Variation in prosodic systems - synchronic and diachronic aspects

Day 3:
Synchronic typology of tone accent systems II
The ‘metrical approach’

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EGG School 2014

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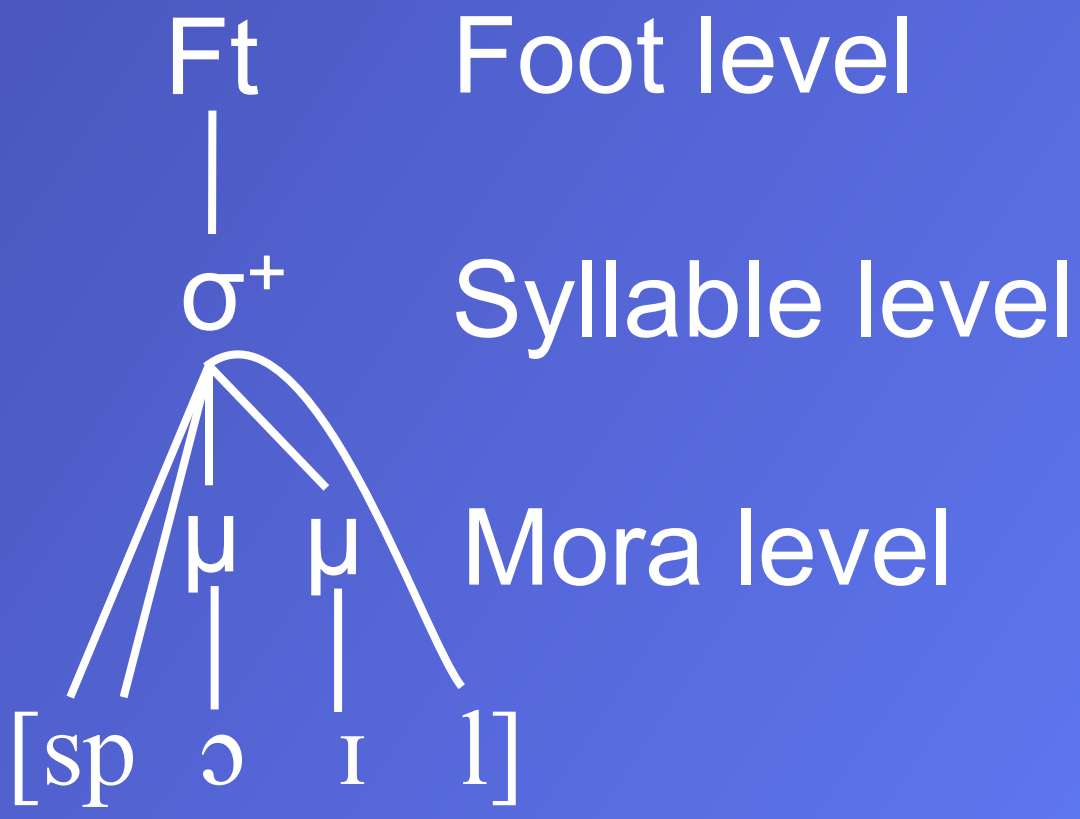
What we did yesterday…

Metrical structure at the word level



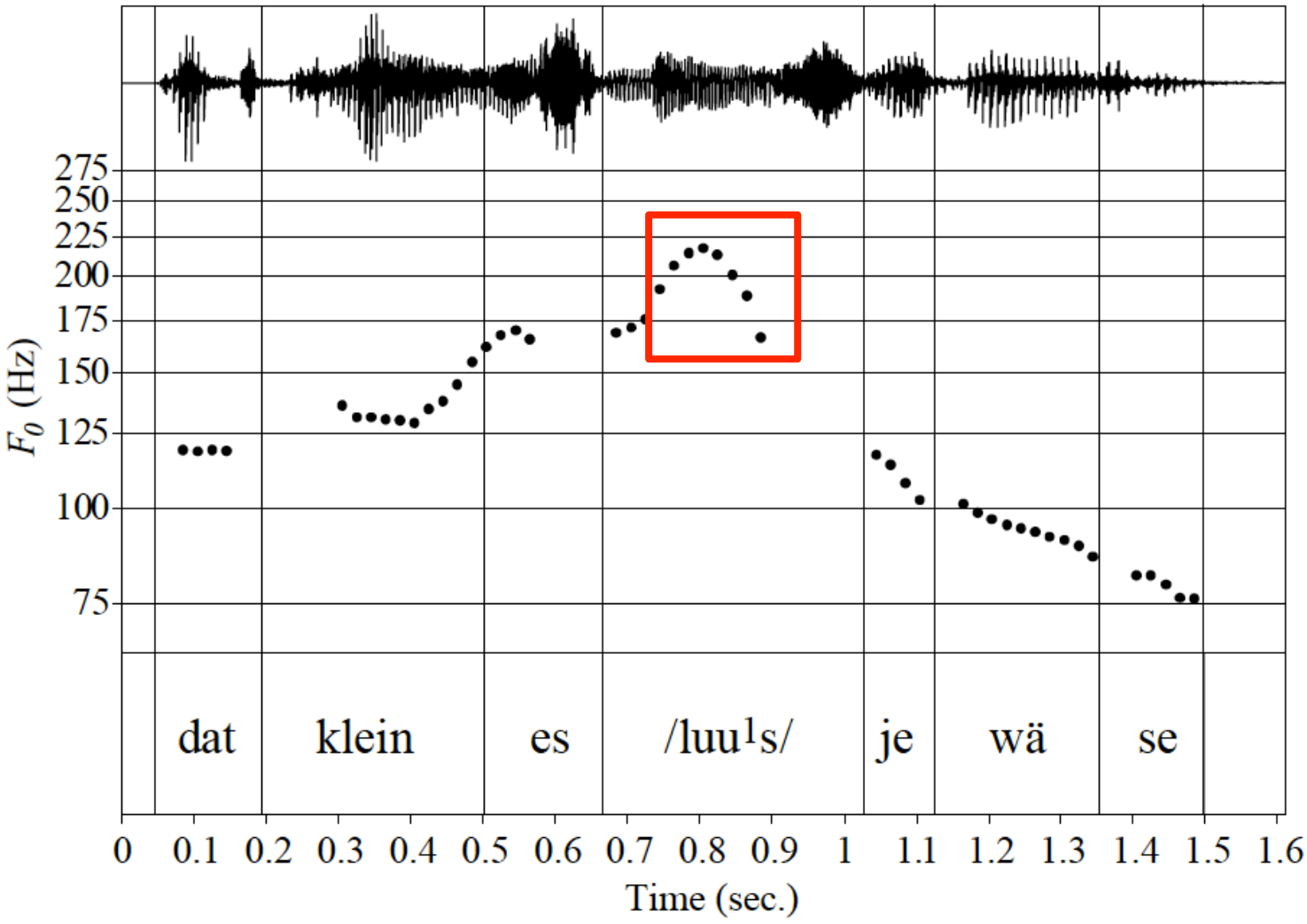
Background

- There are two competing synchronic analyses of the tone accent opposition in Franconian (and Scandinavian)
- I refer to these as…
  - The ‘tonal approach’
  - The ‘metrical approach’

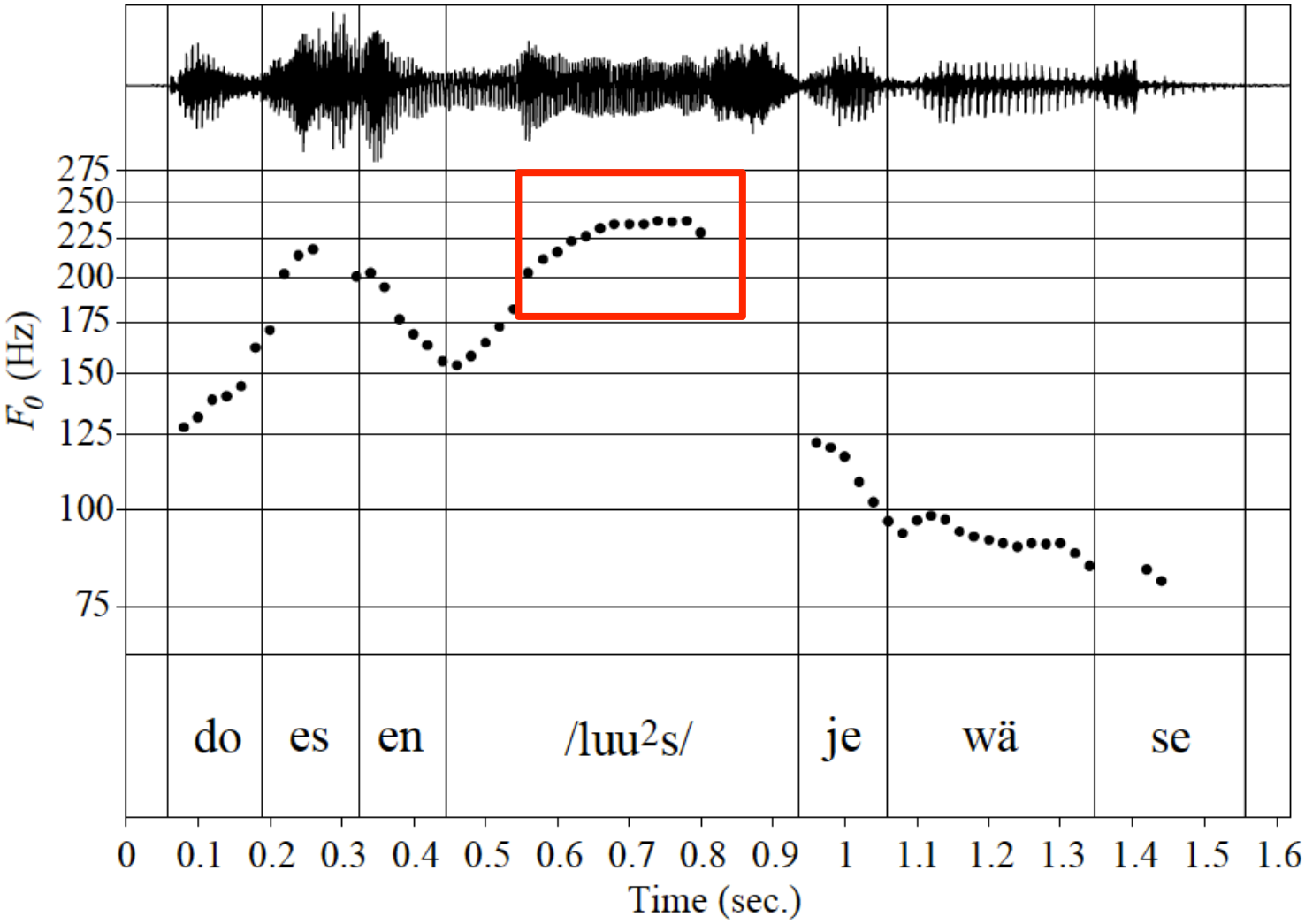
Phonetics of the tone accent contrast in Franconian

- Recall: the tone accent opposition can have multiple phonetic correlates (there are some cross-dialectal differences)
  - F0 (pitch)
  - Duration
  - Vowel quality / consonant quality
  - (Intensity)
  - (Glottalization)

Dec, foc, non-final, Accent 1

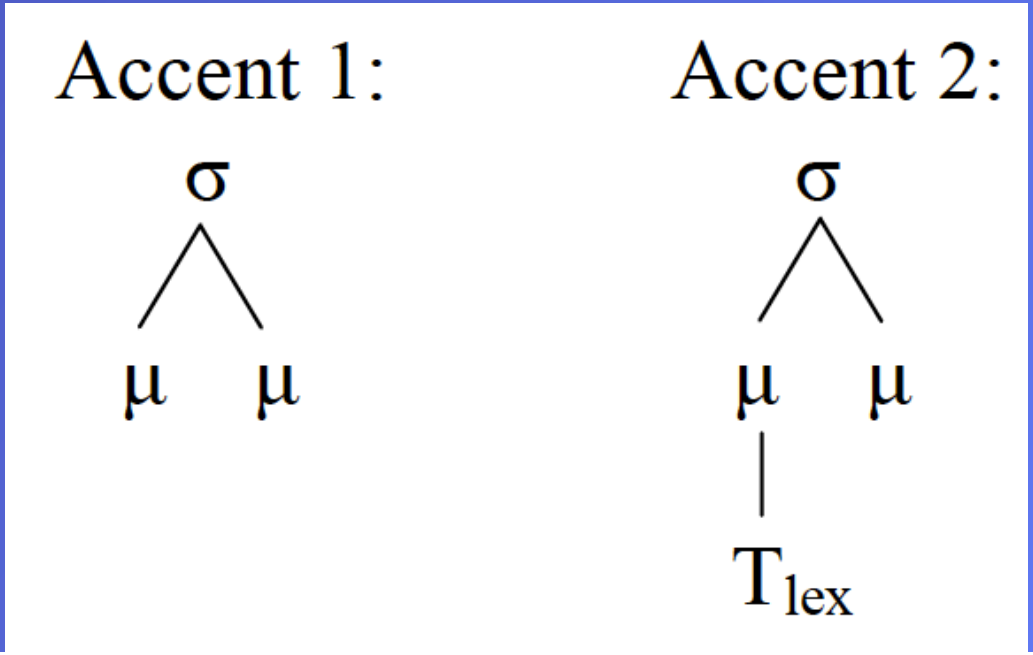


Dec, foc, non-final, Accent 2

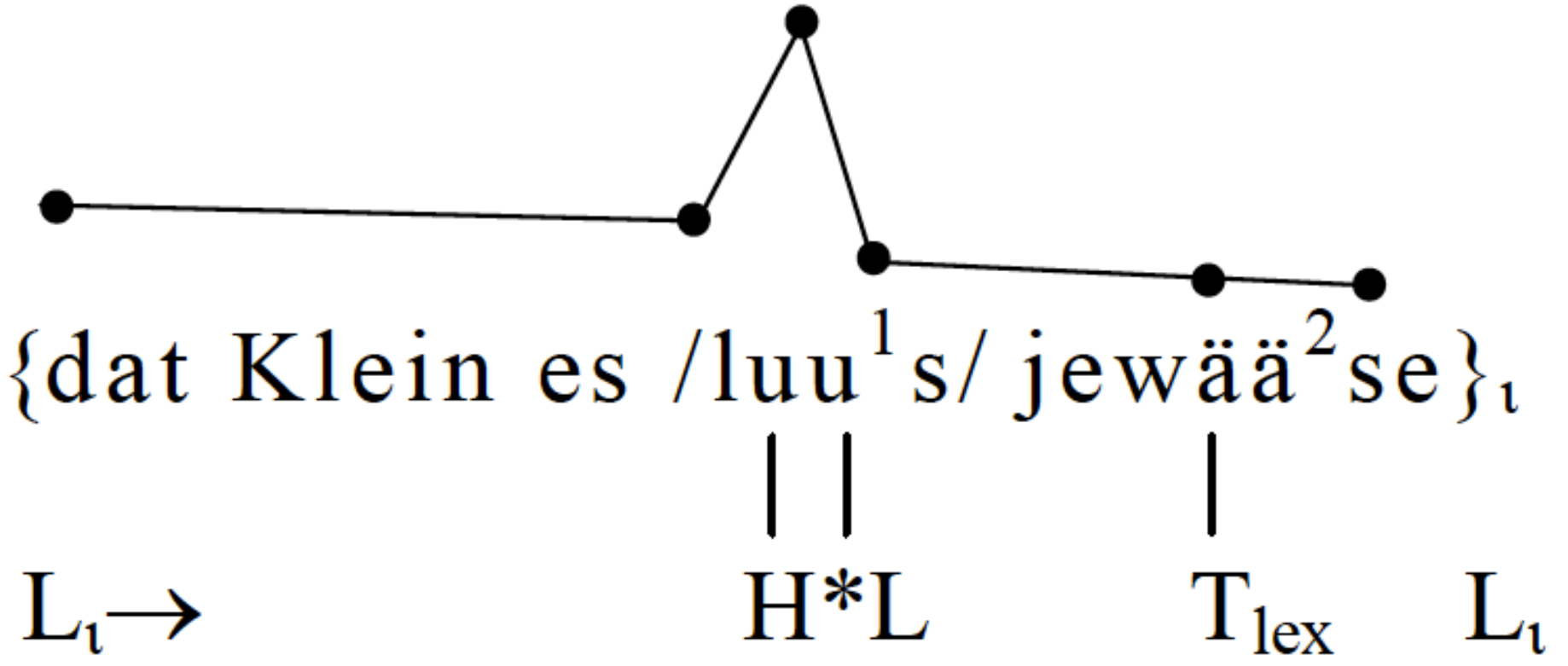


A tonal analysis

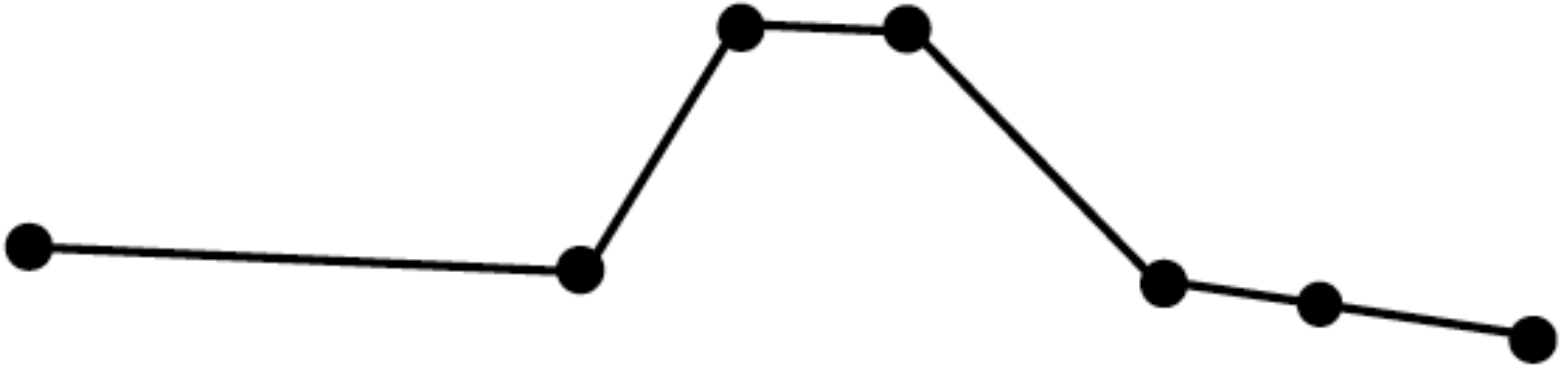
- Accent 2 has an unspecified lexical tone on its first mora, Accent 1 is lexically toneless



Dec, Focus, non-final, Accent 1



Dec, Focus, non-final, Accent 2



{do es en /luu^{2}s/ jewää^{2}se}$_{\iota}$

$L_{\iota}\rightarrow$ $H_{lex}H^{*}$ L T_{lex} L_{ι}

A tonal analysis: summary (tonal mapping)

- The unspecified lexical tone docks onto the first mora of Accent 2
- It blocks the association of the starred tone, which has to go to the second mora
- The lexical tone adopts the value of the following starred tone:
  - T_{lex} H* → H_{lex} H*
  - T_{lex} L* → L_{lex} L*

Goals of today's lecture

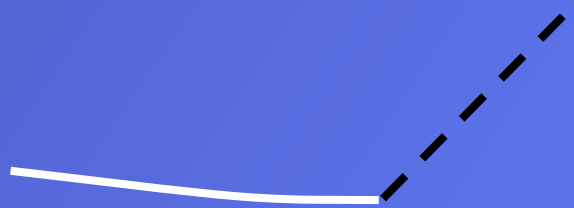
- Today, we will discuss a different analytical approach: the 'metrical approach' (my work)
- We will first discuss some possible problems of the tonal approach, and then see how my metrical approach works
- (Today, there will also be some rather abstract phonology)

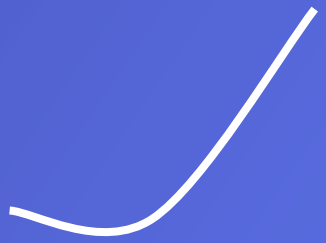
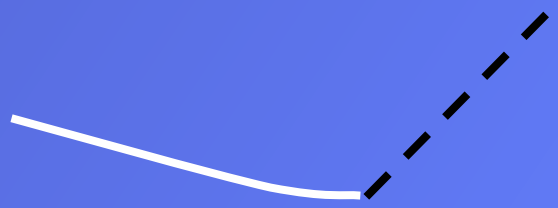
Reversed tonal contours: Declarative, non-final position

Cologne (Rule A, Peters 2006)	
[man^{1}] ‘basket’	[man^{2}] ‘man’
	

Arzbach (Rule B, Köhnlein 2011)	
[man^{1}] ‘basket’	[man^{2}] ‘man’
	

Non-reversed tonal contours: Interrogative, non-final position

Cologne (Rule A, Peters 2006)	
[man^{1}] ‘basket’	[man^{2}] ‘man’
	

Arzbach (Rule B, Köhnlein 2011)	
[man^{1}] ‘basket’	[man^{2}] ‘man’
	

My goals

- Representing the tone accent opposition phonologically
- Accounting for the semi-reversal between Rule A and Rule B

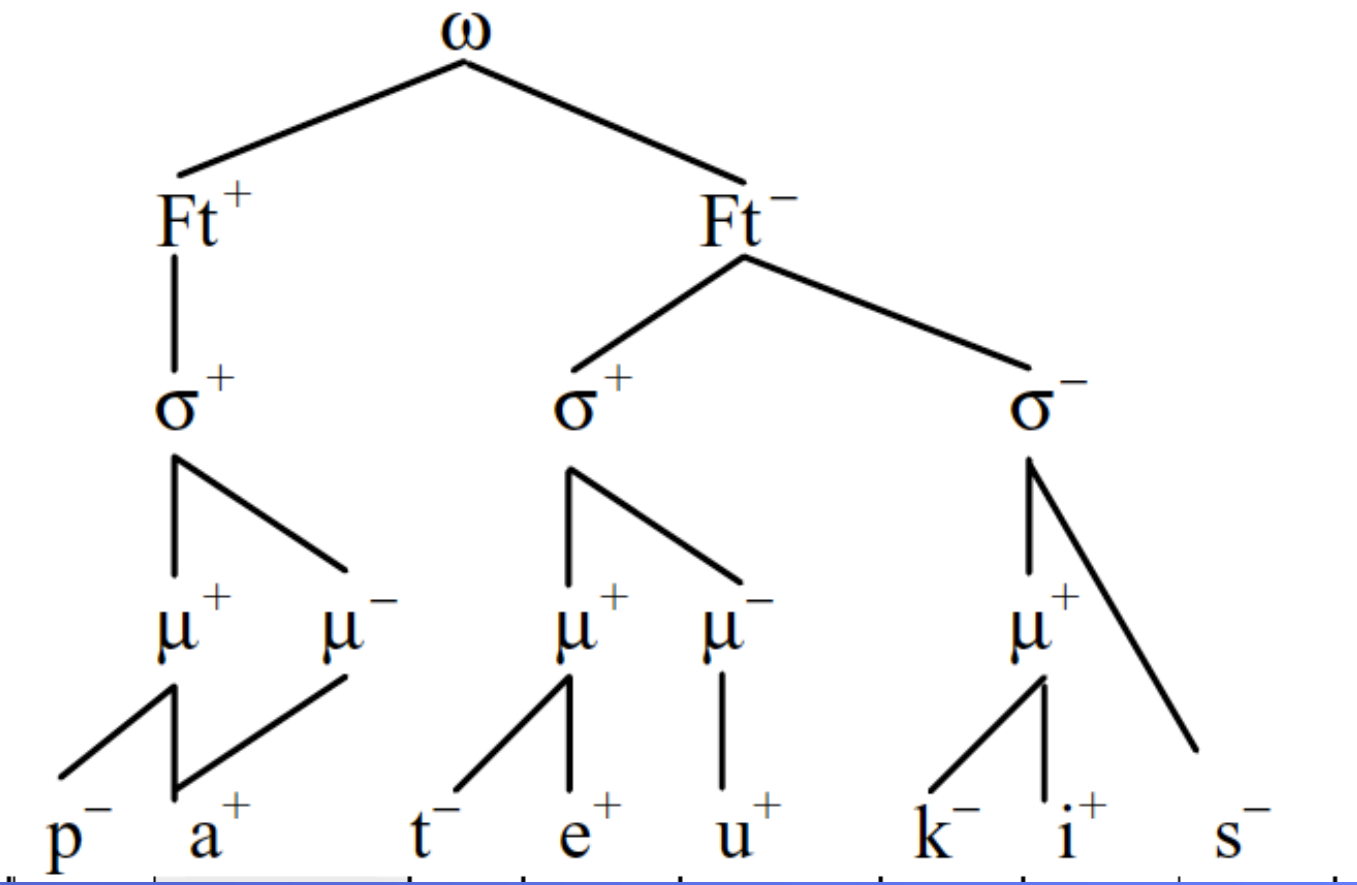
My assumptions

- Metrical representations
- Constraints

My assumptions

- Metrical representations
- Constraints

Traditional: e.g. de Lacy (2006)



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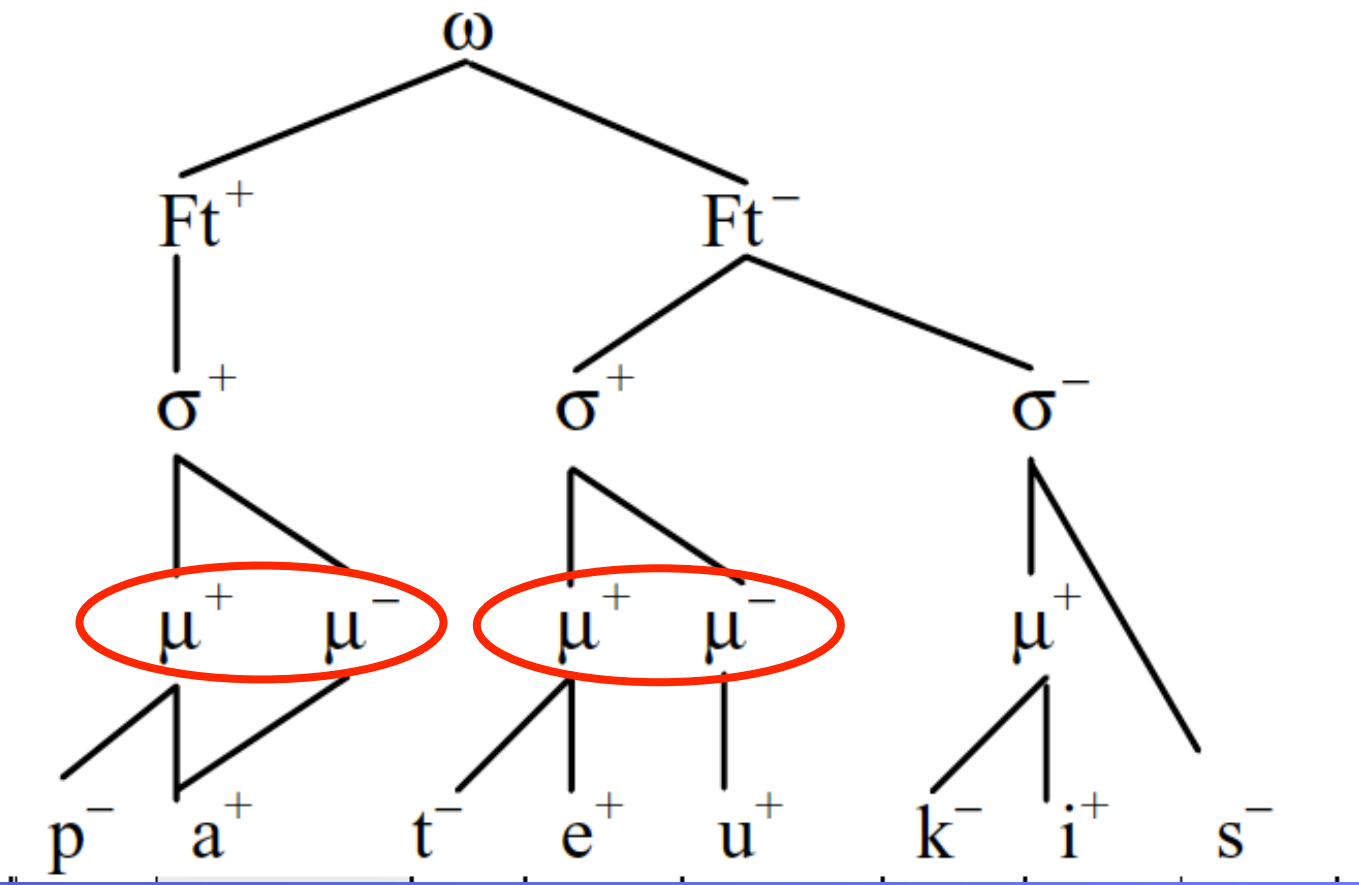
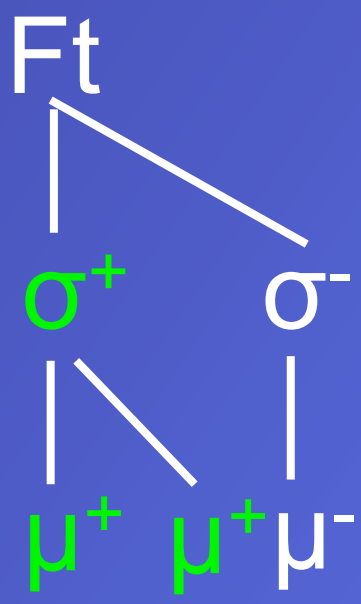


My representations

- I assume that metrical heads create a head domain
- This domain includes the metrical head as well as all other prosodic structure dominated by the head
- Notation: strong elements receive a plus, weak elements receive a minus

Head domain: Foot head plus units directly dominated by the head

Accent 1



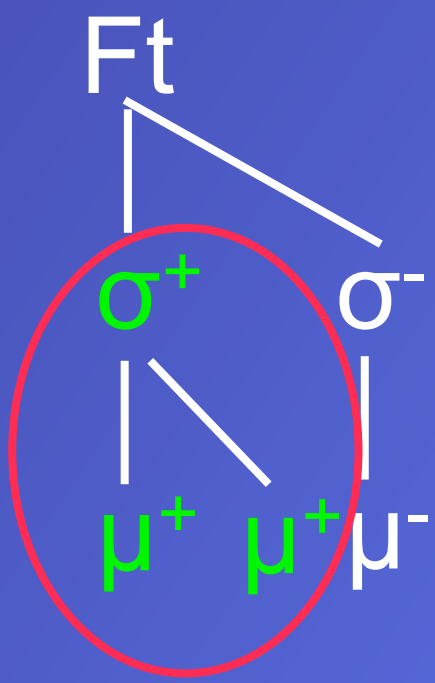
‘Syllabic trochee’

Accent 2

‘Moraic trochee’

Head domain: Foot head plus units directly dominated by the head

Accent 1



‘Syllabic trochee’

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Head domain: Foot head plus units directly dominated by the head

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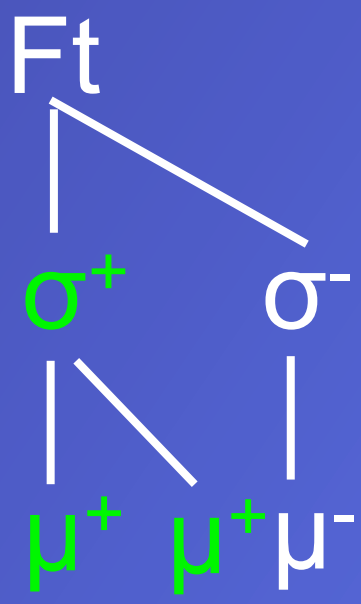


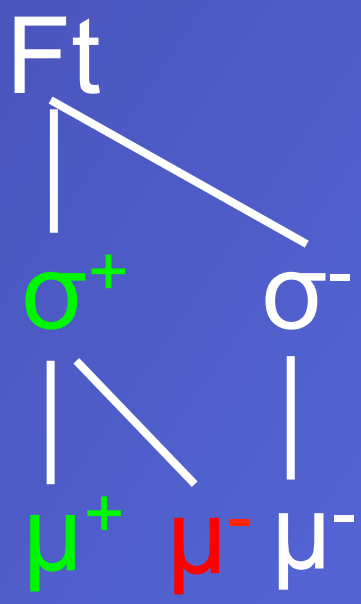
‘Syllabic trochee’

Accent 2

‘Moraic trochee’

Comparison: the standard view

Accent 1



Accent 2

My assumptions

- My modifications do not change the status of metrical heads
- Yet they modify the way headedness can affect lower-level structure

Central constraints

- Two constraint families are mainly responsible for the interactiuon between tones and TBUs (here: moras)

Type 1: Association of tones and TBUs

Examples

- T → TBU = T → μ: A tone is associated with a TBU / μ

- T → Ft-Hd: A tone is associated with mora in a foot head domain

(Also exist the other way around: TBU → T)

Type 2: Avoidance of weak tones in strong positions

- There is a prominence hierarchy in tonal systems (decreasing):
- H > M > L
- L is avoided in strong positions
- H is avoided in weak positions

Example: Ayutla Mixtec (de Lacy 2002)

'HLH	['ʃínìrá]	'his hat'
'HLHL	['ʃáàʃíìʔ]	'is not eating'
'HLHLL	['sátàkáràrìʔ]	'he is buying animals again'
L'HL	[màʔ'náì]	'my drowsiness'
H'HL	[lú'lúrà]	'he is small'
H'HLL	[lú'lúvàrà]	'he is very small'
H'HLH	[ká'tʃíràá]	'there is none of his cotton'
HH'HL	[tíká'tʃíìʔ]	'four whirlwinds'
LL'HL	[sàtà'kárà]	'he will buy more'
LM'HL	[lùlū'úrà]	'he is not small'
LMH'HL	[vìʃīí'ráà]	'he is not cold'

Used for this analysis

- General constraint: *Hd / L: A head is not associated with a low tone
- *Ft-Hd / L: A mora in a foot head domain is not associated with a low tone

OR

- *μ^{+} / L: A strong mora is not associated with a low tone

Central constraints and their ranking in OT

T → μ^+: A tone is associated with a strong mora

*μ^+ / L: A strong mora is not associated with a low tone

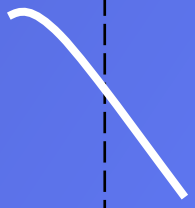
Rule A T → μ^+ >> *μ^+ / L

Rule B *μ^+ / L >> T → μ^+

Rule A (Cologne)
Phrase-medial position

T → μ^+	Accent 1		Accent 2	
	μ^+	μ^+	μ^+	μ^-
Declarative H*L	H*	L	H*	
Interrogative L*H	L*	H	L*	

Rule B (Arzbach)
Phrase-medial position, dec

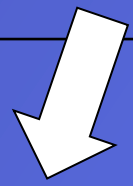
*μ+ / L	Accent 1		Accent 2	
	μ+	μ+	μ+	μ-
Declarative H*L	 H*		H* 	L

Rule B (Arzbach)
Phrase-medial position, int

*μ^+ / L	Accent 1		Accent 2	
	μ^+	μ^+	μ^+	μ^-
Interrogative L*H	L*	H		L*

Rule B (Arzbach)
Phrase-medial position, int

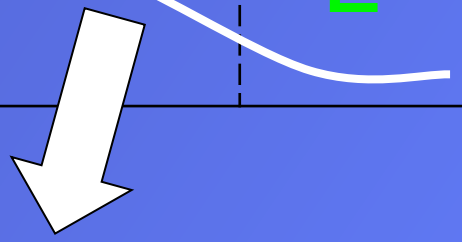
*μ+ / L	Accent 1		Accent 2	
	μ+	μ+	μ+	μ-
Interrogative L*H	L*	H		L*



A starred tone (T*) has to be realized in a prominent syllable!

Rule B (Arzbach)
Phrase-medial position, int

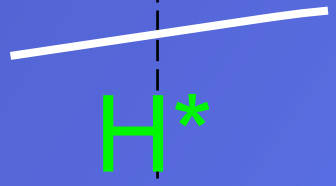
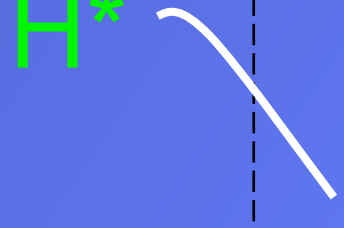
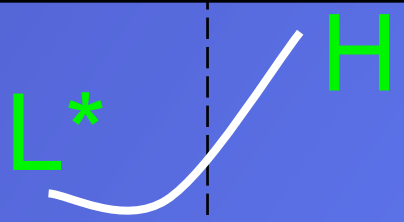
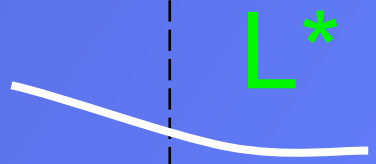
*μ^+ / L	Accent 1		Accent 2	
	μ^+	μ^+	μ^+	μ^-
Interrogative L*H	L*	H		L*



A starred tone (T*) has to be realized in a prominent syllable!

Syllable-initial higher pitch: phonetic enhancement of L*

Rule B (Arzbach)
Phrase-medial position

*μ^+ / L	Accent 1		Accent 2	
	μ^+	μ^+	μ^+	μ^-
Declarative H*L				
Interrogative L*H				

Typological relation

- Representation identical (Accent 1 syllabic trochee, Accent 2 moraic trochee)
- Main difference: re-ranking of two constraints

Rule A $T \rightarrow \mu^{+} >> *\mu^{+} / L$

Rule B $*\mu^{+} / L >> T \rightarrow \mu^{+}$

Underlying representations

- Accent 1: Underlying syllabic trochee (two syllables)
- Accent 2: Metrically unmarked, default footing (moraic trochee, two moras, one syllable)

Four types of words

- ‘Disyllabic’ TA 1: [daʊ^{1}və] ‘pigeon-pl.’
- ‘Disyllabic’ TA 2: [dau^{2}və] ‘baptism-pl.’
- ‘Monosyllabic’ TA 1: [dauf^{1}] ‘pigeon-sg.’
- ‘Monosyllabic’ TA 2: [dauf^{2}] ‘baptism-sg.’

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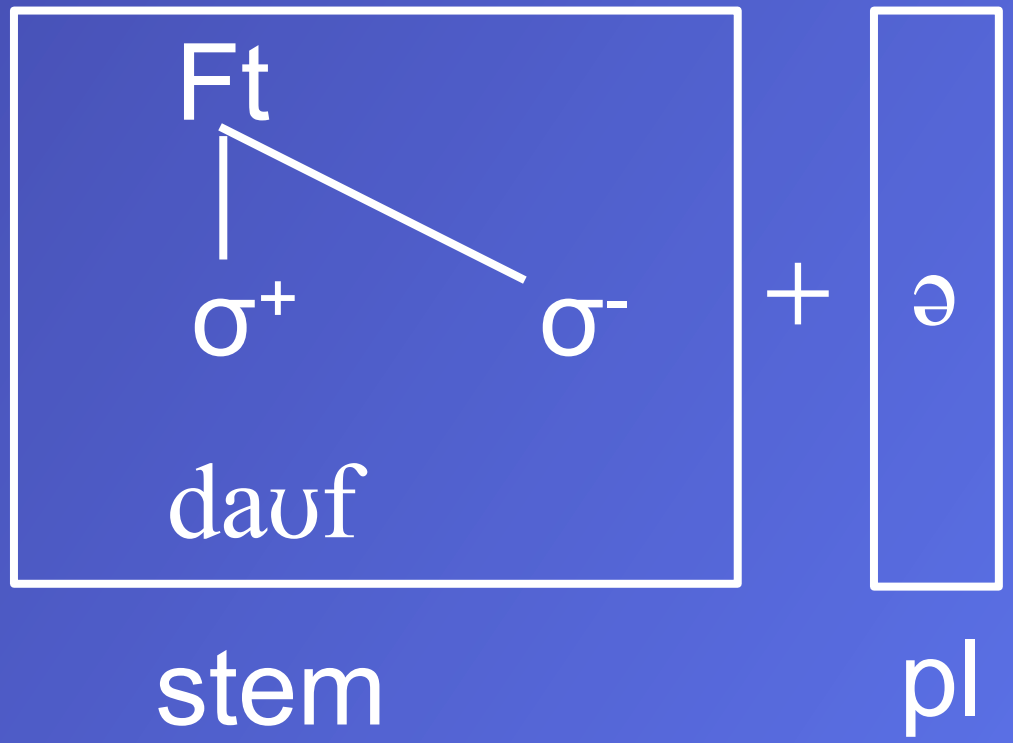
Lexicon

Accent 1

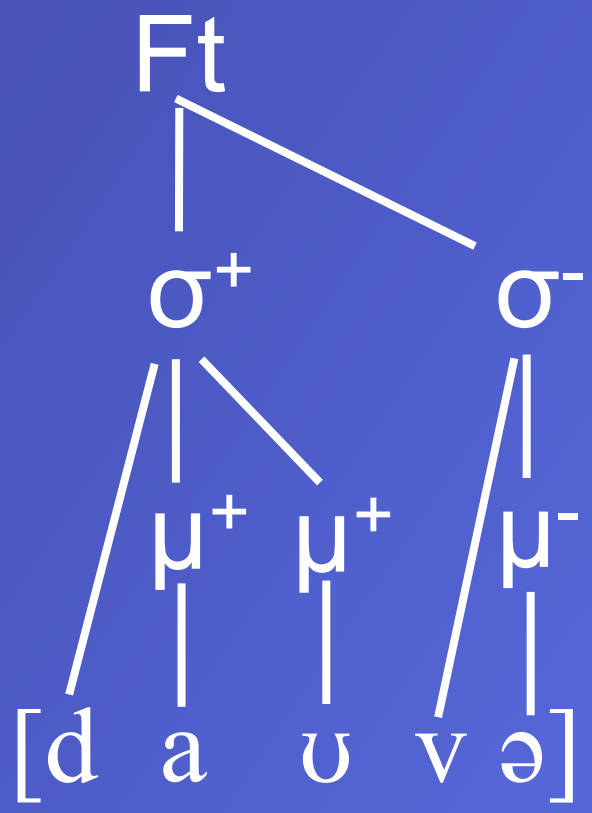


Accent 2

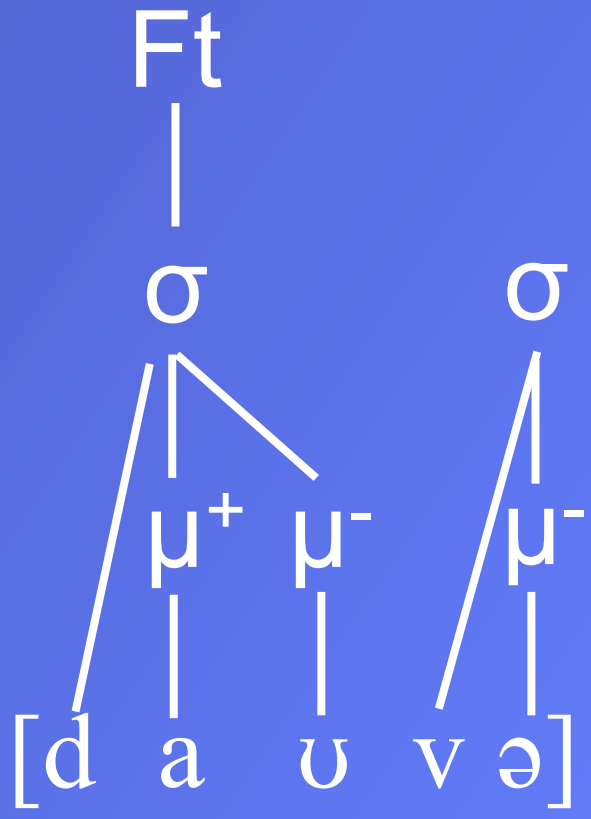
daʊf + ə

stem pl

Accent 1



Accent 2



Faith (Ft-Hd) >> IambicTrochaicLaw

Four types of words

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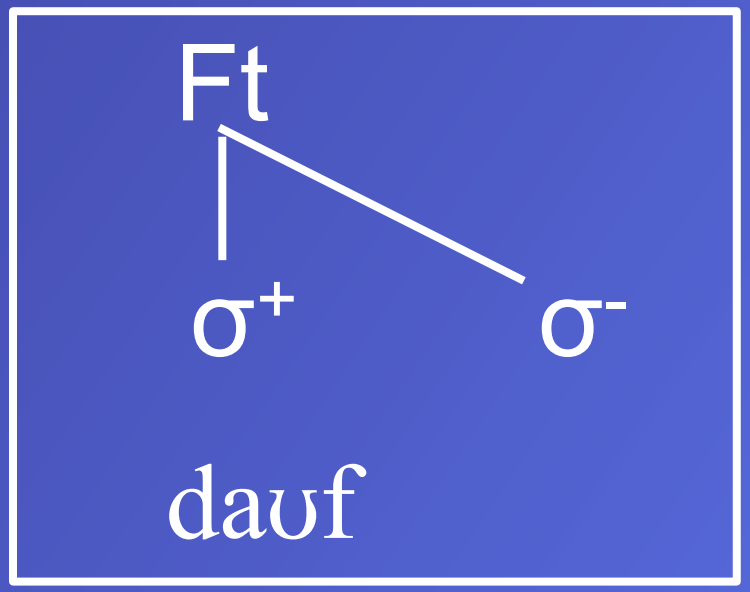
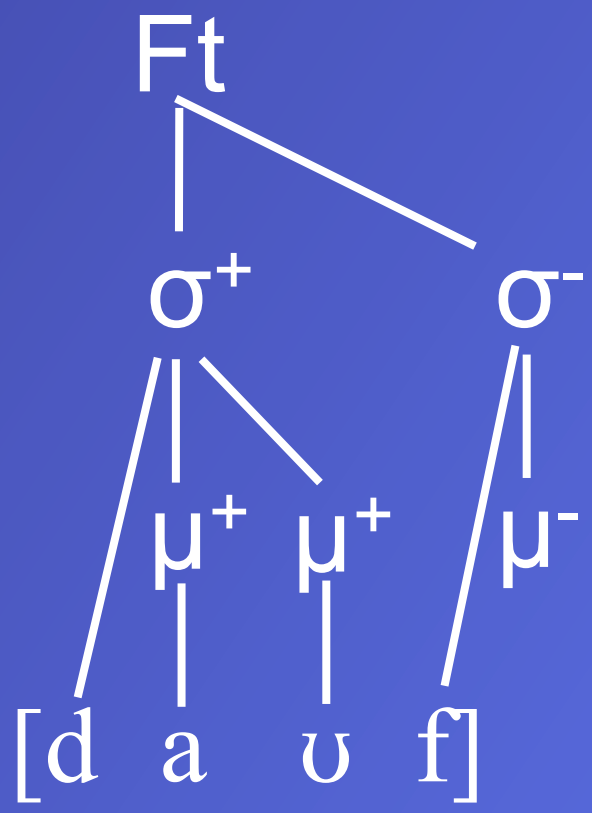
Accent 1



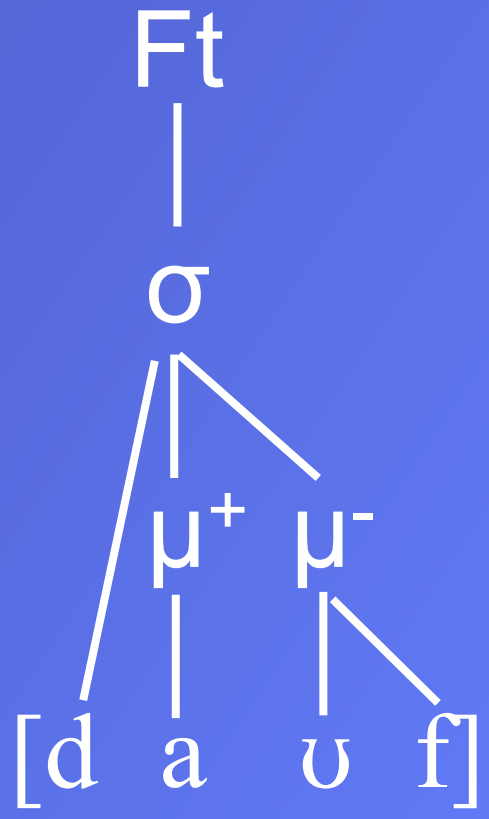
Accent 2

dɑʊf

Accent 1



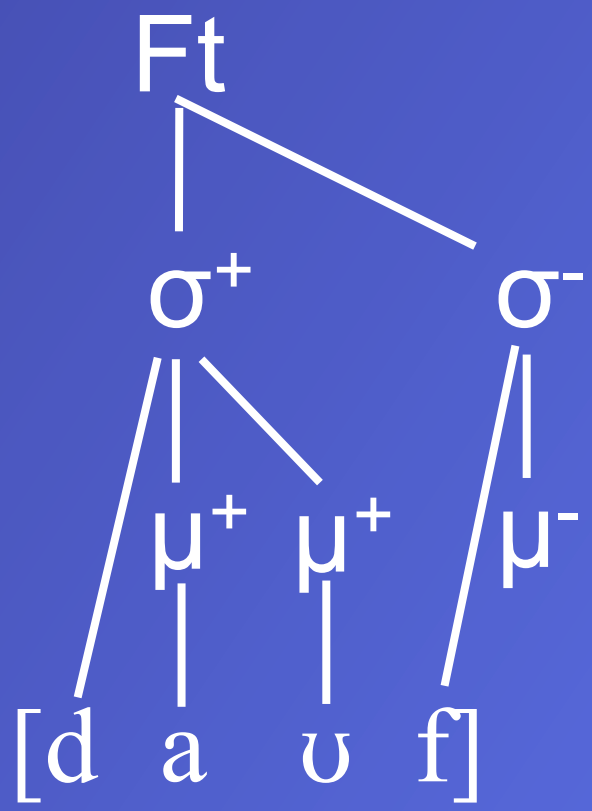
Accent 2



Origin of Accent 1

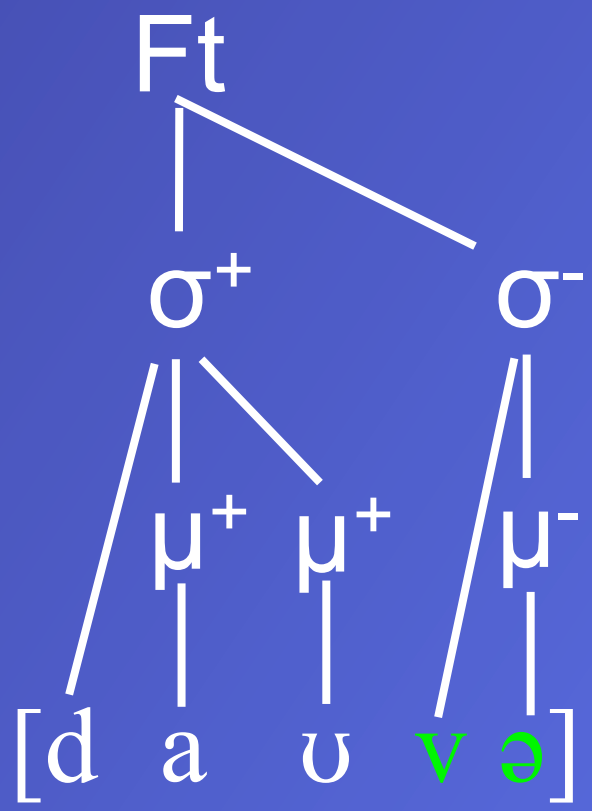
- Majority of Accent 1 words with an empty-headed second syllable derive from disyllabic words
- ‘Compensation’ for lost schwa if the originally intervocalic consonant was voiced

Accent 1



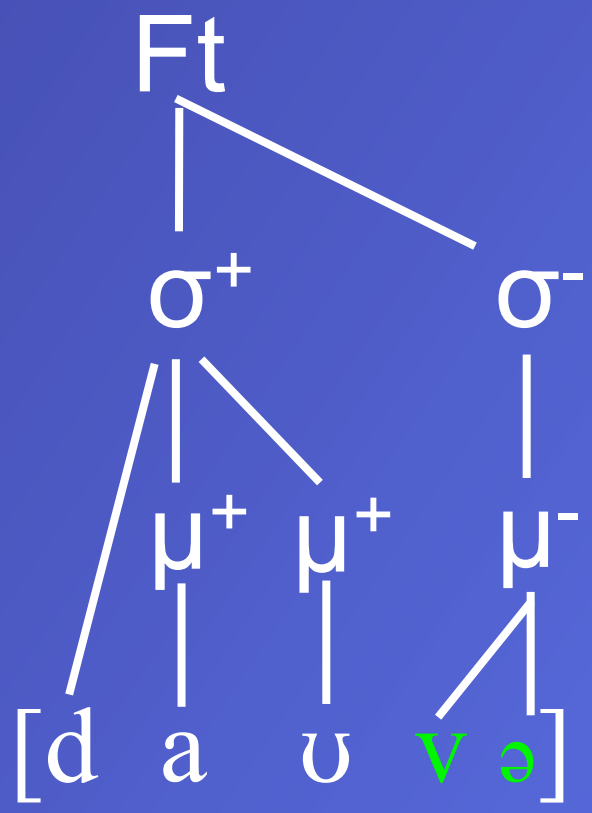
MHG tûbe,
later apocope

Accent 1



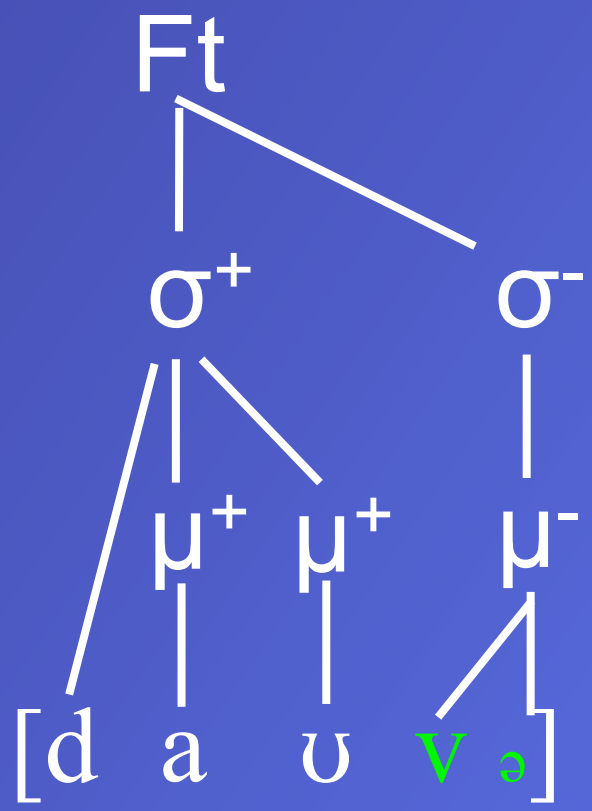
Original pronunciation

Accent 1



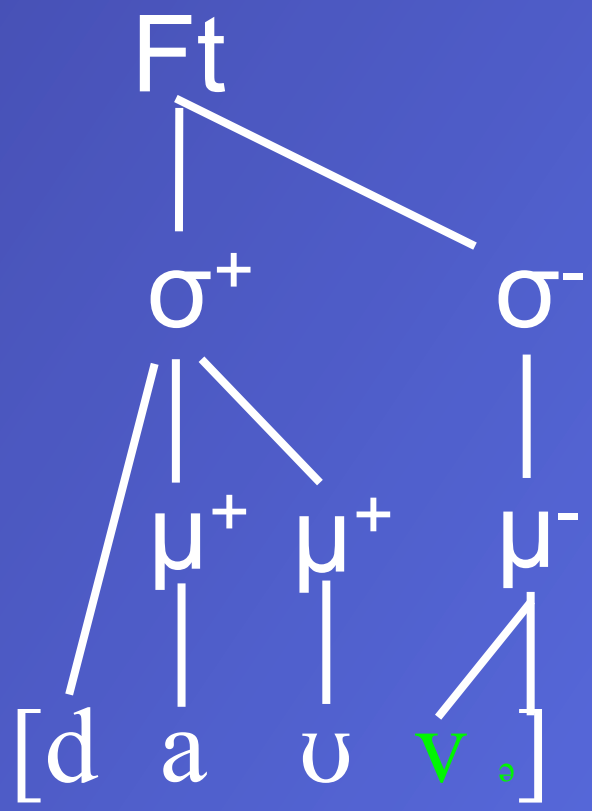
Reduction of schwa

Accent 1



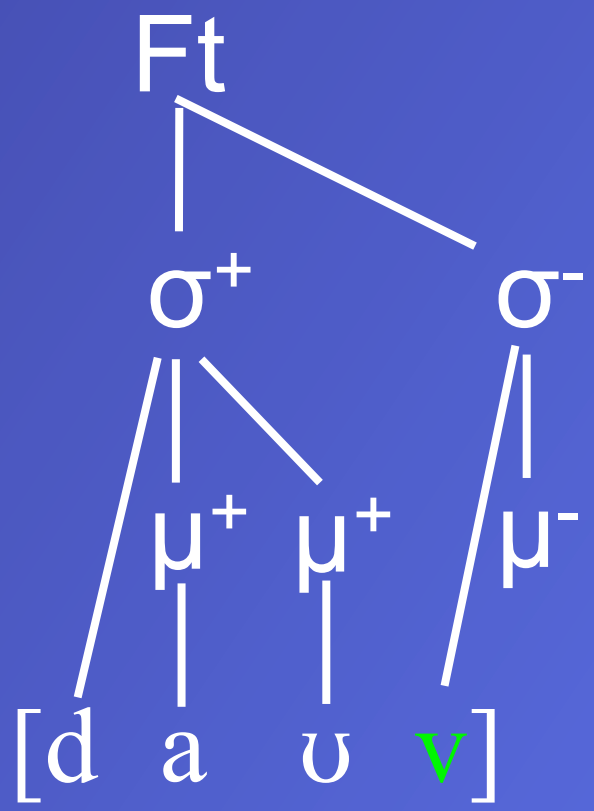
Reduction of schwa

Accent 1



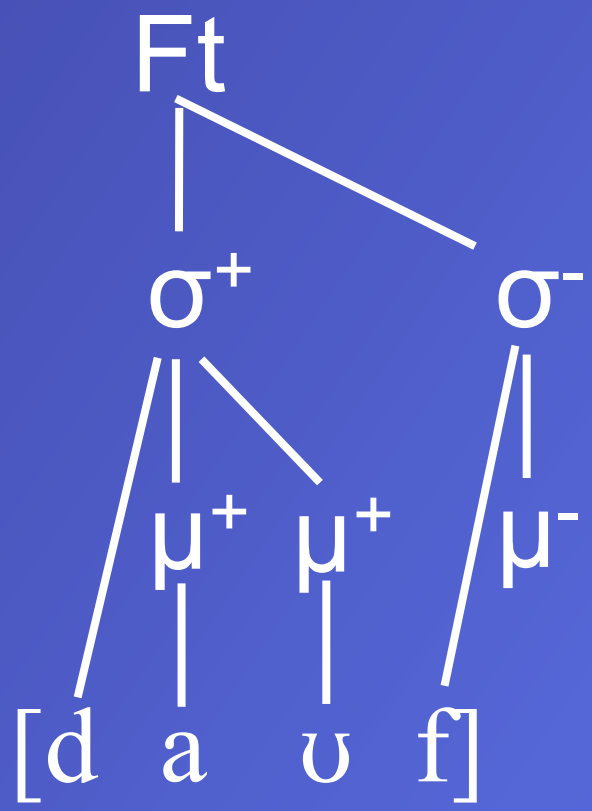
Reduction of schwa

Accent 1



Loss of schwa,
metrical structure stays

Accent 1

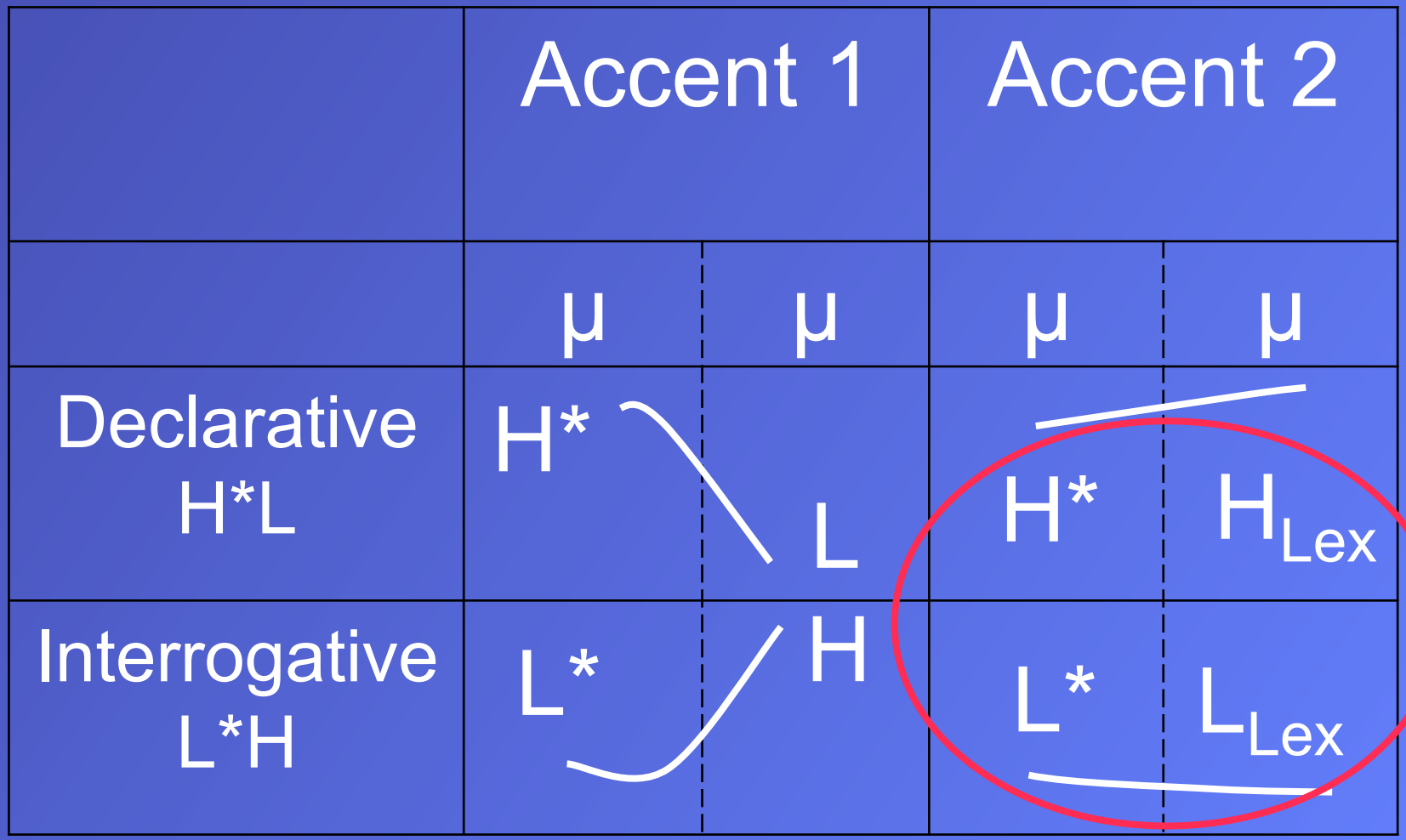


Loss of voicing

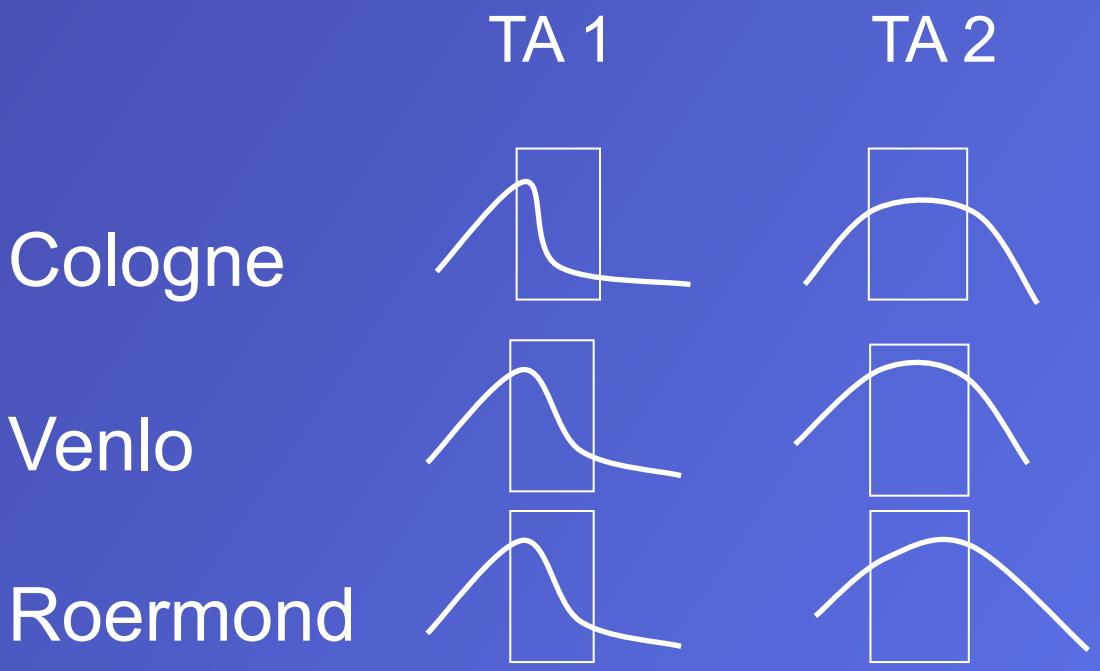
Comparison of my metrical approach to the tonal approach

- Possible advantages of my approach
- Possible advantages of the tonal approach

Recall: Rule A
Tonal analysis



Reason 1: alignment



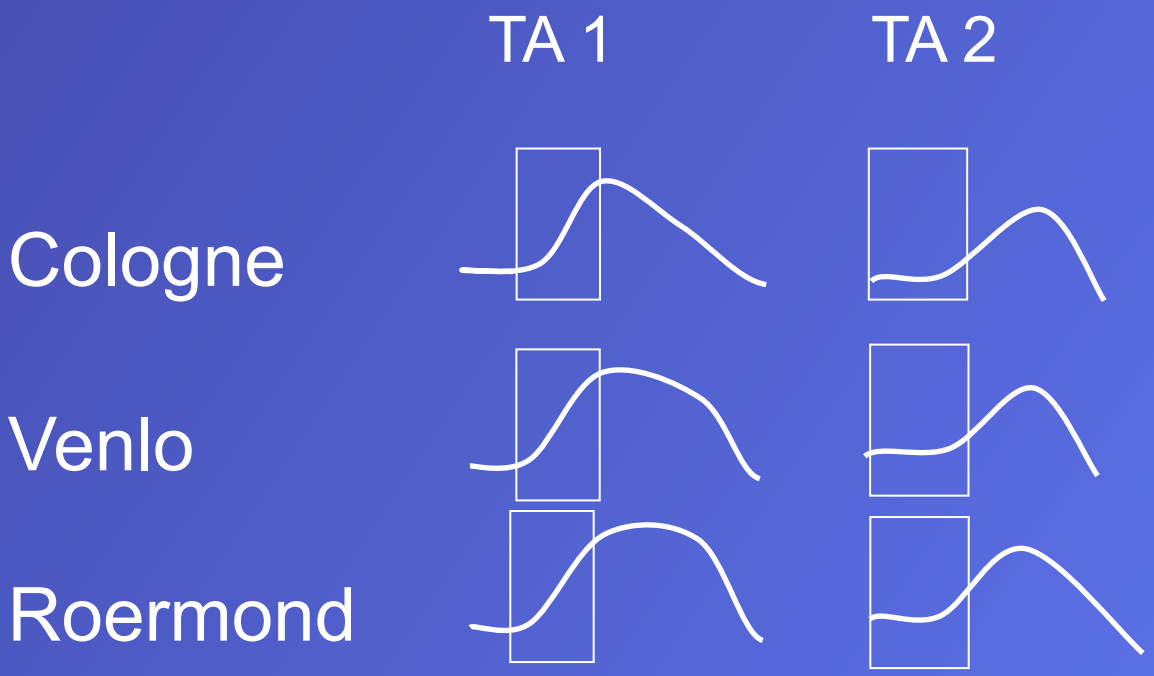
Timing

TA 1: Early movement in σ

TA 2: Late movement in/after σ

Declaratives

Reason 1: alignment



Timing

TA 1: Early movement in σ

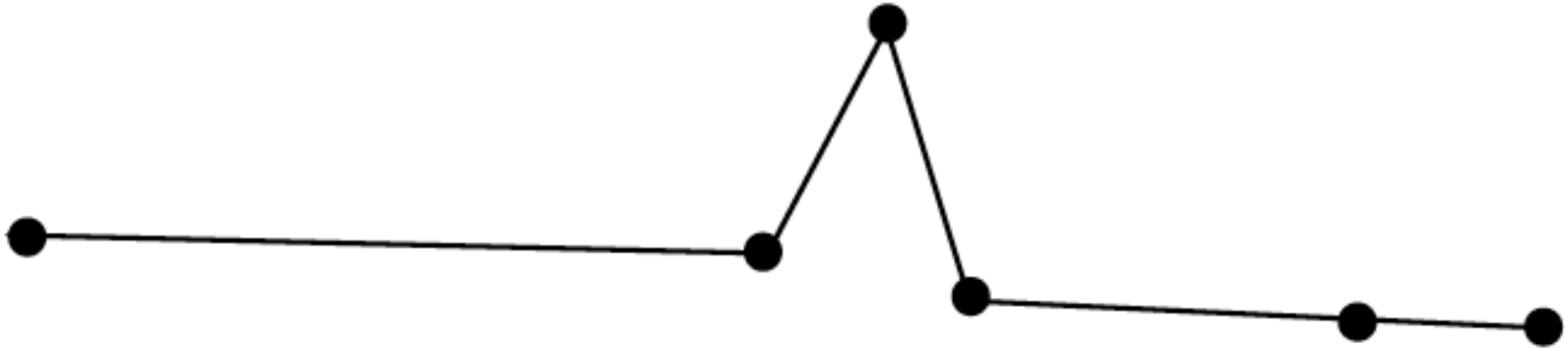
TA 2: Late movement in/after σ

Interrogatives

Alignment

- The tonal approach derives alignment by two independent mechanisms
  - Lexical tone blocks association of starred tone
  - Lexical tone adopts value of starred tone

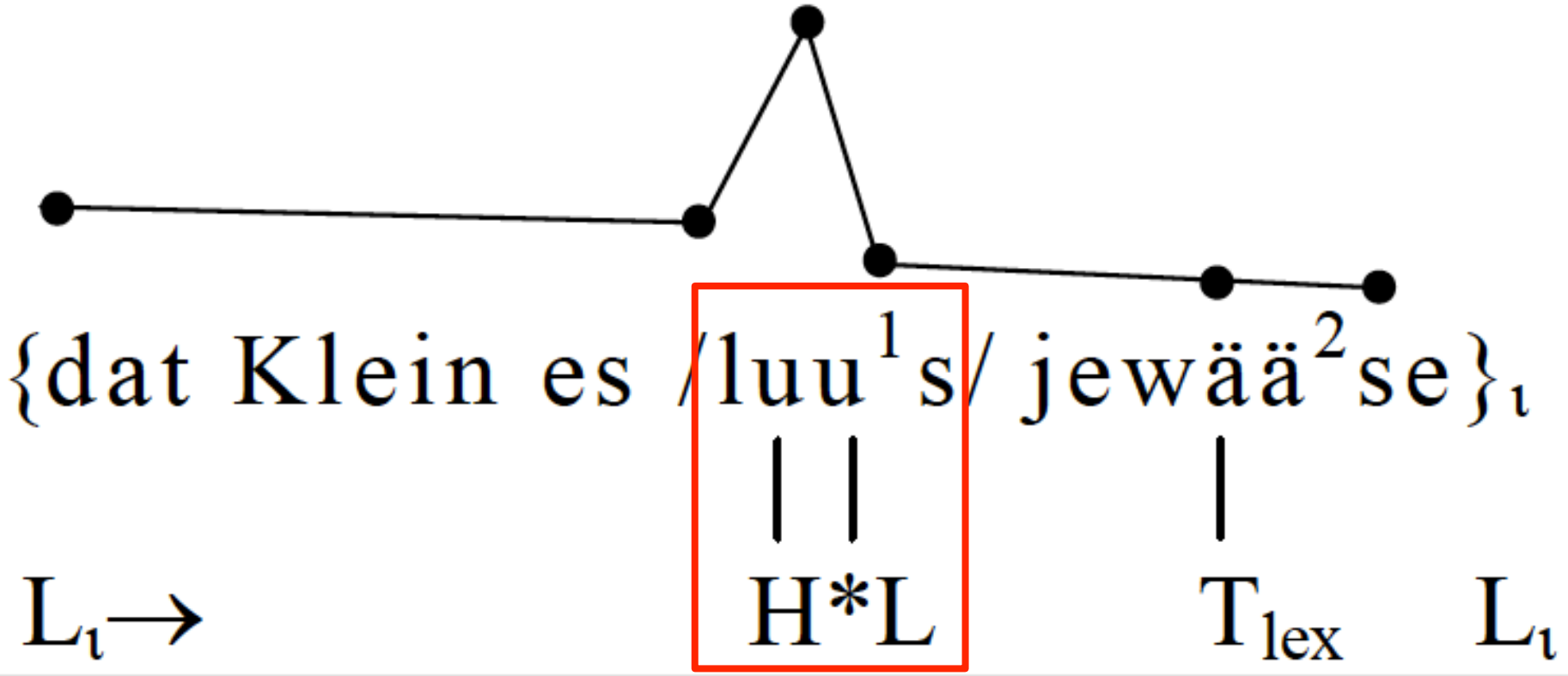
Dec, Focus, non-final, Accent 1



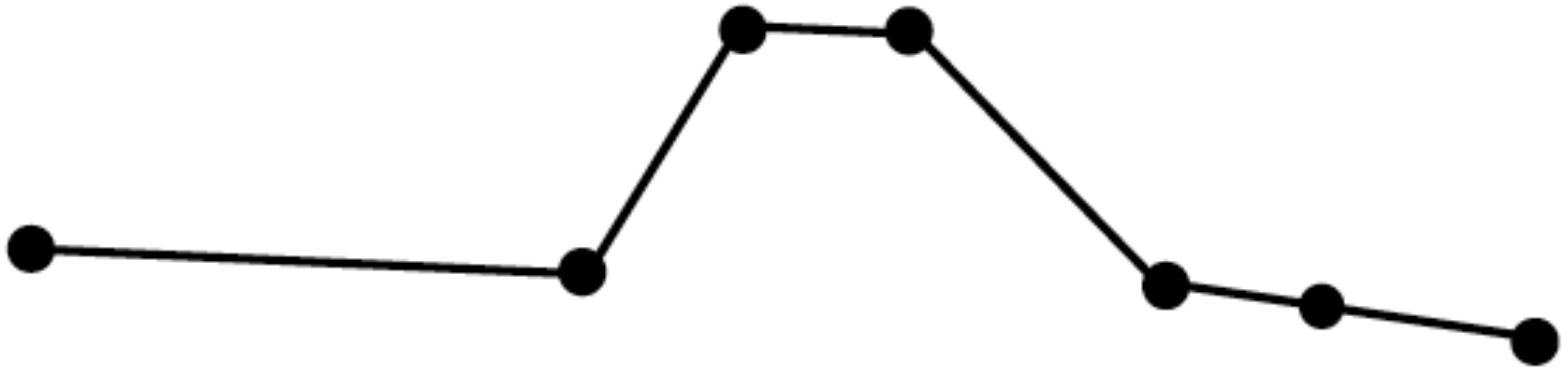
{dat Klein es /luu^{1}s/ jewää^{2}se}$_{\iota}$

- Nuclear falling contour
- Intonation H*L, no lexical tone

Dec, Focus, non-final, Accent 1



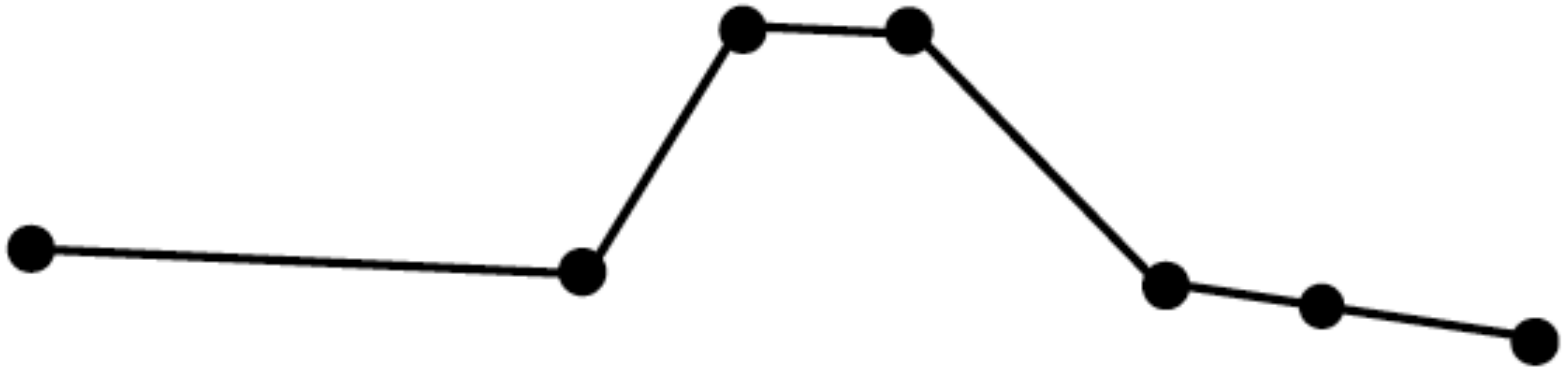
Dec, Focus, non-final, Accent 2



{do es en /luu^{2}s/ jewää^{2}se}$_{\iota}$

- Nuclear high level contour
- Intonation H*L
- Lexical tone: T*

Dec, Focus, non-final, Accent 2



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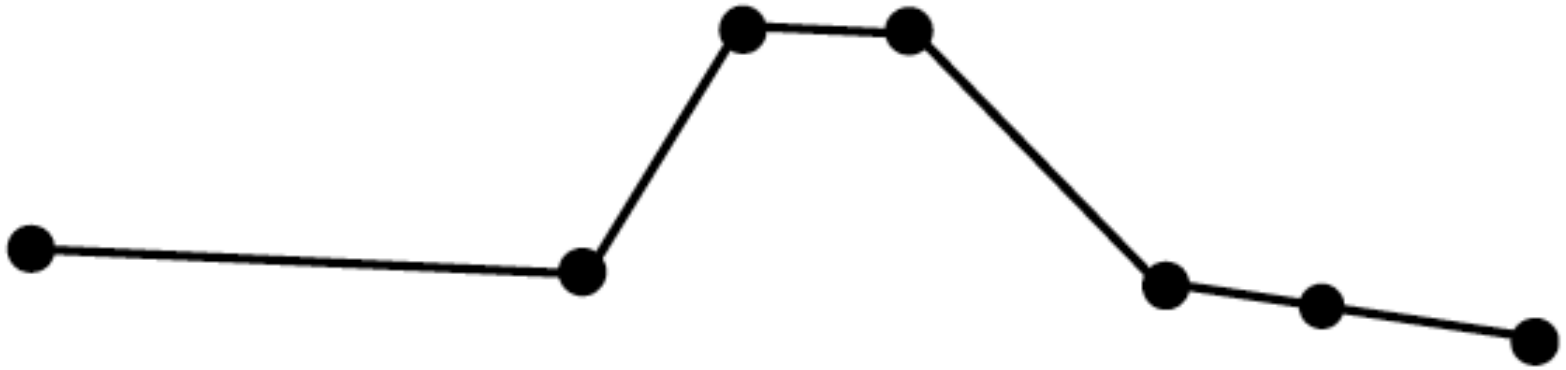
T*

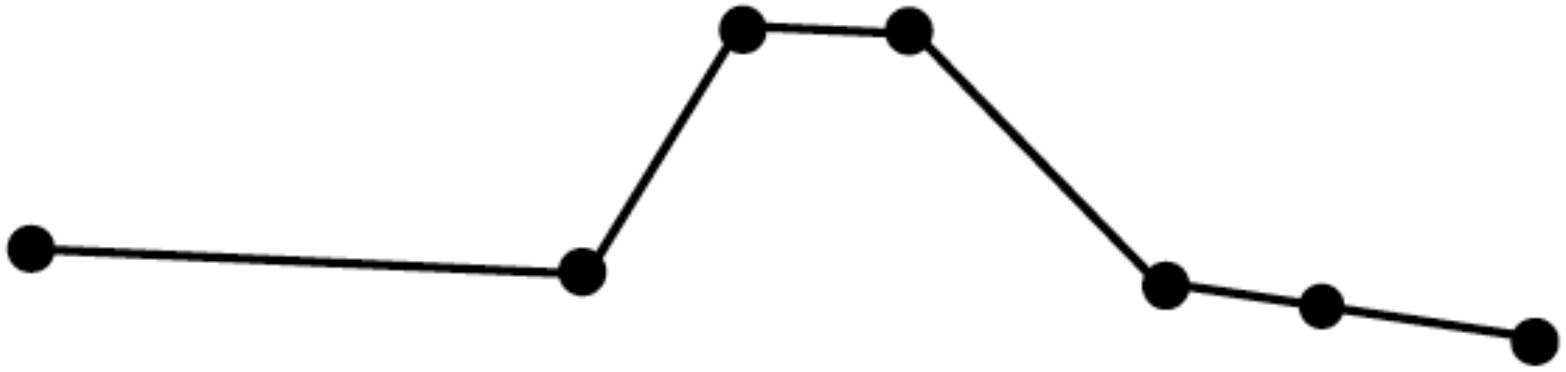
Dec, Focus, non-final, Accent 2



{do es en /luu^{2}s/ jewää^{2}se}$_{\iota}$

Blocking T_{lex} H* L

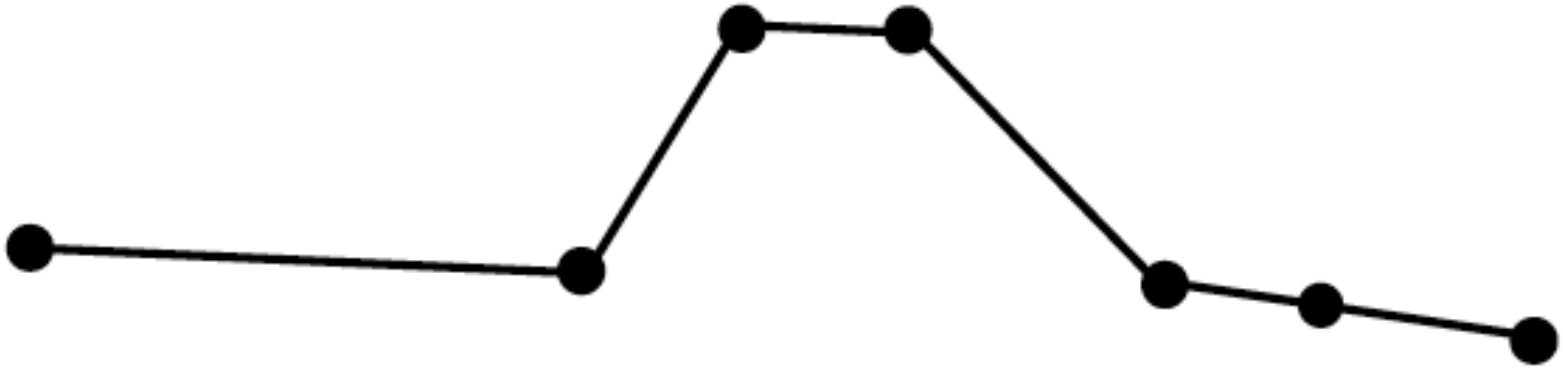
Dec, Focus, non-final, Accent 2



{do es en /luu^{2}s/ jewää^{2}se}$_{\iota}$

Assimilation H_{lex} H* L

Dec, Focus, non-final, Accent 2



{do es en /luu^{2}s/ jewää^{2}se}$_{\iota}$

$L_{\iota}\rightarrow$ $H_{lex}H^{*}$ L T_{lex} L_{ι}

Consequence of the approach

- The timing difference does not follow from one general principle
- We might add: Lexical tone is invisible as a tonal target
- *Note: the alignment difference follows directly from the metrical approach, and there are no invisible lexical tones*

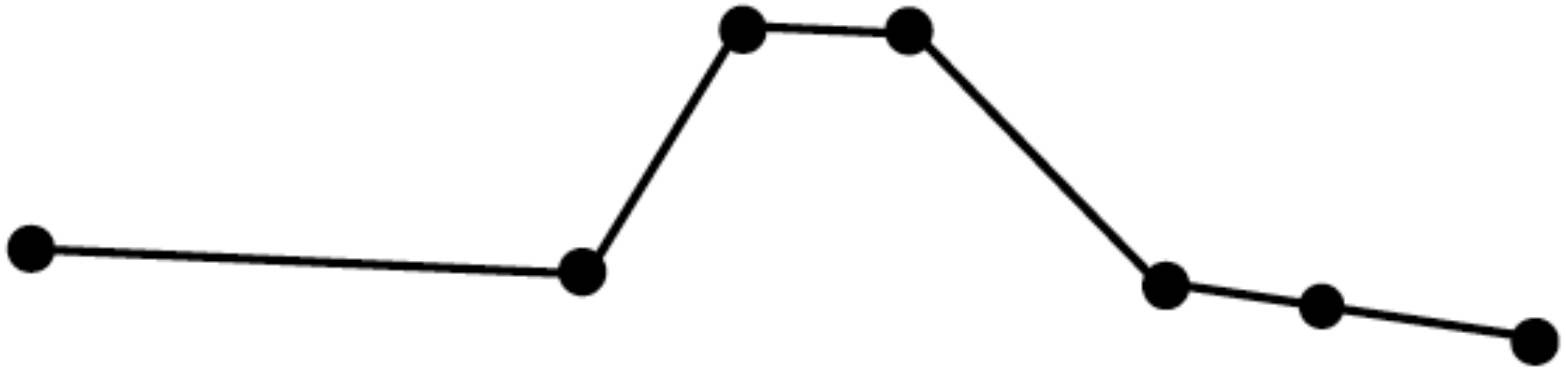
Rule A (Cologne)
Phrase-medial position

T → μ^+	Accent 1		Accent 2	
	μ^+	μ^+	μ^+	μ^-
Declarative H*L	H*	L	H*	
Interrogative L*H	L*	H	L*	

Reason 2: Interaction of tone and intonation

- Typologically exceptional (linear) interaction of intonational and lexical tones

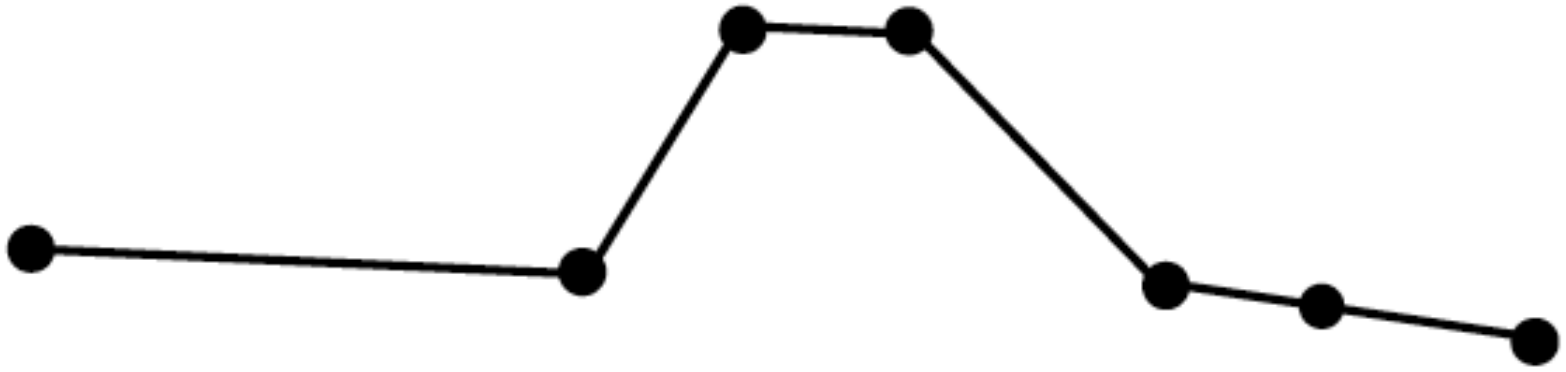
Dec, Focus, non-final, Accent 2



{do es en /luu^{2}s/ jewää^{2}se}$_{\iota}$

Blocking T_{lex} H* L

Dec, Focus, non-final, Accent 2



{do es en /luu^{2}s/ jewää^{2}se}$_{\iota}$

Assimilation H_{lex} H* L

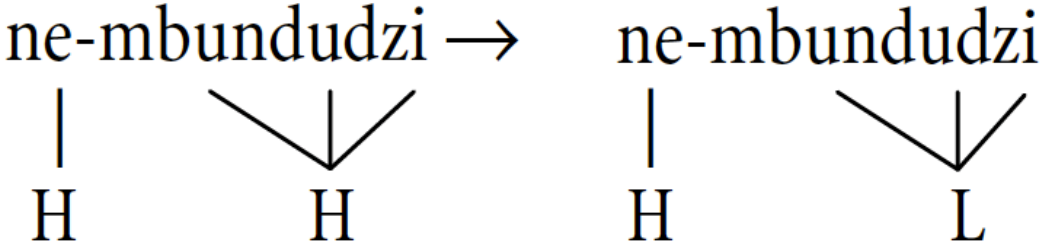
Reason 2: Interaction of tone and intonation

- Lexical tone assimilates / copies the quality of the starred intonational tone
- Such interactions are unattested in ‚real' tone languages (as far as I know)
- Assimilation leads to two adjacent tone with the same value
  - Reverses the Obligatory Contour Principle (OCP)
  - Basic principle in phonology (Leben 1973, Goldsmith 1976)

OCP (Shona, Odden 1986)
Taken from Gussenhoven & Jacobs (2011)

mbwá	‘dog’
hóvé	‘fish’
mbúndúdzí	‘army worms’

$$H \rightarrow L \,/\, \begin{matrix} H \\ | \\ ne \end{matrix} \_\_\_$$



Reason 2: Interaction of tone and intonation

- *These problems do not arise in the metrical approach; there are no lexical tones*

Reason 3: Morphology

- Tonal analyses mark Accent 2 lexically
- Yet in morphologically related accent minimal pairs, the more complex form will always have Accent 1 (e.g. Van Oostendorp 2005)
  - [bain^{2}] ‘leg-sg.’ vs. [bain^{1}] ‘leg-pl.’ (Arzbach)
- Function words, which are cross-linguistically unmarked, commonly have Accent 2 (Van Oostendorp 2005)

Reason 3: Morphology

- This, of course, is not an argument against the tonal approach per se, but against marking Accent 2 in the lexicon
- Could be remedied with an analysis in which Accent 1 is marked with a lexical tone
- *In any case, the generalization is captured in my metrical approach*

Reason 4: Duration as the primary correlate

- We have seen that (at least in Cologne), duration can function as the primary correlate of the accent contrast
- I am not aware that this is attested in ‘real’ tonal languages
- *To be expected under the metrical approach*

One further example

- Estonian has a three-way durational opposition (Q1, Q2, Q3)

Quantity contrast in Estonian

a.	[sada] ‘hundred’	[sa:da] ‘send, imperative	[sa::da] ‘to receive’
b.	[lina] ‘flax’	[lin:a] ‘town, gen-sg’	[lin::a] ‘town, part-sg’

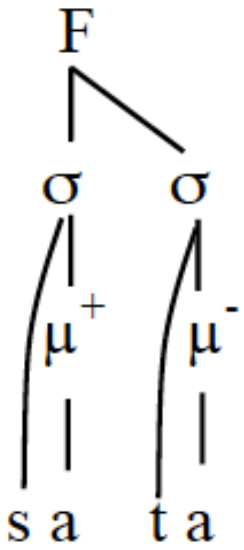
- The durational contrast is accompanied by a pitch contrast
- Much like in Cologne, just that the longer syllable has a falling tone

Analysis by Prince (1980), adapted from Odden (1997)

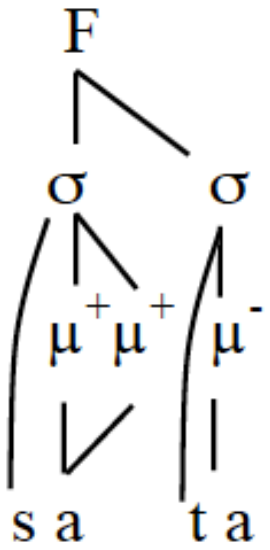
- Bimoraic syllables contrast in foot structure
- Durational differences express the difference in metrical structure
- Monosyllabic foot longer than first syllable of disyllabic foot

Surface representations for three degrees of overlength in Estonian

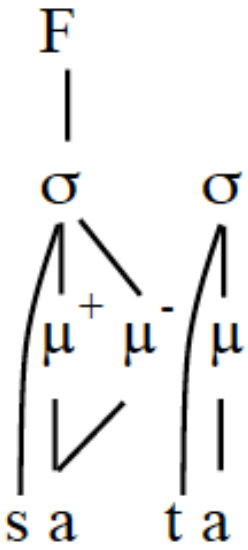
Q1

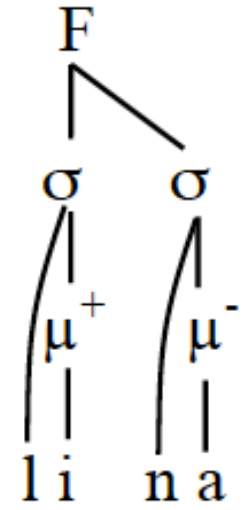


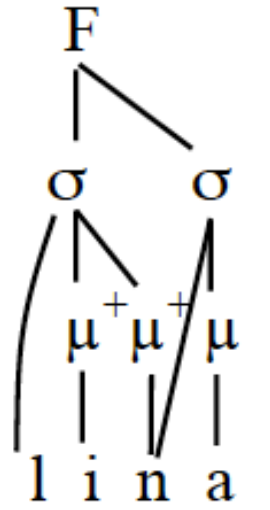
Q2

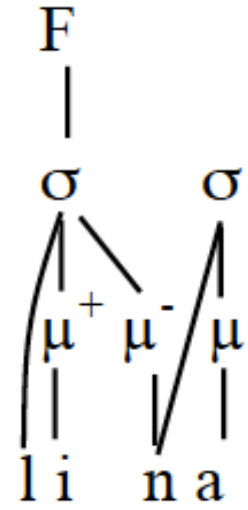


Q3



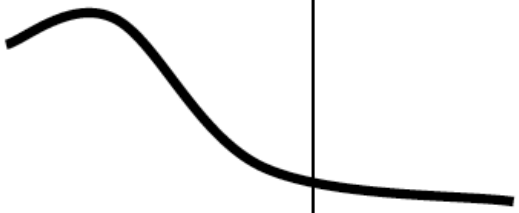
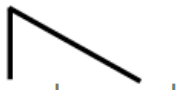
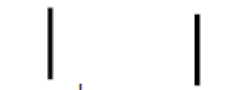






My analysis of the tonal mapping

- Duration like in Cologne (monosyllabic foot is longer)
- Tonal mapping like in Arzbach: *μ^{+}/L is dominant

Q2		Q3	
σ	σ	σ	σ
			
H*	L	H* L	
			
(μ^{+} μ^{+}	μ^{-})	(μ^{+} μ^{-})	μ
(σ	σ)	(σ)	σ

Reason 4: Neutralization of the contrast

- In many Franconian dialects there is no tone accent contrast in non-prominent sentence positions (mostly phrase-medial positions)
- This is not necessarily expected under a tonal approach, since lexical tones are word-level phenomena
- Wouldn‘t we expect them to be preserved independent of the phrasal context?

Reason 4: Neutralization of the contrast

- Solution under the tonal approach:
  - Lexical tone has to be licensed by an intonational tone in the same syllable

"The neutralisation in IP-medial non-accented positions can be explained as a tonal effect, since in those neutralising positions, no intonational tones co-occur with the syllables, as opposed to accented syllables, which have a pitch accent T*, and final syllables, which at least have a boundary tone."

Gussenhoven & Peters (2004:fn. 5)

Reason 4: Neutralization of the contrast

- Of course, it is possible to state such a restriction
- Once more, however, this is typologically unusual
- I am not aware of ‘real’ tonal languages where lexical tones are parasitic on the co-occurrence of post-lexical intonational tones
- *Neutralization expected under the metrical approach (no intonational tones = no tonal contrast)*

Reason 5: Unspecified lexical tone

- The tonal analysis for Cologne relies on the assumption of a lexically underspecified tone T_{lex}
- (Phonological) object without content, maybe a bit like an invisible wall
- Radical innovation in Autosegmental Phonology

Reason 6: Unspecified lexical tone

- The tonal analysis for Cologne relies on the assumption of a lexically underspecified tone T_{lex}
- (Phonological) object without content
- Radical innovation in Autosegmental Phonology

To sum up: the tonal approach

- The tonal approach can derive the tonal mapping in Franconian
- Costs
  - Does not capture the alignment differences directly
  - Unusual interactions of tone and intonation
  - Counter-intuitive from a morphological perspective
  - Unclear relation between tone and duration
  - Enlarges the set of possible phonological representations

Comparison of my metrical approach to the tonal approach

- Possible advantages
- Possible disadvantages

Possible disadvantages

- I can think of one point: the abstractness of my representations, i.e. the assumption of empty categories (empty-headed syllables)
- Tonal approach may be regarded to be ‘closer to the phonetic facts’ (at least when it comes to the pitch contours)

But...

- Working with empty categories (e.g. empty-headed syllables / empty beats) is certainly not unusual in phonology, particular with respect to the analysis of stress (catalexis)
- Empty categories are also used in the analysis of syntactic phenomena (Fodor 2013 for a recent discussion)

And also...

- There are other phenomena in Franconian that can be analysed with my approach :
  - diphthongization under Accent 1
  - vowel shortening under Accent 1
  - effects of voicing on accent distribution

Summing up (my point of view)

- The metrical approach avoids several problems of the tonal account
- Restrictive typology: all differences derive from one source, the grammar (this is in line with morphological alternations across dialects)
- Note: the metrical approach also ‘explains’ why the contrast is always binary (two feet = two tone accents)

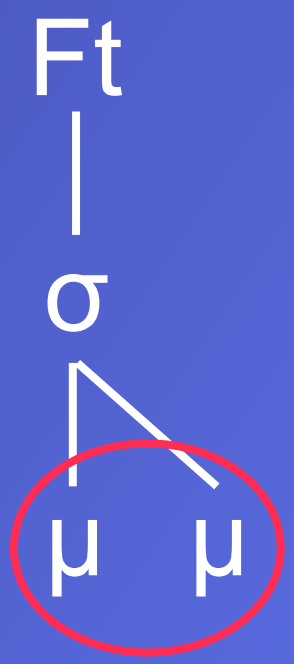
Alternative metrical solutions

- Two vs. one
  (Hermans 2009, Kehrein to appear)
- Strong / weak vs. weak / strong (‘moraic stress’, Kehrein 2007)

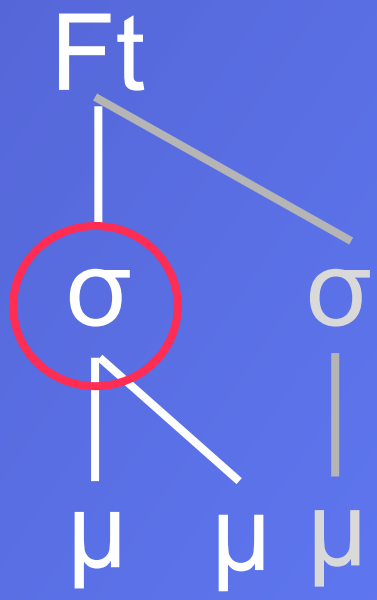
‘Two vs. one’: Rule A

E.g.: Ft-Head = TBU

Accent 1



Accent 2



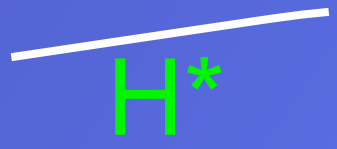
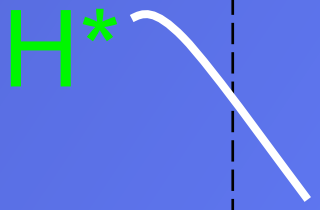
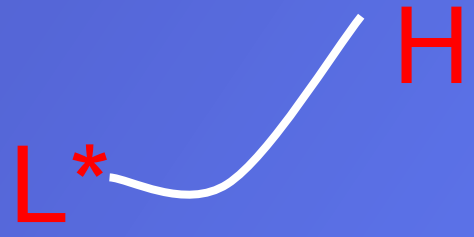
Rule A

Rule A	Accent 1		Accent 2
	μ	μ	σ
Declarative H*L	H*	L	H*
Interrogative L*H	L*	H	L*

Rule B – representation as A Problem declaratives

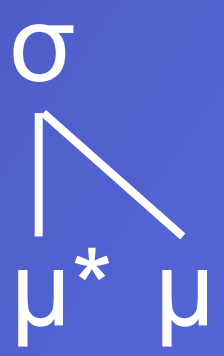
Rule B	Accent 1		Accent 2
	μ	μ	σ
Declarative H*L	H*		H* L
Interrogative L*H	L*	H	L*

Rule B – opposite representation
Problem interrogatives

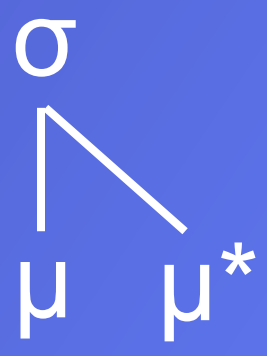
Rule B	Accent 1	Accent 2	
	σ	μ	μ
Declarative H*L			
Interrogative L*H			

‘Strong / weak vs. weak / strong’ Rule A

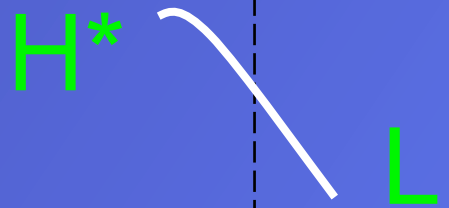
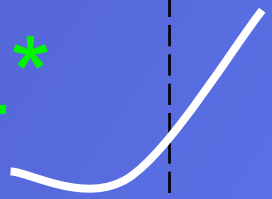
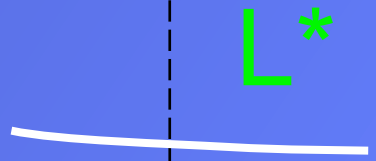
Accent 1



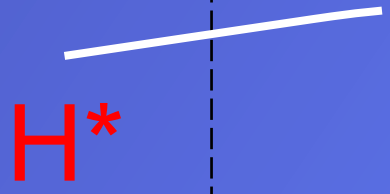
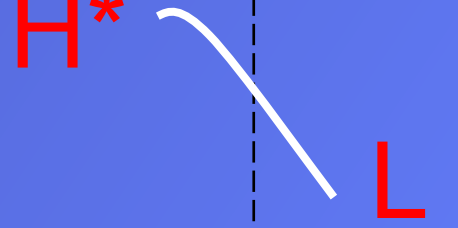
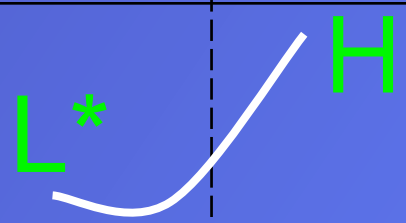
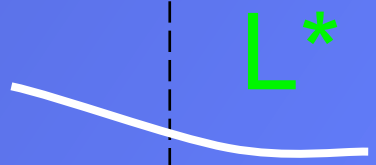
Accent 2



Rule A

T* → μ*	Accent 1		Accent 2	
	μ*	μ	μ	μ*
Declarative H*L				
Interrogative L*H				

Rule B – representation as A Problem declaratives

	Accent 1		Accent 2	
	μ*	μ	μ	μ*
Declarative H*L				
Interrogative L*H				

Rule B – opposite representation Possible

* μ* / L	Accent 1		Accent 2	
	μ	μ*	μ*	μ
Declarative H*L		H*	H*	L
Interrogative L*H	L*	H		L*

Summary

- ‘Two vs. one’ cannot derive correct Rule B contours
- ‘Moraic stress’ can derive correct contours if representation and grammar differ between Rule A and Rule B
- But: predicts four instead of two basic systems