# Rise-fall



# Final fall (no optional L + downstep)



# Downstep: lower H\* after H

- also for non-final H\*:

*Tu sais que j'ai vu Marianne?*  
%L H\*                      (H\*)                      LH\* H%

*T'as vu Marianne?*  
%H                      (H\*)                      LH\* H%

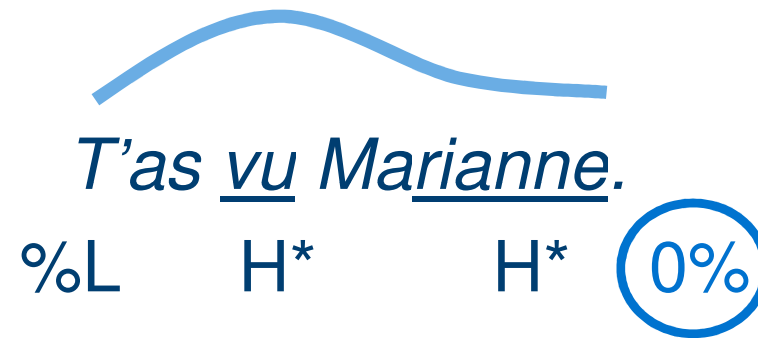
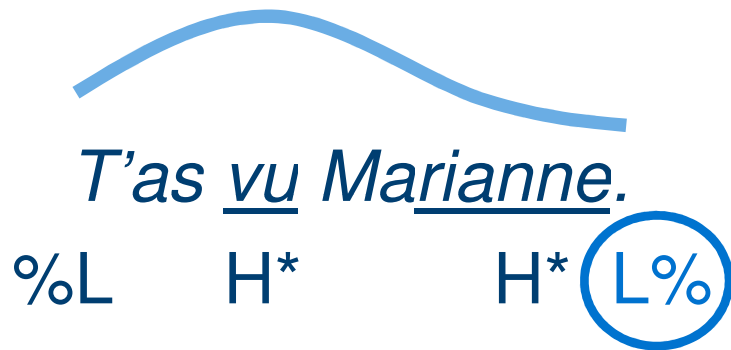
- unless H\* is followed by an H tone:

*T'as vu Marianne?*  
%L                      H\*                      H\* H%

# IP-final contrasts

%H	(H* (L))	H*	0%
%L		H+H*	H%
			L%

- Falls to mid versus falls to low:



# IP-final contrasts

- Falls to mid versus falls to low from penultimate peak (~cliché mélodique):

			0%
%H	(H* (L))	H*	H%
%L		H+H*	L%

*Mais c'est Marianne.*

%L      H + H\*    L%

*Mais c'est Marianne!*

%L      H + H\*    0%

# Summary analysis

- All accented syllables have an H\* tone
- H\* can be preceded by L: optional L
- H\* can be preceded by H: H+H\*
- H\_H is realised as H\_!H
- Categorical differences between rise, rise-fall, falls to mid and falls to low: different T%

# What criteria?

- Intonational meaning
  - Semantic and pragmatic effects
- Distribution of patterns
  - Across speakers, varieties, contexts
  - Contrastiveness , Complementary distribution, Gradience (free variation)
- Phonetic realisation
  - E.g. alignment of targets
  - Systematic patterns in implementation
- Analytical coherence (and testability), transparency and economy

# Strongly reminiscent of structuralist tradition

- **The concrete / physical approach:** characterised by specific phonetic attributes; externally observable (in phoneme theory Jones 1932, Bloomfield 1933)
- **The structuralist approach:** feature of language structure; abstraction; contrastive (in phoneme theory e.g. Pike 1944, Hockett 1958, Gimson 1962; also Trubetsky and Jakobson of Prague School)

Principles underlying the system:

- Opposition / contrast
- Complementary distribution
- Phonetic similarity
- Total accountability



# What criteria?

- Intonational meaning
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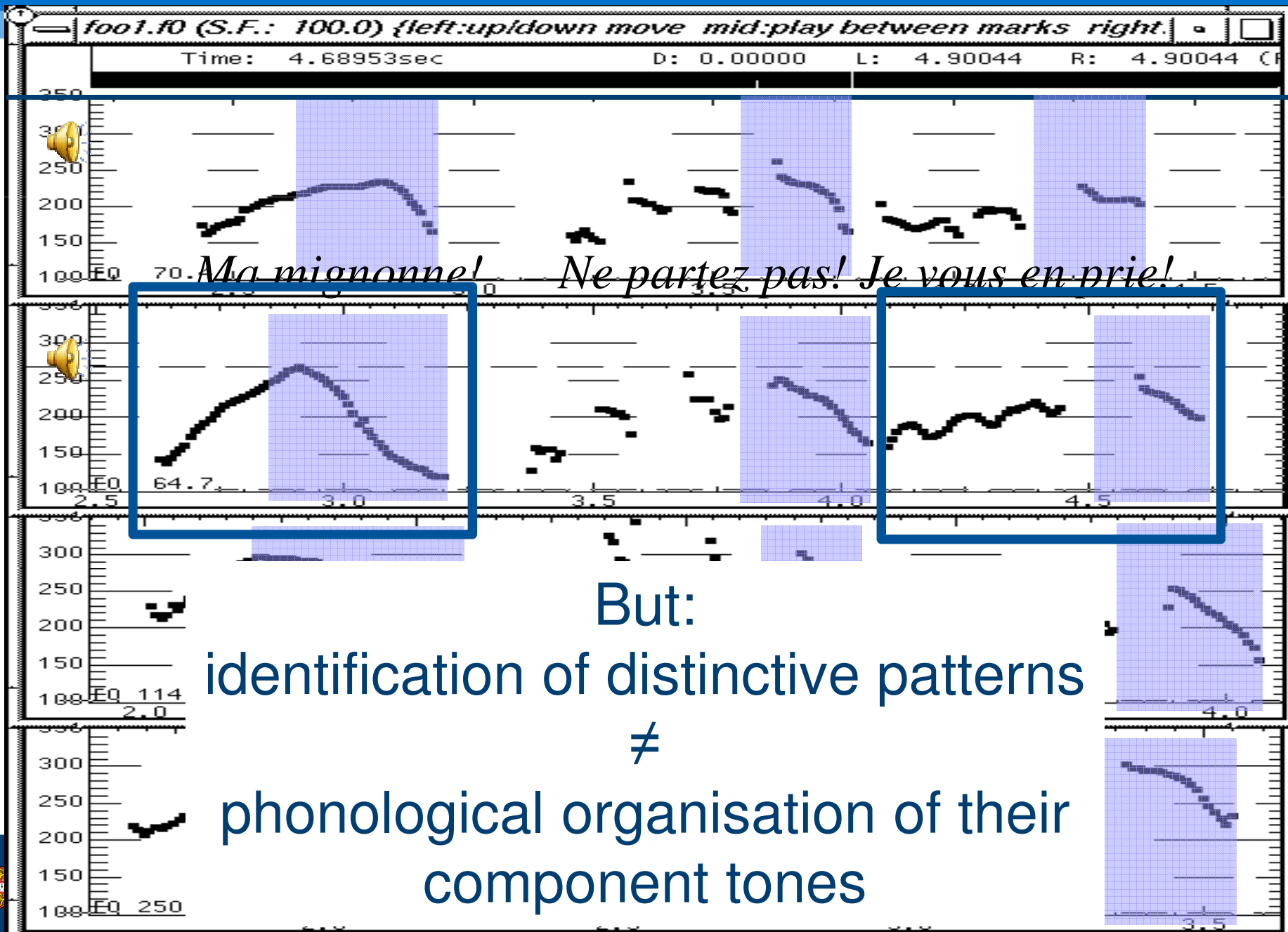
# Criteria: Intonational meaning

1. Linguistically structured, language-specific meaning
  - arbitrary form-function relations
  - forms composed of 'meaningful' (phonological) units
  - No one-to-one mapping between form and function
2. Iconic, paralinguistic meaning
  - Directly rooted in biological codes
  - Universal (usually)
3. Variation in forms is that not meaningful

# What criteria?

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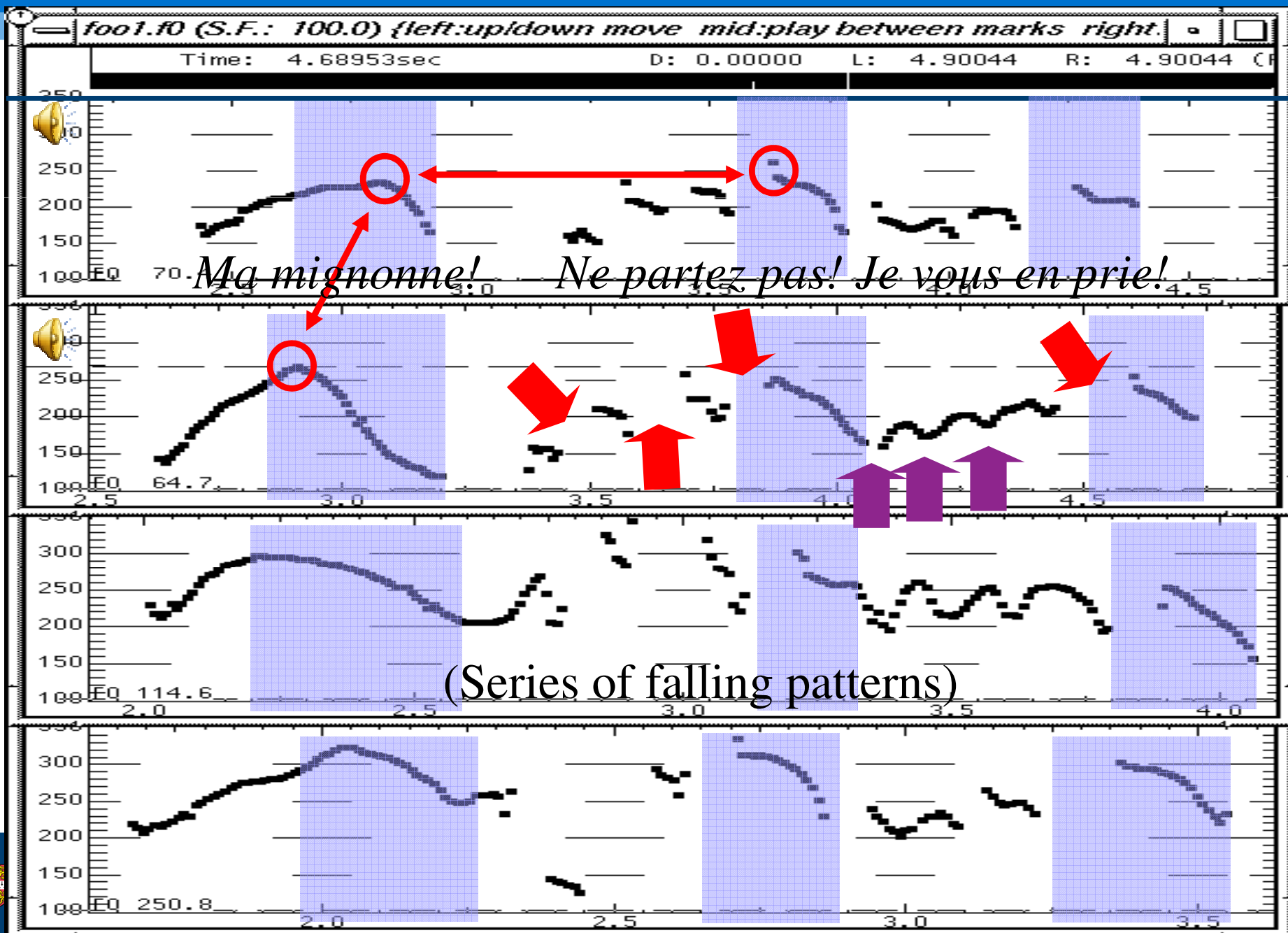
# Criteria: Distribution of patterns



# What criteria?

- Intonational meaning
  - Semantic and pragmatic effects
- Distribution of patterns
  - Across speakers, varieties, contexts
  - Contrastiveness , Complementary distribution, Gradience (free variation)
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  - E.g. alignment of targets
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# Criteria: Phonetic realisation



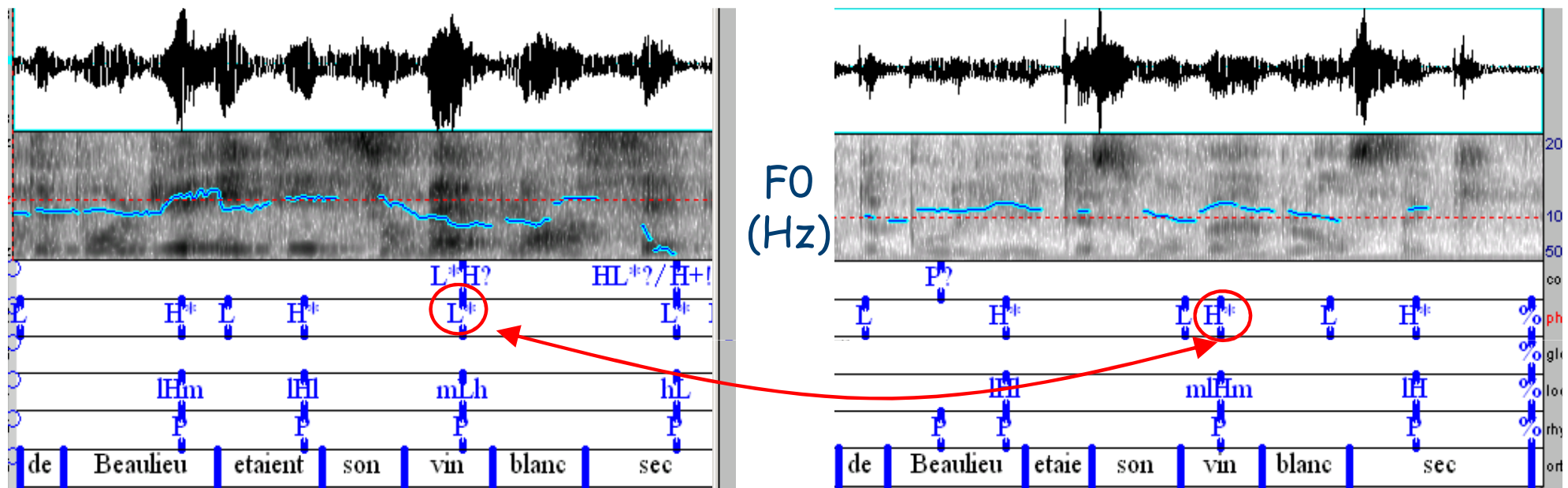
# What criteria?

- Intonational meaning
  - Semantic and pragmatic effects
- Distribution of patterns
  - Across speakers, varieties, contexts
  - Contrastiveness , Complementary distribution, Gradience (free variation)
- Phonetic realisation
  - E.g. alignment of targets
  - Systematic patterns in implementation
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# Criteria: Analytical coherence

Dialect variation:

Alsace: Contrast between L\* and H\* accents within IP



/-internal L\*

'Default' /-internal H\*

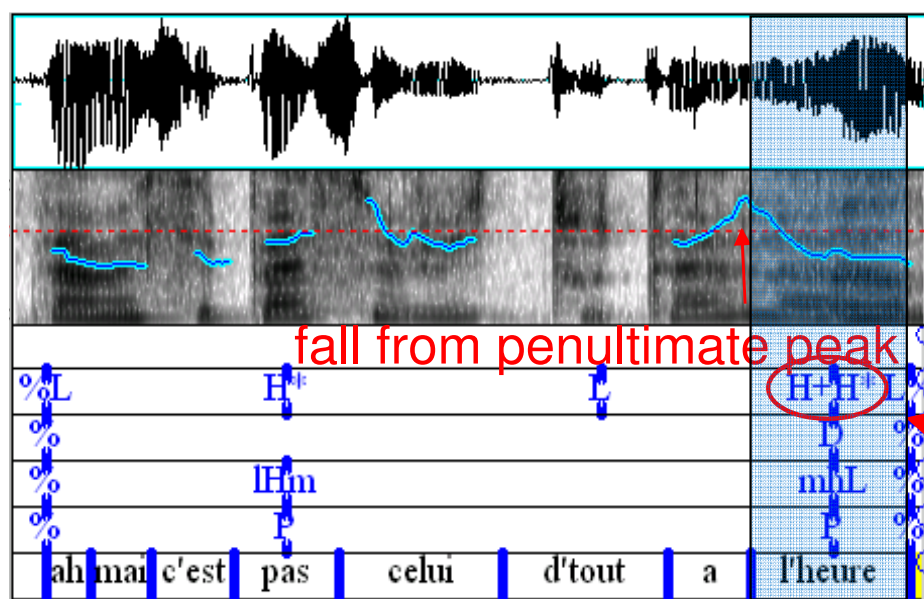
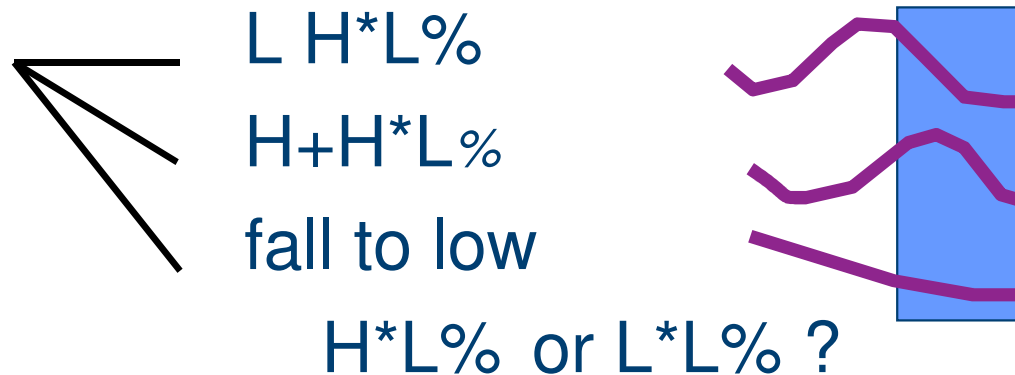


unlike Parisian: low accents in /-final position only

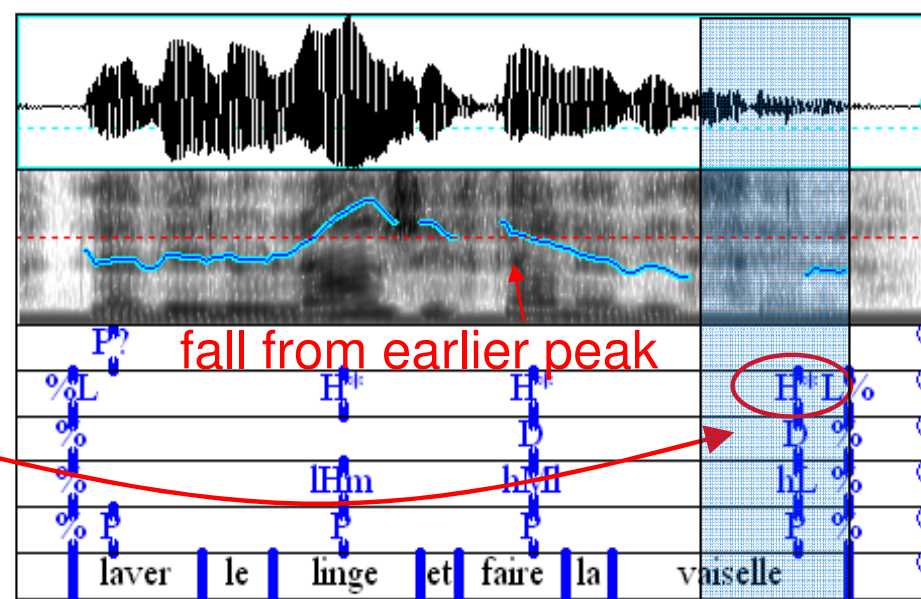
(Post and Delais-Roussarie 2006)

# What criteria: Analytical coherence

- 3-way contrast:  
Paris



Prefinal peak



Final low accent



Is Parisian the exception? No L\*?

(Post and Delais-Roussarie 2006)

# Advantages of this approach

- All surface forms derived from small set of underlying tones
- Only actual phonetic targets represented in phonology
- Abstracts away from contextual variation (allophonic/segmental/speaker)
- No difference between tonal primitives at level of tonal inventory; contrasts arise when tones associate with text
- Separate tonal specifications for *IP*-internal and *IP*-boundary movements naturally accounts for greater number of contrasts in *IP*-final position than elsewhere



# Phonetics vs phonology

Further advantage:

- Strict division of labour between phonetics and phonology forces clear decisions about grammatical status of differences between contours

➔ choice needs to be motivated: testable model.

- However, AM approach relies on clearly separable phonetics and phonology
- This fits conventional view that variant tokens of pronunciation of a word undergo some sort of normalization to a single, clean, prototypical, usually symbolic/phonemic representation prior to access in speech comprehension

# Challenges: Phonetics vs phonology

- Functional categories and gradient variation are closely intertwined in intonation, since both can be used to signal linguistic as well as paralinguistic variation in meaning (e.g. Crystal 1969, Bolinger 1970).
  - Categorical variation in form can signal paralinguistic meaning (e.g. rise vs rise-fall for surprise)
  - Gradient variation in form can be categorically meaningful (e.g. height of a rise contrasting questions vs. continuations)
- There is no minimal pair test to decide category membership (as for segments, e.g. *tear* vs *beer*)
- We know very little about how acoustic cues interact in signalling different ‘types’ of meaning
  - How do they carve up phonetic dimensions to convey meaning?

# What this grammar was not designed to do

- Speaking styles
  - because the grammar shouldn't change, although distributional properties may do
- Different varieties of French
  - Because they may have a different grammar, e.g. L\*
- Paralinguistically relevant intonational variation: phonetics
  - because they are used to reinforce, undermine etc. propositional content, but do not change it
  - although pitch, voice quality, duration and loudness are affected when they are used to express attitude or emotion can be used
- Discourse/information structure
  - because it was designed to account for utterance-level 'neutral' intonation

# but what it could do

... had I studied it, and found it to be relevant to the phonological structure of intonation:

- Intonational reflexes of discourse and information structure
  - They could be phonological, and part of the intonational grammar, e.g. Focal accents in European Portuguese and Neapolitan Italian are distinct type of pitch accent
  - Or reside in other components of the grammar, and only have a reflex in intonation
  - e.g. Focus realisation in Dutch, which involves gradient variation in peak height rather than a distinct pitch accent
  - e.g. Early focus in French, which probably involve differences in phrasing, entailing the appearance of a nuclear configuration (T\*T%), but not a distinct accent category

(As it stands, the grammar assumes they are not)

# Conclusion

- Distinguish between different levels of structure in grammar:
  - syntax, metrical structure, semantico-pragmatic structure, discourse and information structure, segmental phonology, intonational phonology (tonal structure, here)
- Together they determine surface realisation of segmental as well as suprasegmental acoustic correlates
- Where mapping relations between the components restrict the possibilities at the phonological as well as phonetic level
- Choice of where particular linguistically relevant distinction resides in the grammar and way in which components interact may vary between languages



# Acknowledgements

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