

Word-Level Prosodic Typology

Day 4: Two types of feet in stress systems –
the case of German

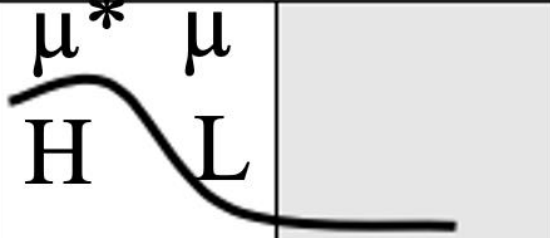
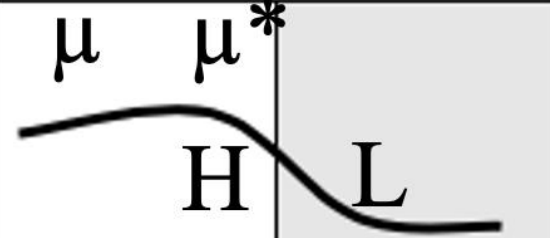
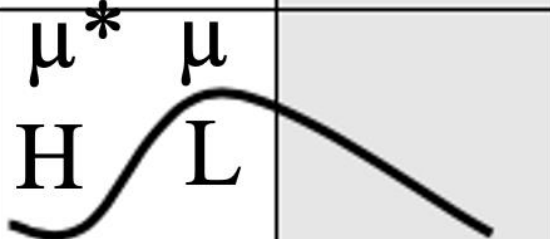
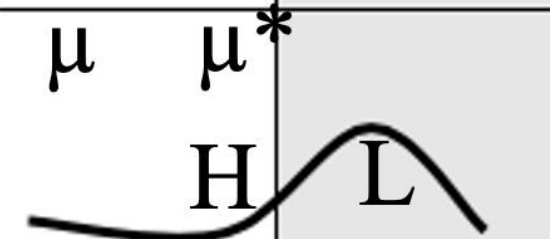
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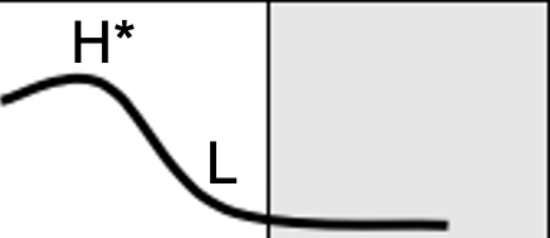
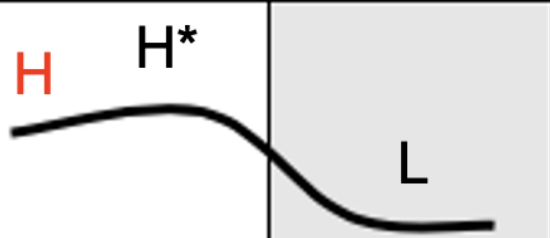
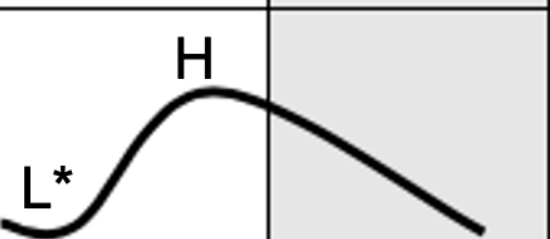
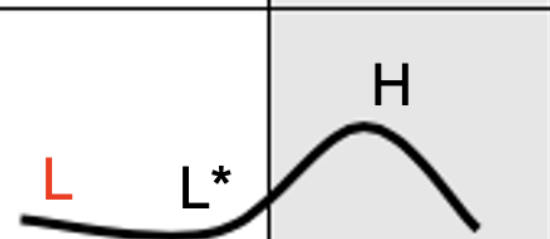
What we will do today

- Some repetition
- Discuss more Franconian tonal accent

Mora stress/accent

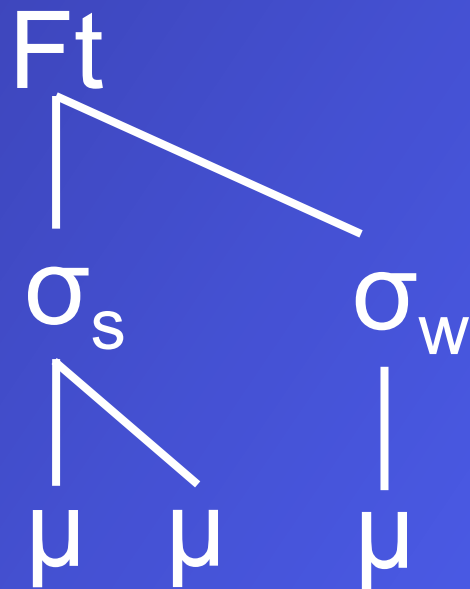
Lexical tone

Context		Accent 1		Accent 2	
Declarative, non-final position	H*L				
	L*H				

Context		Accent 1		Accent 2	
Declarative, non-final position	H*L				
	L*H				

Some abstract structures (slightly simplified)

Accent 1
counts syllables



Accent 2
counts moras



Consonants and feet in Franconian dialects (Köhnlein & Cameron 2024)

Some Franconian dialects show synchronic interactions of accent and the voicing quality of word-medial consonants:

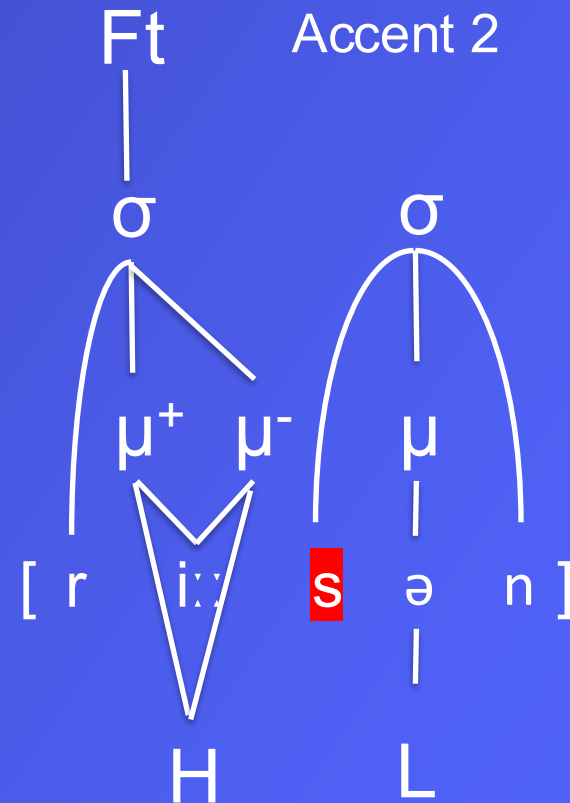
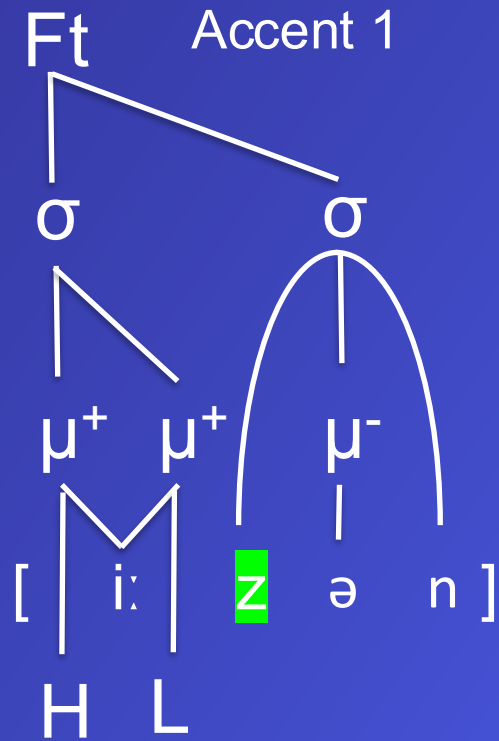
1. Disyllabic words with medial voiced (weaker) consonants always receive Accent 1

Examples: *Always* [i:¹zən] 'iron', [drø:¹mən] 'to dream'

2. Disyllabic words with medial voiceless (stronger) consonants typically receive Accent 2, though some words receive Accent 1 (ask if you want)

Examples: *Typically* [ri:²sən] 'to tear'

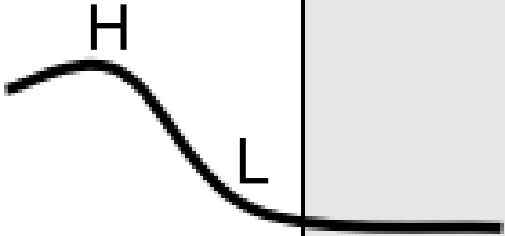
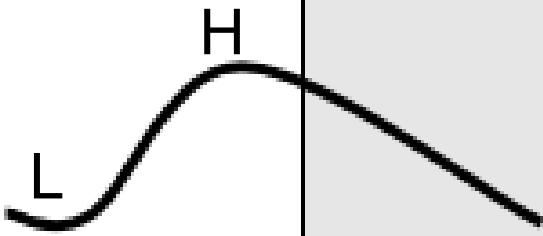
Everything put together



Foot-based approach =
unified analysis of various co-occurring phenomena

- Tonal patterns (check; analyzed with feet)
- Consonantal patterns (check; analyzed with feet)
- Durational patterns (check; analyzed with feet)

So why not lexical tone?

Context	Accent 1		Accent 2	
Declarative, non-final position				
Interrogative, non-final position				

Early

Late

Some reasons, referencing my initial concerns

- The ‘invisible’ lexical tone makes the timing difference look coincidental – follows from foot approach
- No other tone language has been described that changes a lexical tone because of an intonational tone – not needed in foot approach
- Franconian contours not that different from what German/Dutch/English generally sound like – is that mere coincidence? No, at least not under the foot approach; they are closely related metrical systems

Some more reasons

- It doesn't need to assume an arbitrary lengthening rule
→ lengthening follows from invoking foot structure
- Interactions with word-medial consonant voicing not straightforward

So why not 'moraic stress'?

Context	Accent 1		Accent 2	
Declarative, non-final position H*L	μ^* μ 		μ μ^* 	
Interrogative, non-final position L*H	μ^* μ 		μ μ^* 	

Early

Late

Some reasons

- Can model the tonal patterns, but...
 - Doesn't have much to say about interactions with voicing in the following syllable or Accent-2 lengthening
- I'd say: advantage for the foot

So what does this all mean?

- If on the right track, this analysis suggests that the long prevalent assumption 'stress = feet = syllables' is too simplistic
 - There exist rhythmic/timing contrasts below the syllable level
 - Not necessarily two types of stress, but different domains are possible (in line with the assumption that feet can count syllables or moras)
- Approach emerges from a detailed study of an individual language via unifying several phenomena using the same machinery

Today:
use of feet outside of tonal accent

The argument in one slide

- Goal: showing how and why certain metrical structures permit or prohibit the realization of umlaut in German
- Main claim: schwa is footed differently from unstressed full vowels, leading to different metrical domains → affects umlautability = two types of feet
- Unified, foot-based analysis of multiple (morpho-) phonological puzzles in (Standard) German phonology
- Can model interactions of vowel quality and accentuation in North Germanic

Roadmap

- I. Diminutive umlaut and some other puzzles
- II. Theoretical background
- III. Analysis
- IV. Bonus panel

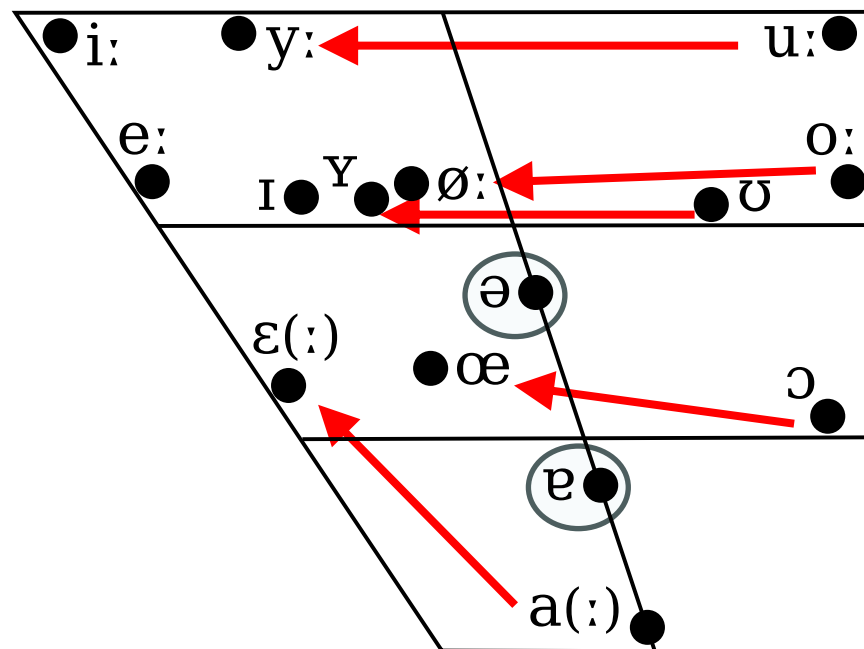
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Puzzle 1 – umlaut in diminutives

Basics: what is umlaut?

- Process that fronts stressed German back vowels /a:, o:, u:, a, ɔ, ʊ/ and the diphthong /au/ to [ɛ:, ø:, y:, ε, œ, ʏ] and [ɔi], respectively
- Schwa-vowels are always unstressed and do not participate in umlaut



Puzzle 1: umlaut in diminutives

- Most productive umlaut trigger (for common nouns; e.g., Iverson and Salmons 1992)
- Multiple (umlauting) diminutive suffixes in the history of German (Lameli 2018), such as...
 - *-chen*
 - *-lein*
 - *-gen*
- Here: focus on *-chen* (most common in modern German)

Exercise 1

Umlaut in diminutives with *-chen*

- Umlaut attracted to stressed syllables with full vowels: schwa cannot be stressed/umlauted but does not block umlaut either

<i>Isolation</i>	<i>Diminutive</i>	<i>Gloss</i>
• ['bo:t]	['bø:t-çən]	‘boat’
• ['mʊtəʁ]	['mʏtəʁ-çən]	‘mother’
• [pɔʁ'tsjɔ:n]	[pɔʁ'tsjø:n-çən]	‘portion’ (loanword)
• ['ti:ʁ]	['ti:ʁ-çən]	‘animal’
• ['ʃɪf]	['ʃɪf-çən]	‘ship’

Umlaut of back vowels in diminutives with *-chen*

- Umlaut is blocked when unstressed syllable has a full vowel

<i>Isolation</i>	<i>Diminutive</i>	<i>Gloss</i>	
• ['pu:ma]	['pu:ma-çən]	‘cougar’	*['py:ma-çən], *['pu:mɛ-çən]
• ['o:ma]	['o:ma-çən]	‘grandma’	
• ['fo:to]	['fo:to-çən]	‘photo’	
• ['halo] / [ha'lo]	[ha'lø-çən]	‘hello’	*['halø-çən], *['hɛlo-çən], *[ha'lo-çən]
• Sporadic formations:	['o:ma]	→	['ø:m-çən]
	['kafe]	→	['kɛf-çən]

Umlaut puzzle: takeaways and questions

- Takeaway: Unstressed full vowels display a different behavior from schwa
- Some of the biggest questions
 - Why do unstressed full vowels block umlaut?
 - Why does schwa not block umlaut?
 - (Why is umlaut restricted to stressed syllables?)
- To answer these questions, it's worthwhile to look at some other, related puzzles

Puzzle 2: engma

- Realization of /ŋ/ in coda position before an unstressed vowel
 - a. Following unstressed syllable with schwa = ambisyllabic [ŋ.ŋ]
 - b. Following unstressed syllable with full V = [ŋ.g] (at least in underived words)
- Re a. [fiŋ.ŋəʊ] *[fiŋ.gəʊ] 'finger'
- Re b. [taŋ.go] *[taŋ.ŋo] 'tango'

Engma puzzle: takeaways and questions

- Takeaway (again): Unstressed full vowels display a different behavior from schwa
- The questions
 - Why do unstressed full vowels get [ŋ.g]
 - Why does (necessarily unstressed) schwa get [ŋ.ŋ]?
 - (What is the underlying representation?)

Puzzle 3: *[hə]

- The sequence [hə] is disallowed in German, barring extremely careful spelling pronunciations (Wiese 1996)
 - ['ze:ən], ['ze:n], *['ze:hən] 'to see'; cf. orthographic *sehen*
- Unstressed [h], however, is unproblematic (though rather rare) when a comparable unstressed syllable contains a full vowel
 - ['u:.hu] 'owl', [ˌma:ha'ʁadʒa] 'maharaja'

*[hə] puzzle: takeaways and questions

- Takeaway (again): Unstressed full vowels display a different behavior from schwa
- The questions
 - Why do unstressed full vowels allow [h] in the onset?
 - Why does schwa not allow [h] in the onset?

Umlaut, Engma, *[hə]: what I observe they have in common

- In all three phenomena, post-tonic syllables with schwa have a different status from post-tonic syllables with full vowels → strange coincidence
- Isolated solutions to each of these puzzles are available but no analysis that treats them in tandem
- → My attempt: unified metrical approach
- Basic ingredients: German data support...
 - Sonority/Quality-sensitive foot structure (here: schwa versus full vowels)
 - Two types of feet in the same language

Roadmap

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Sonority-sensitive foot structure

- In some languages, vowel quality appears to influence the placement of stress (e.g., Kenstowicz 1995, de Lacy 1999)
- Basic hierarchy: $a > o$, $e > i$, $u > \text{ə}$ (or subset thereof)
- My claim for Standard German: only schwa can be a foot dependent, full vowels cannot

Two types of feet in the same language

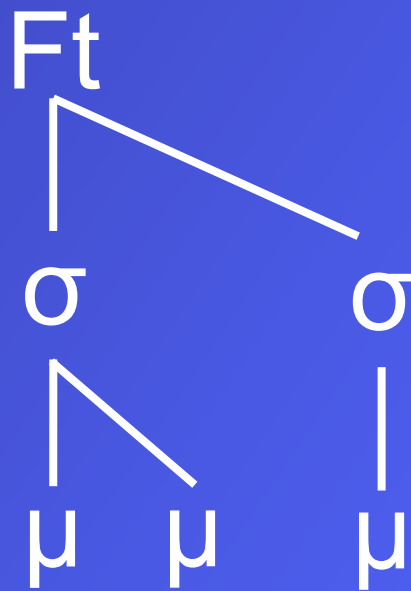
- Claim: metrical systems of some languages allow more than one foot type (as defined in Hayes 1995)
- Most controversial in parametric models with 'switch-based' settings (such as indeed Hayes 1995), predicted in OT
- One potential source of evidence: tone-accent systems with (bi)moraic, monosyllabic trochees versus (di)syllabic trochees (see last few days)

Two types of trochaic feet in some (Germanic) languages, after Köhnlein (2016)

Bimoraic,
monosyllabic trochee



Disyllabic,
uneven trochee



Note: all stressed
syllables =
bimoraic
(Prokosch's Law)

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A core observation: the special status of schwa in (Standard) German

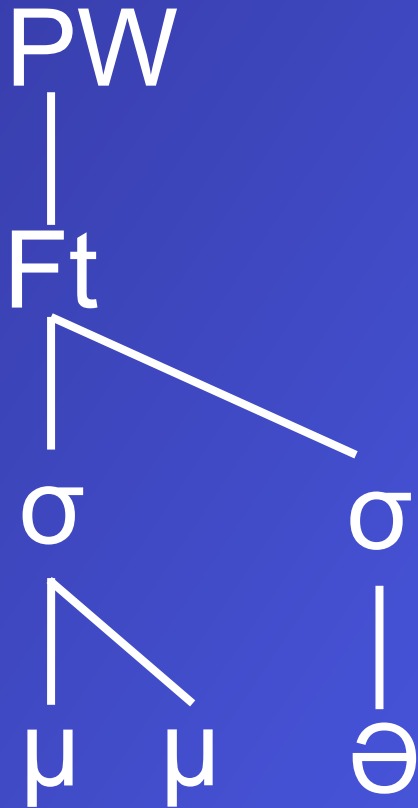
- My claim: Schwa in underived words restricted to post-tonic syllables (= syllables directly following a stressed syllable)
 - [ti.ʌa:.də], *[t̪i.ʌa.də], ‘tirade’
 - [ge.ne:.sə], *[ge.ne:.sə], *[gə.ne:.sə] ‘genesis’

Two analytical main claims: the special status of schwa in German

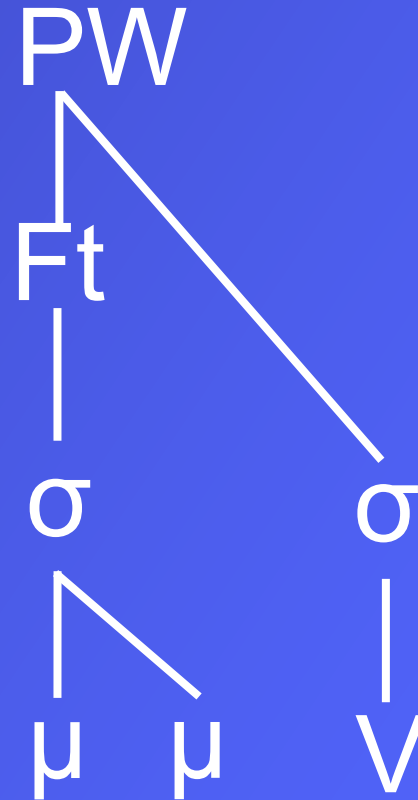
- **Claim 1:** Schwa must be a foot dependent (stronger version of van Oostendorp 1995 for Dutch = WEAKSCHWA) – at least in simplex words
- Reformulated WEAKSCHWA: Only schwa can and must occur in the dependent position of a foot (in simplex words)
- Apparent exceptions = prosodic compounds (Hall 2001, 2002) or morphologically complex words (e.g., prefixes /gə-/, /bə-/)
- **Claim 2:** unstressed full vowels *cannot* be parsed as foot dependents and remain unfooted
- → Both claims together will be crucial for understanding umlautability

Two types of trochaic feet in German

Post-tonic schwa =
Disyllabic trochee



Post-tonic full V =
bimoraic trochee



Schwa should only occur as a foot dependent: some predictions

Schwa disallowed	Pre-tonic	Stressed	Unstressed	Unstressed	Stressed
Stem-initially	*ə	✓			
After unstressed: final		✓	[ə] ok	*ə	
After unstressed: non-final		✓	[ə] ok	*ə	✓

Foot domains = green

Schwa should only occur as a foot dependent: some predictions

Schwa disallowed	Pre-tonic	Stressed	Unstressed	Unstressed	Stressed
Stem-initially	*ə	V			
After unstressed: final		V	[ə] ok	*ə	
After unstressed: non-final		V	[ə] ok	*ə	V

Foot domains = green

Dispreferred stem-initial schwa: evidence from loanword integration

- CELEX: 8 potential ‘monomorphemic’ counterexamples, all French loanwords

Item	Transcription	Frequency
remis	r@-'mi	4
Remis	r@-'mi	10
Renonce	r@-'n~-s@	0
Revuebuehne	r@-'vy-by-n@	1
Revue	r@-'vy	13
Tenue	t@-'ny	0
Veloursleder	v@-'lur-le-d@r	0
Velours	v@-'lur	8

Dispreferred stem-initial schwa: evidence from loanword integration

- CELEX: 8 potential 'monomorphemic' counterexamples, all French loanwords

Item	Transcription	Frequency	What speakers I surveyed say
remis	r@-'mi	4	r[e]mis
Remis	r@-'mi	10	R[e]mis
Revue	r@-'vy	13	R[e]vue
Velours	v@-'lur	8	V[e]lours

Schwa should only occur as a foot dependent: some predictions

Schwa disallowed	Pre-tonic	Stressed	Unstressed	Unstressed	Stressed
Stem-initially 😊	*ə	✓			
After unstressed: final		✓	[ə] ok	*ə	
After unstressed: non-final		✓	[ə] ok	*ə	✓

Foot domains = green

Schwa should only occur as a foot dependent: some predictions

Schwa disallowed	Pre-tonic	Stressed	Unstressed	Unstressed	Stressed
Stem-initially 😊	*ə	✓			
After unstressed: final		✓	[ə] ok	*ə	
After unstressed: non-final		✓	[ə] ok	*ə	✓

Foot domains = green

Dispreferred final schwa
after unstressed syllable (here: schwa syllables)

- CELEX: 8 potential 'monomorphemic' counterexamples

Item	Transcription	Frequency	Analysis
ander-er	'&n-d@-r@r	9664	Complex
Baedek-er	'b)-d@-k@r	10	Complex, (derived from) name
besonder-e	b@-'zOn-d@-r@	1185	Complex
Ebene	'e-b@-n@	340	See below
euer-e	'X-@-r@	2	Complex
mehr-ere	'me-r@-r@	1031	Complex
ober-e	'o-b@-r@	191	Complex
unser-e	'Un-z@-r@	4994	Complex

Dispreferred final schwa after unstressed syllable (here: schwa)

- CELEX: 8 potential 'monomorphemic' counterexamples

Item	Transcription	Frequency	Analysis
Ebene	'e-b@-n@	340	See below

Ebene as a complex word

- -e = nominalizing suffix (though non-productive)
- *eben* 'flat' → *Eben-e* 'plain'
- *breit* 'wide' → *Breit-e* 'width'
- *tief* 'deep' → *Tief-e* 'depth'
- *lang* 'long' → *Läng-e* 'length'
- ...

Dispreferred final schwa after unstressed syllable (here: schwa)

- CELEX: 8 potential 'monomorphemic' counterexamples

Item	Transcription	Frequency	Analysis
Eben-e	'e-b@-n@	340	Complex

Schwa should only occur as a foot dependent: some predictions

Schwa disallowed	Pre-tonic	Stressed	Unstressed	Unstressed	Stressed
Stem-initially 😊	*ə	✓			
After unstressed: final 😊		✓	[ə] ok	*ə	
After unstressed: non-final		✓	[ə] ok	*ə	✓

Foot domains = green

Schwa should only occur as a foot dependent: some predictions

Schwa disallowed	Pre-tonic	Stressed	Unstressed	Unstressed	Stressed
Stem-initially 😊	*ə	✓			
After unstressed: final 😊		✓	[ə] ok	*ə	
After unstressed: non-final		✓	[ə] ok	*ə	✓

Foot domains = green

Dispreferred pre-tonic schwa after unstressed syllable

- CELEX: potential 'monomorphemic' counterexamples only some words ending in *-erie*
 - *Artill-erie* 'artillery'
 - *Infant-erie* 'infantry'
 - *Kavall-erie* 'cavalry'
- *-erie* = suffix (e.g., Fleischer 1969)

Post-tonic schwa versus pre-tonic full V in loanwords with originally full /e/

Stressed	Unstress ed	Unstress ed	Stresse d	Gloss
V	V	*[ə]	V	–
Ge	o	m[e]	trie	‘geometry’
Or	tho	p[e]	die	‘orthopedics’
A	ka	d[e]	mie	‘academy’
(V	[ə])	*[ə]	V	–
Tem	p[ə]	ra	tur	‘temperature’
in	t[ə]	r[ɛ]	ssant	‘interesting’
Li	t[ə]	ra	tur	‘literature’

Two pronunciations of *interessant*

(from [Wiktionary](#))

- IPA^(key): /ˌɪn.tə.ʁɛ'sant/, /ˌɪn.tʁə'sant/

- Audio:  0:02

- Audio (*Germany (Berlin)*):  0:02

- Audio (*Germany (Berlin)*):  0:02

- Rhymes: *-ant*

Schwa should only occur as a foot dependent: some predictions

Schwa disallowed	Pre-tonic	Stressed	Unstressed	Unstressed	Stressed
Stem-initially 😊	*ə	✓			
After unstressed: final 😊		✓	[ə] ok	*ə	
After unstressed: non-final		✓	[ə] ok	*ə	✓

Foot domains = green

Added benefit: German ‘plural templates’ (e.g., Smith 2007, 2020) are regular phonology

(20) Plural formation in Standard German

a. Stem is a syllabic trochee: (‘σσ) → (‘σσ)		b. Stem is not a syllabic trochee: (‘σ) → (‘σσ)	
Ta fel <u>n</u> ‘tables’	-n	Uh ren <u>n</u> ‘clocks’	-en
Tan ten <u>n</u> ‘aunts’		Frau <u>en</u> ‘women’	
Leh rer ‘teachers’	No ending	Freun de <u>e</u> ‘friends’	-e
On kel ‘uncles’		Jah re <u>e</u> ‘years’	
Vä ter ‘fathers’	No ending (with umlaut)	Bü cher <u>e</u> ‘books’	-er (with or without umlaut)
Brü der ‘brothers’		Kin der <u>e</u>	

Added benefit: German ‘plural templates’ (e.g., Smith 2007, 2020) are regular phonology

(21) Template for German and Dutch plurals

Template for German and Dutch plurals

(Ft)#

Word final foot

('σσ)

Syllabic trochee

|

ə

Must end in a schwa syllable

Works, but no need for a template in my analysis
→ schwa must be post-tonic anyway

Visible in loanword pluralization (Wegener 2004)

- | • | <i>SG</i> | <i>PL</i> | <i>Gloss</i> |
|---|------------------------------|--|----------------|
| • | <u>A</u> lbum | Albums > Alb[ə]n | ‘album’ |
| • | <u>P</u> izza | Pizzas > Pizz[ə]n | ‘pizza’ |
| • | <u>K</u> onto | Kontos > Kont[ə]n | ‘bank account’ |
| • | However (just to be fair)... | | |
| • | <u>R</u> isiko | <u>R</u> isikos, <u>R</u> isik[ə]n (?) | ‘risk’ |

But there’s something about the suffix <-ik>; see *Grammatik[ə]n* ‘grammars’, *Plastik[ə]n* ‘sculptures’), etc., quite possibly secondary stress

Summary of foot structure claims

- Claim 1: in simplex words, schwa can only occur as a foot dependent
- Evidence provided
 - Distributional (possible locations of schwa in simplex words)
 - Morphophonological (plural formation)
- Claim 2: Full vowels cannot be parsed as foot dependents
 - No evidence provided so far
 - Upcoming core evidence: umlaut in diminutives (plus some other puzzles)
- How does this help us understand the puzzles?

Puzzle 1: umlaut in diminutives

The basic generalizations again

- Umlaut attracted to stressed syllables with full vowels:
unstressed schwa can be ignored
- ['bo:t] ['bø:t-çən] 'boat'
- ['mʊtəɐ̯] ['mʏtəɐ̯-çən] 'mother'
- Umlaut is blocked when unstressed syllable has a full vowel
- ['o:ma] ['o:ma-çən] 'cougar' *['ø:ma-çən]

The main puzzle: umlaut

A note on features

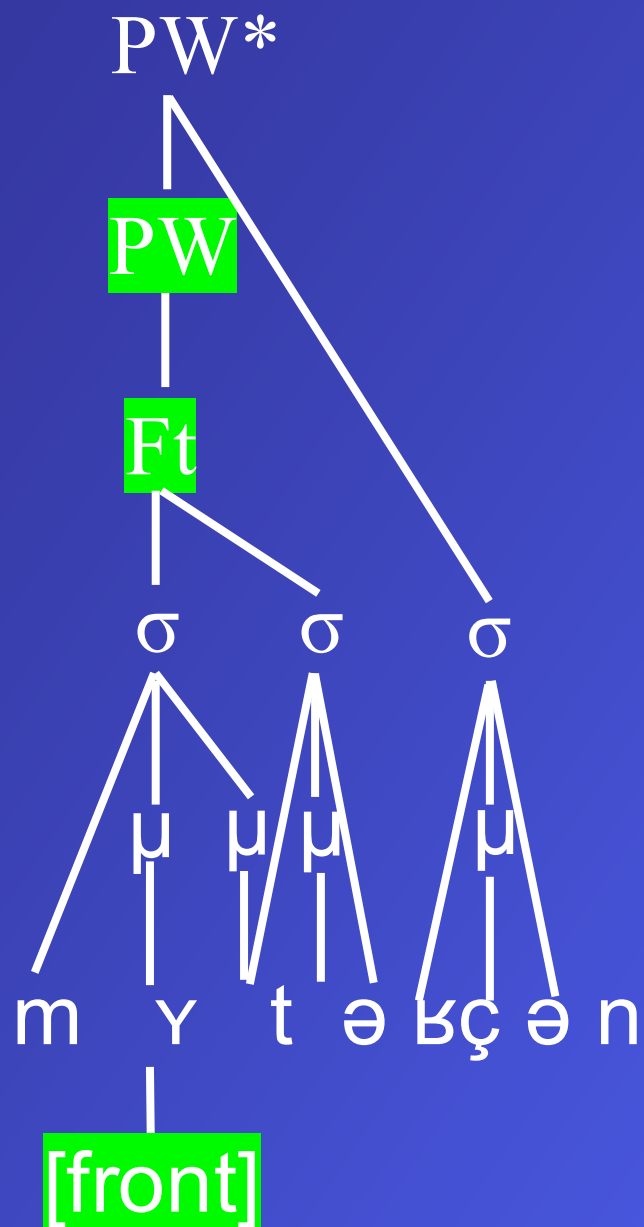
- Umlaut = adding floating privative feature [front] to vowels without a frontness feature (Hansson and Wiese 2024 for discussion)
- Unstressed vowels in German repel feature-adding operations → only stressed vowels can license ‘new additions’
- This models why umlaut must surface on stressed vowels

Representation of the diminutive morpheme: some very basic assumptions

- Exponent 1: /-çən/
 - That one goes at the end
- Exponent 2: [front]
 - As a suffix exponent, [front] must be realized in a right-aligned foot in the minimal Prosodic Word (PW); e.g., Zimmermann (2017) on non-concatenative affixation

Categorization of the diminutive morpheme: stress-neutral, word-level suffix

- *-chen* is a cohering but stress-neutral, word-level suffix
- → Does (typically) not influence stress placement
 - ***Kolibri***-*chen* ‘humming bird-dim’
 - ***Paprika***-*chen* ‘pepper-dim’
 - ***Kakadu***-*chen* ‘cockatoo-dim’
 - These would all violate the 3-syllable window if relevant for stress
 - Potential counterexample = base forms ending in *-or* shift stress:
Autor vs. *Autör*-*chen* ‘author’, though *-or* is strange anyway
- Prosodic integration: attaches to higher-level PW projection PW* (alternatives possible)



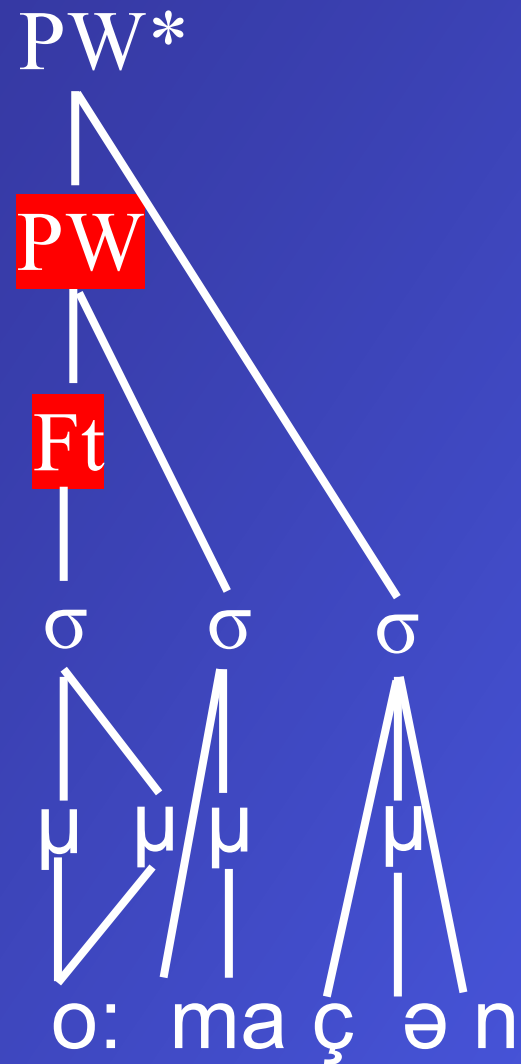
*Mutter +
-chen*

Disyllabic, uneven
trochee

Foot PW-final = umlaut
licensed

Schwa as foot
dependent $\rightarrow$ satisfies
WEAKSCHWA

Oma + *-chen*



Minimal foot: Bimoraic
trochee (NOT
disyllabic)

Why? WEAKSCHWA:
Full vowels cannot be
dependent of minimal
foot

Post-tonic syllable
unparsed

Foot not PW-final =
umlaut not licensed

Puzzle 2: engma

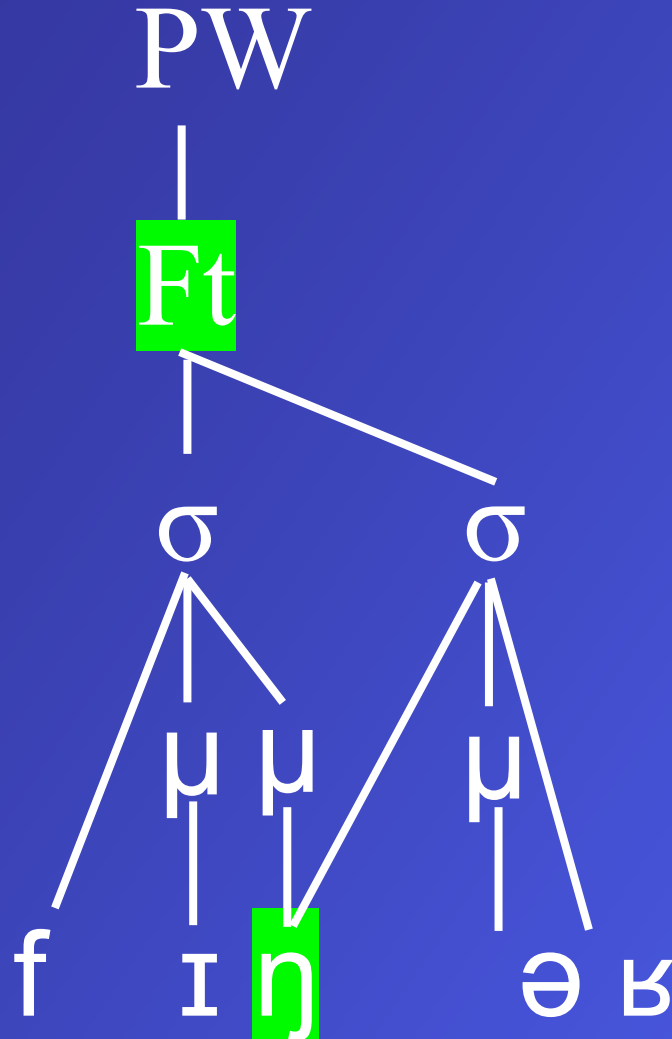
The basic generalizations again

- Realization of /ŋ/ in coda position before an unstressed vowel
 - a. Following unstressed syllable with schwa = ambisyllabic [ŋ.ŋ]
 - b. Following unstressed syllable with full V = [ŋ.g] (at least in underived words)
- Re a. [fiŋ.ŋəʊ] *[fiŋ.gəʊ] 'finger'
- Re b. [taŋ.go] *[taŋ.ŋo] 'tango'

[fɪŋ.ŋəʊ]

Disyllabic, uneven
trochee

Schwa as foot
dependent → satisfies
WEAKSCHWA

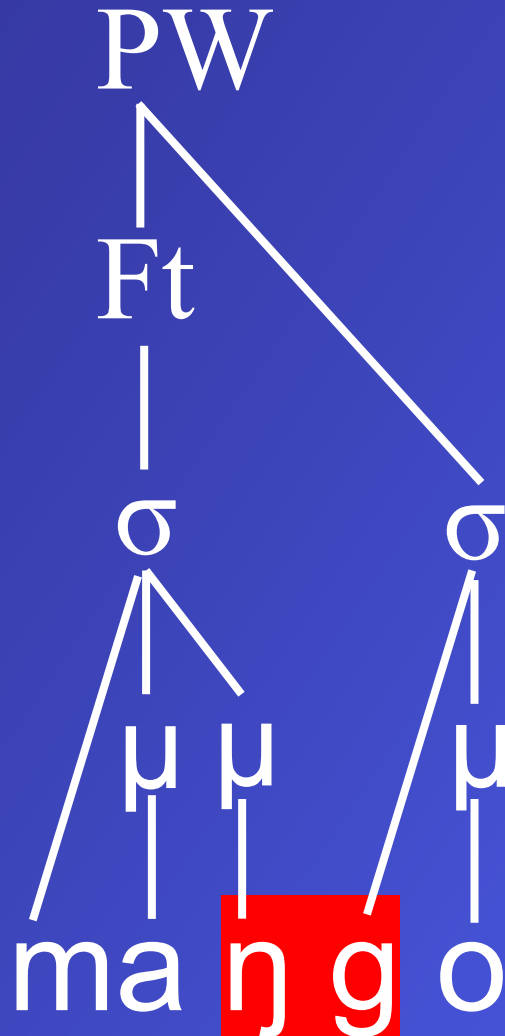


Ambisyllabic engma
licensed within a foot OR
[n.g] not licensed within
a foot

[maŋgo]

Bimoraic trochee (NOT
disyllabic) because of
post-tonic full vowel

Ambisyllabic engma
not licensed across a
foot boundary OR [ŋ.g.]
possible across a foot
boundary



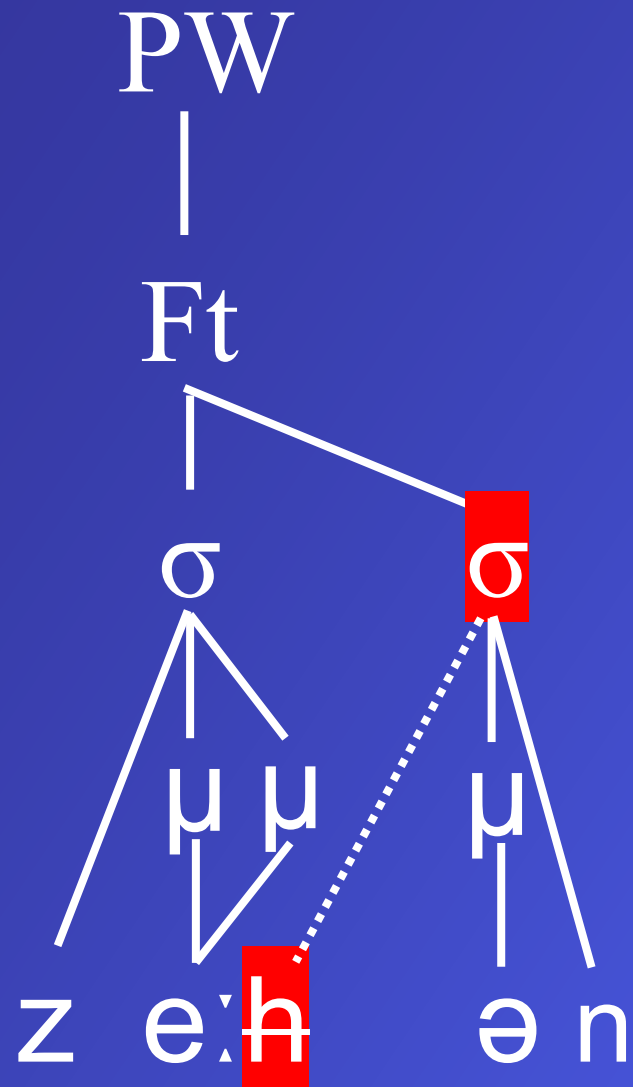
One remaining classic issue not addressed here

- Is the underlying form /ŋ/ or /ng/ (easier for some dialects than for others)?
- Not the core point of this presentation
- Possible answers to the question also depend on the chosen grammatical framework

Puzzle 3: *[hə]

The basic generalizations again

- The sequence [hə] is disallowed
- Unstressed [h], however, is unproblematic
- a. ['ze:.ən], ['ze:n], *['ze:.hən] 'to see'; cf. orthographic *sehen*
b. ['u:.hu] 'owl'

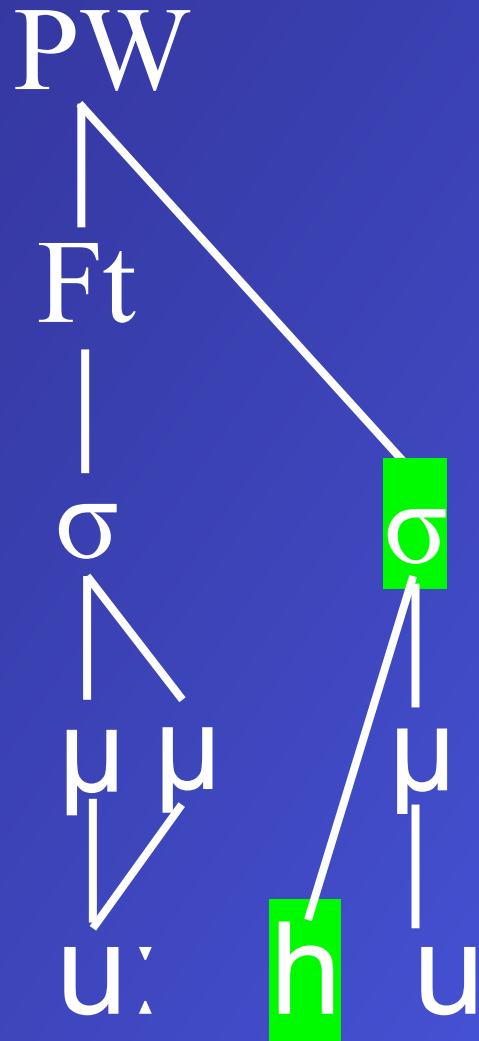


[ze.hən]

Disyllabic, uneven
trochee

Schwa as foot
dependent →
satisfies
WEAKSCHWA

[h] disallowed in the
onset of a
dependent syllable



[u:hu]

Bimoraic trochee (NOT
disyllabic) because of
post-tonic full vowel

[h] perfectly fine in
onset of unparsed
syllable

Puzzle 3: *[hə]

Why they can't co-occur

- *[hə] is a combination of two generalizations
 - [h] cannot be foot-medial AND
 - [ə] must occur as a foot dependent
- Accidental complementary distribution

Umlaut, Engma, *[hə]: Summary of the analysis

- Observation: In all three phenomena, post-tonic syllables with schwa have a different status from post-tonic syllables with full vowels
- Solution: schwa is footed differently from unstressed full vowels, which leads to different domain sizes
- Expresses all three phenomena with the same machinery, crucially including umlaut
- In line with the general behavior of schwa in the German stress system (post-tonic preference, role in plural formation)

Roadmap

- I. Diminutive umlaut and some other puzzles
- II. Theoretical background
- III. Analysis
- IV. Bonus panel

Alternative approaches

- Most obvious alternative: make things follow from special syllabification status of schwa via some type of invisibility
 - Féry (e.g., 1994) for diminutives: schwa syllables invisible for stress, foot can be built across schwa syllables, incorporating *-chen*
 - Hall (1989) for engma: schwa as initially unsyllabified $\otimes$ -slot
- Some notes
 - Not entirely clear to me how invisibility extends to pre-stressing property of schwa, pluralization template
 - Not entirely clear to me whether why schwa in diminutive suffix itself should not be invisible to foot structure (re Féry)

Some emerging bonus questions

- Can we identify typological parallels?
 - Confident answer: yes, e.g., from tonal accent in North Germanic
- What effects does this have on the general analysis of the German metrical system?
 - Confident answer: no serious ones, I think
- How does a system of this type arise diachronically?
 - Necessarily speculative answer: prosodic integration of novel loanwords with full unstressed vowels

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North Germanic tone accents

- Word-prosodic opposition between two ‘word tones’
- Distribution
 - Accent 2 cannot occur on words with final stress (including monosyllables)
 - Both Accents can occur on non-final stress
- Some examples from Urban East Norwegian (UEN)

^{1(*2)} *tank* ‘tank’

¹ *vinter* ‘winter’

stu^{1(*2)} *dent* ‘student’

² *sommer* ‘summer’

Surface vs. underlying contrast

- Very few, if any, minimal pairs on roots
- Most tonal minimal pairs differ morphologically
- Structure of many native words
 - One stem vowel = Accent 1
 - Two stem vowels = Accent 2
- ‘Minimal pair’ from Urban East Norwegian
- ¹*t^ank-en* ‘the tank’ vs. ²*t^anke-n* ‘the thought’

Accentuation in vowel-final disyllables with initial stress

- Urban East Norwegian (Kristoffersen 2000: 255)
 - Items ending in schwa (weak vowel) → Accent 2
 - Items ending in unstressed full vowels → Accent 1
- Central Swedish (Bruce 1977)
 - Items ending in [ə] or [a] (weak vowels = inflectional endings) → Accent 2
 - Items ending in unstressed full vowels → Accent 1

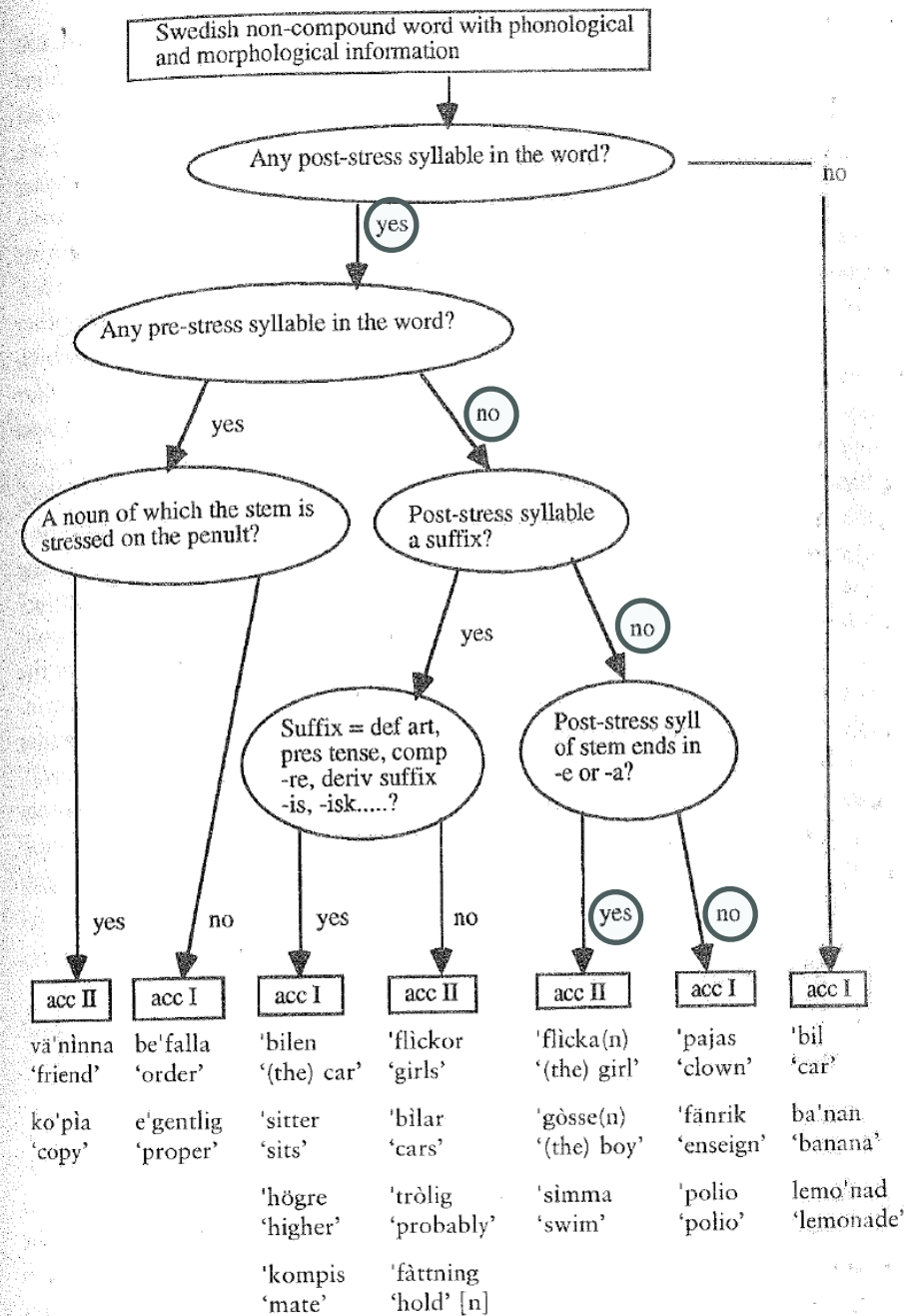


Figure 2. Diagram for predicting the word accent of a Swedish non-compound word (after Bruce 1977)

Swedish
m Bruce & Hermans (1999),
after Bruce (1977)

Analytical approaches and parallels to German

- Metrical approaches to tonal accent (e.g., Morén-Duolljá 2013, Iosad 2015, Bye to appear)
 - Accent 1 = monosyllabic foot domain
 - Accent 2 = disyllabic foot domain
- Recall my claim for German
 - Strong post-tonic vowel $\rightarrow (\mu\mu).\sigma$
 - Weak post-tonic vowel $\rightarrow (\sigma.\epsilon)$
- Can be extended to North Germanic
 - Accent 1: foot = bimoraic, monosyllabic domain $\rightarrow$ UEN/CS $(\mu\mu).\sigma$
 - Accent 2: foot = disyllabic domain $\rightarrow$ UEN $(\sigma.\epsilon)$; CS $(\sigma.\epsilon/a)$

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Classifying German trochees as (di-)syllabic or (bi-)moraic is difficult anyway (see below from Hayes 1995)

Page 181:
moraic trochee
(plus NOCLASH)

Page 200:
syllabic trochee

Languages with Latin-like Stress

- a. **Spanish** (Harris 1983, 1992). No minimal word constraint.
- b. **Romanian** (Steriade (1984). No minimal word constraint.
- c. **English** (Chomsky and Halle 1968). Minimal word = / – /.
- d. **German** (Giegerich 1985; Hayes 1986c). Minimal word = / – /.

German (Giegerich 1985; Hayes 1986c)

Main stress calculated from right edge

Secondary stress: 01 . . . , 201 . . . , 2001 . . . , 20201 . . .

Vowel length is phonemic; but in syllables lacking main stress, a tense-ness contrast is substituted for the length contrast.

Minimal word is a heavy syllable.

Analysis: Syllabic trochees from left to right, degenerate feet forbidden

Effects on the analysis of German stress

- In general, the analysis I propose should predict the same stress patterns as 'traditional' approaches
- Main ingredient: avoidance of clashes
- Traditional: [(,promə)('nadə)] 'promenade'
- Here: [(,promə)('nadə)]
- Traditional: [(,mak.ka)('ro:ni)] 'macaroni'
- Here: [(,mak)ka('ro)ni]
*[(mak)(ka)(ro)(ni)]

But... I can see one potential difference

Antepenultimate stress in trisyllabic items (but there are debates about final secondary stress anyway):

	No secondary stress		Secondary stress
Traditional:	[(kam.mə)ra]	OR	[[(kam.mə)(ra)]]
‘camera’			
Here:	[(kam.mə)ra]	OR	[(kam.mə)(ra)]
Traditional:	[(do:mi)no]	OR	

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A very rough possible history of German foot structure

- Native simplex words become monosyllabic or disyllabic with initial stress, unstressed final vowels reduce to schwa
(from Ritt 2009, Ch. 9: “The Great Trochaic Conspiracy”)
- Basic word template: $(\underline{\mu}\underline{\mu})$ OR $(\underline{\mu}\underline{\mu}.\text{ə}(\text{R}))$ $\text{R} = [\text{n}, \text{r}, \text{l}, (\text{m} > \text{n})]$
- Schwa now the only vowel that can be a foot dependent
(introducing/promoting WEAKSCHWA)
- New loanwords with final unstressed full vowels enter the language
- Solution: these vowels don’t fit existing metrical templates, hence they can’t be foot dependents, so we won’t parse them in a foot
- Emergence of $(\underline{\mu}\underline{\mu}).\text{V\#/C}$ alongside $(\underline{\mu}\underline{\mu}.\text{ə}(\text{R}))$ and $(\underline{\mu}\underline{\mu})$

To sum up

- Assuming that German foot structure is sensitive to vowel quality provides a principled solution toumlautability
- Can be extended to other phonological puzzles in German and has typological support (cf. North Germanic)
- Helps gain a better understanding of division of labor between morphosyntax and phonology → reduces idiosyncrasy in morphological operations