Prolegomena to a theory of word accent (Extensive handout)

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The goal is to outline a theory of *word accent* and to consider both languages in which the location of accent is mainly *phonologically-driven* as well as languages in which *morphological structure* plays a decisive role.

Definition: A syllable is said to have *word accent* if it is the *head of a dependency structure* that comprises the whole word.

We will see that the notion 'word' can be relativized such that there is an accentual domain that is smaller than the whole word which itself may function as a larger accentual domain. When more than one word-internal domain is relevant, we can distinguish between a *primary word accent* and a *secondary word accent*. When no such distinction obtains, I simple speak of the *word accent*.

Heads-ups:

- I use the term 'accent' where other uses the term 'stress'. For me 'stress' refers to the *phonetic manifestation* of accent which is an abstract (substance-free) property.
- I mostly limit my attention to accent locations that correlate with 'primary stress'. Non-primary stresses can be accentual or they are rhythmic in my account. As far as ryhythmc stress is concerned, I separate the treatment of accent (which is 'lexical') from rhythm (which is 'post-lexical'). I will clarify this view later when I show how my approach differs from Metrical Theory (*MT).
- I do not do Optimality Theory (*OT), not Distributed Morphology (*DM)

Some examples of accentual languages to set the stage. (Source of language examples and (limited) data: **StressTyp2**: http://st2.ullet.net/)

(1) **Latvian** (*Indo-European, Baltic*. Latvia)

ˈbagātĭba	'wealth'	ˈkrāsa	'colour, paint, dye'
ˈkokvilna	'cotton'	ˈmākslinieks	'artist'

The location of word accent is always the *first syllable*, which means that 'syllable weight' plays not role. We call this system *weight-insensitive*.

(2) **Korafe** (Papua New Guinea)

a.	nó	(name of snake)
e.	ríri	'steps'
b.	oká	'lime, lime pot'
f.	óka	'fish'
c.	oróro	'blood'
g.	óroro	'clans'

d. atóvembo ‘father-in-law’
h. bósivara ‘porpoise’

Accent falls unpredictably on *the first or second syllable*. Since all syllables are CV, syllable weight (including vowel sonority) is not a factor.

(3) **Maranungku** (Australia):

a. tíralk ‘saliva’
b. moéroepoèt ‘beard’
c. jáŋarmàta ‘the Pleiades’
d. ŋáltiřitiřì ‘tongue’
e. wélepènemànta ‘kind of duck’

Weight-insensitive *initial accent* AND rhythmic ‘beats’ on alternating syllable thereafter.

(4) **Dakota** (Siouan, great Plains)

ˈkte ’he kills’ wa ˈkte ’ı kill’
ma ˈya kte ’you kill me’ oˈwičha ya kte ’you kill them there’
wiˈčha ya kte ’you kill them’

Accent falls on the *second syllable*. No sensitivity to weight.

(5) **Weri** (Trans-New Guinea)

a. ŋɪntíp ‘bee’
b. kʊ̀lɪpʊ́ ‘hair of arm’
c. ʊlʊ̀amít ‘mist’
d. àkʊnètepáˈl ‘times’
e. lɪlɪ̀ŋewèlɪˈáˈl ‘two ladders’
f. mʊ̀lmʊlàiʲmèntɪáˈl ‘two tomatoes’

Word accent is *final*, weight-insensitive, with alternating rhythmic beats preceding.

(6) **Warao** (Isolate, Venezuela)

a. tíra ‘woman’
b. koránu ‘drink it!’
c. rùhunáe ‘he sat down’
d. jiwàranáe ‘he finished it’
e. jàpurùkitàneháse ‘verily to climb’
f. enàhoròahàkutái ‘the one who caused him to eat’

Weight-insensitive penultimate accent, while secondary beats on even-numbered syllables preceding the main stress.

(7) **Central Sierra Miwok** (Penutian, California Penutian,

taˈnaːja	’evening star’	kuˈmaʔsa	’aunt’
ˈkoːkotʃu	’clover’	ˈnopta	’to drop’

Initial accent if the first syllable is closed or contains a long vowel; otherwise stress falls on the second syllable. This system is thus *weight-sensitive*.

I will later on represent this system with the following notation:

[(**σ̲**σ) [(σ**σ̲**) [(**σ̲σ**) [(σσ̲) (‘[’ = left edge to the word)

Here **bold** represent a *heavy syllable* and underlining indicates the location of the word accent.

I will call this a **FIRST/LAST system**, meaning accent is on the FIRST (i.e. leftmost) heavy syllable or (if there is no heavy syllable) on the LAST (i.e. rightmost) syllable **WITHIN A TWO-SYLLABLE WINDOW on the left edge of the word**.

(8) **Capanahua** (Panoan, North-Central)

raʔ	‘perhaps’
hiwín	‘tree’
mápo	‘head’
pisǩáp	‘small’
čičǩa	‘knife’
wáraman	‘squash’
sóntako	‘young girl’
wiránkin	‘he pushed it’

Accent occurs on the second syllable if that syllable is closed by a consonant that is not a glottal stop. Otherwise accent is initial. Weight-sensitive.

Notice that this system is the mirror-image compared to (7):

[(**σ̲**σ) [(σ**σ̲**) [(**σ̲σ**) [(σ̲σ)

I will call this a **LAST/FIRST system**, meaning accent is on the LAST (i.e. rightmost) heavy syllable or (if there is no heavy syllable) on the FIRST (i.e. rightmost) syllable **WITHIN A TWO-SYLLABLE WINDOW on the left edge of the word**.

(9) All examples given thus far have bounded accent, which means that the accent location is limited to a peripheral or near-peripheral syllable on the left or right edge of the word.

The formal characterization is that in bounded systems, the accent is located in a two-syllable window on the left or right-side of the word, which is called the **accentual window**.
The two-syllable window can be extended to a three-syllable accentual window.

(10) **Latin**

reˈfeːcit	reˈfectus	ˈreficit	from reficio: 'to remake'

Stress falls on the penultimate syllable if it contains a long vowel or is closed. Else stress is antepenultimate. The final syllable is never accented:

((σσ)σ)] ((σσ)σ)] ((σσ)σ)] ((σσ)σ)]

Here, we often speak of the final syllable being 'extrametrical'. I will call such extra syllables that do not seem to matter for accent location **satellites**.

(11) Summarizing what we have seen so far, using the notion of *parameter*.

Accent parameters
Accentual window edge: left/right
Satellite: yes/no
Weight-sensitivity: yes/no

Latin
Accentual window edge: right
Satellite: yes
Weight-sensitivity: yes

Central Sierra Miwok
Accentual window edge: left
Satellite: no
Weight-sensitivity: yes

Capanahua
Window edge: left
Satellite: no
Weight-sensitivity: yes

(12) What these three parameters do not tell us is what the accent location is within the window.

Let's focus on the Miwok and Capanahua. How do we differentiate between them?

Miwok	[(**σ**σ)	[(σ**σ**)	[(**σσ**)	[(σσ)	FIRST/LAST
Capanahua	[(**σ**σ)	[(σ**σ**)	[(**σσ**)	[(σσ)	LAST/FIRST

Both are weight-sensitive. In the first and second case there is only one heavy syllable in the window. In all weight-sensitive system, when there is only one heavy syllable, this syllable gets the word accent. *The third and fourth case then remain unsettled*. In the third case there is 'competition' between two heavy syllables, whereas in the fourth case there is no heavy syllable. To locate the word accent in these two cases, we need two further parameters, one to resolve the competition ('resolution') and one to determine the accent location when there is no heavy syllable ('default')

Central Sierra Miwok (FIRST/LAST)
Window edge: left
Satellite: no
Weight-sensitivity: yes
Resolution: first (or 'left')
Default: last (or 'right')

Capanahua (LAST/FIRST)
Window edge: left
Satellite: no
Weight-sensitivity: yes
Resolution: last
Default: first

(13) If Resolution and Default are binary parameters, the full set of parameters will be:

Accent parameters
Window edge: left/right
Satellite: yes/no
Weight-sensitivity: yes/no
Resolution: first/last
Default: first/last

(14) Now note that this predicts **two more** left-edge, weight-sensitive systems, because two binary parameters allow four combinations:

Left-edge weight-sensitive systems

i.	a. [(**σ** σ)	b. [(σ **σ**)	c. [(**σ σ**)	d. [(σ σ)	e.g. Capanahua (L/F)
			Res: last	Def: first	
ii.	a. [(**σ** σ)	b. [(σ **σ**)	c. [(**σ σ**)	d. [(σ σ)	e.g. **Archi (L/L)**
			Res: last	Def: last	
iii.	a. [(**σ** σ)	b. [(σ **σ**)	c. [(**σ σ**)	d. [(σ σ)	e.g. **Malayalam (F/F)**

		Res: first	Def: first	
iv. a. [(**σ** σ)	b. [(σ **σ**)	c. [(**σ** **σ**)	d. [(σ σ)	e.g. Miwok (F/L)
		Res: first	Def: last	

(15) Interestingly, turning to the right edge we also find four possibilities:

Right-edge weight-sensitive systems

i. a. (**σ** σ)]	b. (σ **σ**)]	c. (**σ** **σ**)]	d. (σ σ)]	e.g. Rotuman (L/F)
		Res: last	Def: first	
ii. a. (**σ** σ)]	b. (σ **σ**)]	c. (**σ** **σ**)]	d. (σ σ)]	e.g. Yapese (L/L)
		Res: last	Def: last	
iii. a. (**σ** σ)]	b. (σ **σ**)]	c. (**σ** **σ**)]	d. (σ σ)]	e.g. Sunda (F/F)
		Res: first	Def: first	
iv. a. (**σ** σ)]	b. (σ **σ**)]	c. (**σ** **σ**)]	d. (σ σ)]	e.g. Aklan (F/L)
		Res: first	Def: last	

(16) Toward a more formal analysis

a. Heavy syllables *project* a *variable syllabic accent*
b. Resolution take the form of a *licensing parameter* (first/last)
c. A variable syllabic accent that is licensed become 'visible' for the location of word accent
d. Default arises from assigning a *left-headed or right-headed* structure within the window.

In addition to syllabic accents, languages can also have *moraic accents*, which are marked 'inside the syllable rhyme' on either the head position in the rhyme or the dependent position. Moraic accents are often analysed as H tones, as in Blevins (1993) for Lithuanian and, for Serbo-Croatian, in Inkelas & Zec (1988). Given the distinction between diacritic syllabic and moraic accents, the question arises as to whether a language can make use of both. In the analysis of Bogomolets 2020, 2022), Arapaho has diacritic syllabic accents, but it also has lexically specified falling tones on some long vowels that are independent of the accentual system. In my view this falling tone can be specified as a moraic accent on the first mora. This means that in Arapaho we have to distinguish between syllabic diacritic accents, which are interpreted as stress, and moraic diacritic accents, which are interpreted as high pitch.

(17) I will demonstrate this for a right-edge LAST/FIRST system (e.g. Rotuman)

i. Projection of variable accents

(x)	(x)	(x) (x)	
a. (**σ** σ)]	b. (σ **σ**)]	c. (**σ** **σ**)]	d. (σ σ)]

ii. Licensing of last (i.e. rightmost) variable accent

x	x	x	
a. (**σ** σ)]	b. (σ **σ**)]	c. (**σ** **σ**)]	d. (σ σ)]

iii. Construction of left-headed D-structure

x	x	x	
a. (**σ** σ)]	b. (σ **σ**)]	c. (**σ** **σ**)]	d. (σ σ)]

Here note that a left-headed structure cannot be assigned in the second and third case, in which case the demand of exhaustivity (exhaustive parsing) necessitates *adjunction* (indicated by the dotted lines).

Weight-sensitivity: a heavy syllable cannot be a dependent: σ *σ

For words comprising more than two syllables, a full dependency structure will arise by adjoining all syllables:

x	x	x	
a. [σ σ σ (**σ** σ)]	b. [σ σ σ (σ **σ**)]	c. [σ σ σ (**σ** **σ**)]	d. [σ σ σ (σ σ)]

It is now very important to see that the head of the dependence structure that here comprises the whole word can be accented or not, i.e. in the default case (where there are no heavy syllables in the accentual window), we have a head that is not based on a syllabic, weight-based accent. This means that the default D-structure, while locating the word head, does not 'insert' an accent. Nevertheless, we I will refer to the word head as the *word accent*, which means that a word accent does not have to also have a syllabic accent. This difference, I claim, can have an effect on phonetic implementation. One case of this is that the phonetic manifestation of word headedness where there is no accent is 'weaker' than in cases where there is a syllabic accent at play. This means that if a language has no syllabic accents as all, it could be that overall the cues for word headedness are weaker than in languages that use syllabic accents, sometimes causing people and linguists to disagree on where the 'word prominence peak' is. A case in point seems to be 'word stress' in Indonesian. In some languages, however, where word prominence is entirely predictable, such as Hungarian or Finnish (that have initial 'stress'), there is no disagreement about the location, whereas such systems could be analyzed as non-accentual; see van Coetsem (1996).

(18) Shown for all four *right-edge* weight-sensitive systems (Note: the licensed instances of (x) 'loose' their parentheses.)

i. a. (**σ** σ)] b. (σ **σ**)] c. (**σ** **σ**)] d. (σ σ)]

e.g. Rotuman: stress the rightmost (last) heavy syllable, otherwise the leftmost (first) syllable (i.e. if there is no heavy syllable): LAST/FIRST

ii. a. (**σ** σ)] b. (σ **σ**)] c. (**σ** **σ**)] d. (σ σ)]

e.g. Yapese: stress the rightmost (last) heavy syllable, otherwise the rightmost (last) syllable: LAST/LAST

iii. a. (**σ** σ)] b. (σ **σ**)] c. (**σ** **σ**)] d. (σ σ)]

e.g. Sunda: stress the leftmost (first) heavy syllable, otherwise the leftmost (first) syllable: FIRST/FIRST

iv. a. (**σ** σ)] b. (σ **σ**)] c. (**σ** **σ**)] d. (σ σ)]

e.g. Aklan: stress the leftmost (first) heavy syllable, otherwise the rightmost (last) syllable: FIRST/LAST

(18) **How does all this differ from assigning (trochaic or iambic) weight-sensitive feet? Is this just saying that assigning in my approach foot structure is <u>non-iterative</u>.**

van der Hulst (2012): "It should be noted that the four-way distinction that we find at each edge *cannot* be accounted for in any of the foot typologies that have been developed in standard varieties of metrical theory (Vergnaud and Halle 1978; Hayes 1981, 1995; Idsardi 1992, 2009). At least, no inventory of feet has ever been proposed in the metrical literature that accounts for this diversity *without additional machinery* such as movement or deletion rules. For example, Hayes (1981) and Halle and Vergnaud (1987: 45-46), must adopt a stress retraction rule to account for penultimate accent in Aklan when words ends in two heavy syllables". Aklan: FIRST/LAST:

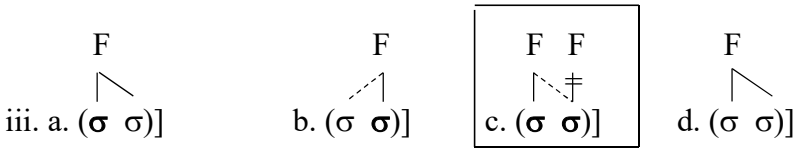
iv. a. (**<u>σ</u>** σ)] b. (σ **<u>σ</u>**)] c. (**<u>σ</u>** **σ**)] d. (σ <u>σ</u>)]

The fourth case shows that default is *iambic*. But in an iambic foot analysis, the third case requires a rule of 'defooting' (which achieves the 'stress retraction').

van der Hulst (2012): "It would seem then that standard foot inventories are not rich enough to account for all bounded primary stress locations." I would go as far as to say that no theory of feet that fares better is conceivable.

What if we say for Aklan that the rightmost heavy syllable counts as light? The phenomenon that heavy syllables can count as light when they are on the edge of a word is independently motivated (See Rosenthal and van der Hulst 1999, who call this 'weight-by-position-by-position'). We could then say that the iambic foot will provide the correct accent location for the third case and in the second case it is harmless to say that the final heavy syllable counts as light because it will then behave like the fourth case.

Turning to the Sunda case, it would seem that a trochaic analysis (as suggested by the default case) also needs a defooting rule:



Sunda: stress the leftmost (first) heavy syllable, otherwise the leftmost (first) syllable: FIRST/FIRST

In this case, appealing to WBPBP does not work because we would then get an iambic pattern in the second case counter to fact.

(19) **Conclusion**: For both the right-edges and the left-edge bounded, weight-sensitive accent system, two out the four cases do not follow straightforwardly from any foot-based approach.

On the other hand, foot theories are too rich to account for rhythm, as I show in van der Hulst (2014). In conclusion, standard foot theories, in trying to generalize over primary stress and rhythm are both too limited (for primary stress) and too rich (for rhythm). The present approach allows the necessary complexity for primary stress, and allowing a simple and independent approach to rhythm.

(20) My analysis is 'direct'. I do not build structure that subsequently needs to be deleted (no defooting) . Why? The reason is simply that resolution (which in a sense does what defooting does) *feeds* into the formation of D-structure. This makes my approach computationally superior ('Emmon Bach's Principle'). Also, importantly, my approach *predicts* that there *are* four possibilities (at each edge), whereas the standard metrical approach does not make this prediction.

(21) To further support this approach, we now turn to so-called **unbounded accent systems**. Here the basic idea is that the accentual window coincides the 'whole word'. Despite initial attempts (cf. Halle and Vergnaud 1978), such systems fall outside the scope of metrical approaches (Hayes 1995).

(22) As it turns out there are 4 types of unbounded weight-sensitive systems, which are completely analogous to the four possibilities in bounded systems that we find on each end of the word.

(23) **Kenuzi-Dongola** (Nilo-Saharan): LAST/FIRST

- Accent falls on the last (rightmost) syllable with a long vowel or closed syllable.
  (Final closed syllables are light unless they contain a long vowel.)
- In words without heavy syllables, accent is initial.

gɛˈriːf ’small net’	inˈtillɛ	’needle	duˈroːkanɛ ’thickness’
ˈnosogid ’length’	ˈdurukanɛ	’old age’	ˈaru ’rain’

(24) **Yukaghir** (Yakutia and the Kamchatka Peninsula): LAST/LAST

- Accent falls on the last syllable that is closed by a consonant or has a long vowel.
- Else accent falls on the last syllable of the word.

ˈaːsˈe	’domestic deer’	leˈgul	’food’
aˈroːje	’kind of fish’	ˈāolhoro	’hare’
moˈro	’hat’	cöbiˈne	’spear’

(25) **Amele** (*Trans-New Guinea*): FIRST/FIRST

- Accent falls on the first closed syllable
- Else the first.

duˈan	’cold’	jaˈwalti	’wind from north’
ˈnifula	species of beetle	itiˈtom	’righteous’

(26) **Tahitian** (*Austronesian*): FIRST/LAST

- Accent stress falls on the first long vowel,
- Else on the penultimate syllable.

ʔoˈhipa	’work’	ˈfare	’house’
taˈmaahine	’daughter’	taˈmaaroa	’boy’

(27) The only difference is the size of the accentual window which, if comprising the whole word of course has no left/right edge option.

(This case shows that in unbounded system, ‘extrametricality’ also can be at play. Or is could be that the default case appeals to a bounded window.)

(28) Accent parameters for **phonologically-driven accent**
Window size: bounded/unbounded
Window edge: left/right
Satellite: yes/no
Weight-sensitivity: yes/no
Resolution: first/last
Default: first/last

Example of satellite option in the right edge:

a. Bounded(R); Satellite(R):
….. σ ((σ σ)+σ)] (external satellite, aka 'extrametricality)
b. Bounded(R); Satellite(L):
…..σ (σ+(σ σ))] (internal satellite; not covered by 'extrametricality')

Internal satellite positions are accessible for accent, e.g., in languages where accent can be on the final, penultimate or antepenultimate syllables (Spanish, English, Dutch, etc.)

(29) Thus far, we have considered the role of only phonological factors in accent placement. We now turn to the role of the lexicon, i.e., *unpredictable syllable accents that are not weight-based.*

(30) **Korafe** (Papua New Guinea)

a.	nó	(name of snake)
e.	ríri	'steps'
b.	oká	'lime, lime pot'
f.	óka	'fish'
c.	oróro	'blood'
g.	óroro	'clans'
d.	atóvembo	'father-in-law'
h.	bósivara	'porpoise'

Accent falls unpredictably on the first or second syllable. Since all syllables are CV, syllable weight (including vowel sonority) is not a factor.

(31) This looks like a bounded weight-sensitive system, except in this case we mark syllables with 'diacritic weight'. We can mark either the first or the second syllable with a *variable diacritic syllabic accent*. For this language we still need a left edge accentual window because accent is bounded. However, there seems to be no evidence for setting the Resolution parameter (but see below):

a. ~~[(σ σ)~~ b. [(σ σ) ~~c. [(σ σ)~~ d. [(σ σ) (-/F)

Res: undef. Def: left

a. [(σ σ) ~~b. [(σ σ)~~ ~~c. [(σ σ)~~ d. [(σ σ) (L/-)

Res: undef. Def: right

(32) diacritic syllabic weight can also play a role combined with phonological syllabic weight.

(33) **Maidu, Mountain** (Penutian): left-edge FIRST/LAST system

- Accent is initial if the first syllable is closed.
- Else accent falls on the second syllable.
- BUT: *There are many words with lexicalized initial stress*

kyˈle	’woman’	ˈjukbom	’bear dance’
wiˈsetpem	’frightened’	ˈsyndaˌka	’forehead’
caˈtataˌk’a	’rattlesnake’	ˈʔomkaˌnajdi	’under the rock’

Words with exceptional initial accent have a diacritic syllabic accent on the initial syllable which causes these syllables to act as if they are heavy. *Exceptionality is a sign of accent being lexical*.

a. [(σ σ) (x) [(σ σ)] b. [(σ σ) c. [(σ σ) d. [(σ σ) e.g. Like Miwok (F/L)

← diacritic syllabic accent

Res: left Def: right

It is important to see that we do not have to regard lexical accent as marking the word accent directly. We can say that lexical accents are variable, hence *potential* word accents, and apply the phonological parameters to decide which lexical accent is the word accent. We do this because when there is more than one lexical accent, which is of course not the case in simplex words, we need to decide which one ‘wins’. When we consider morphologically complex words it can happen that a word contains more than one lexical accent; see (35).

(34) An unknown: do the two types of weight count as equal in all languages or do diacritic accents ‘outrank’ phonological weight accents? See Vaxman (2016).

(35) Diacritic weight can take center stage in so-called *lexical accent systems*.

(36) In such systems, morphemes come in two kinds: accented and unaccented.

(36) **Russian** (Slavic): FIRST/FIRST

- Accent falls on the first syllable that is *lexically marked for accent*,
- Else, if no morpheme brings in an accent, accent is on the first syllable

This is what Kiparsky & Halle (1979) call *The Basic Accentuation Principle* (BAP): "which erases all accents but the leftmost one, and assigns an accent to the left edge of an unaccented domain." It applies in many Indo-European languages.

(37) The pitch-accent system of Tokyo Japanese is a FIRST/LAST system (A H tone associates to the first diacritic accent, or, if there is no such accent, to the last syllable.

a. HLL	b. LHL	c. LHH L	d. LHH H
x	x	x	
σσσ	σσσ	σσσ(-σ)	σσσ(-σ)
inoti	kokoro	atama	konpyūta
'life'	'heart'	'head'	'computer'

(38) We predict that we can find four types of 'lexical accent systems'. It would appear that other Japanese dialects display a LAST/LAST or FIRST/FIRST patterns. No cases of LAST/FIRST (Haraguchi 1977). Once more we find that the accentual parameters proposed here account for the typology of lexical accent systems.

(39) **Question**: *Are there weight-insensitive systems that are unbounded?* If a language has weight-insensitive word accent on the last or first syllable, how do we know whether it is bounded or unbounded?

a. [σ σ (σ σ)] bounded b. [(σ σ σ σ)] unbounded

Sometimes we can tell. *Turkish*, which seems to have final accent, is unbounded because there are stems that have exceptional syllabic accents that get the word accent:

(x)
an.ka.ra 'Ankara'

We know it has a FIRST/LAST system because when an exceptional stem is followed by a pre-accenting suffixes such as *-la* 'with', the first accent wins:

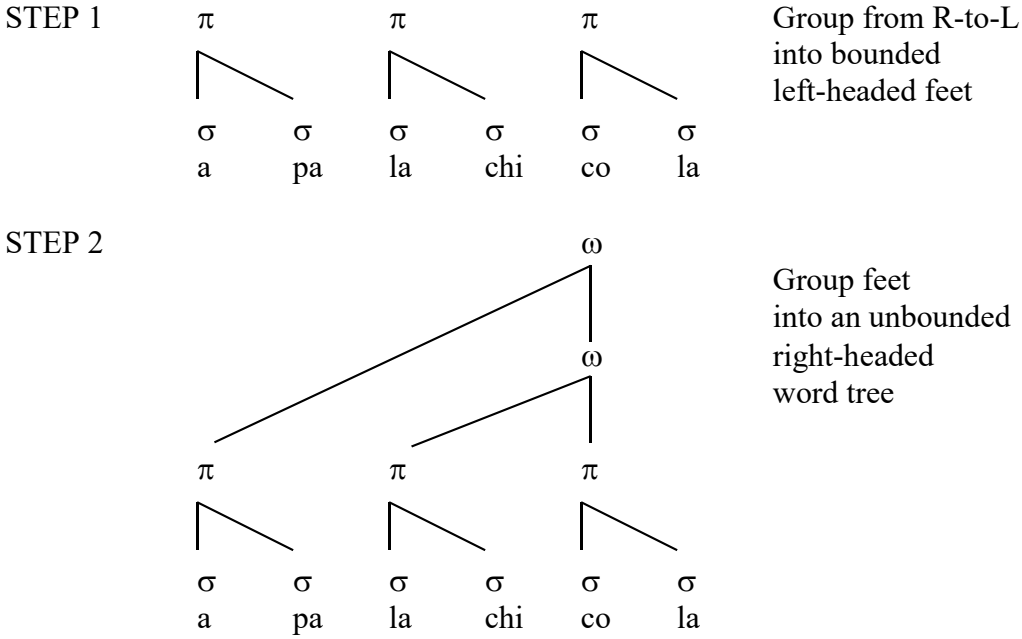
(x) (x)
şevrole-la with 'Chevrolet'
[x-]

In other cases, we cannot tell. Perhaps the unbounded option is the simplest in that case. (We could strengthen this idea if we assume that unboundedness is the result of leaving the window parameter unspecified.)

(40) *How does my approach differ from Metrical Phonology?* In my previous work on word prominence (going back to van der Hulst 1984), I have rejected the metrical model (Liberman and Prince 1977) and replaced it by an approach that represents *rhythm* as 'secondary', i.e. as being assigned *after* word accent has been determined at the lexical level. Rhythm arises at a 'post-grammatical' level, possibly as part of phonetic implementation (see van der Hulst 2011b). The most important problem with selecting primary 'stress' from a wave of rhythmic beats is that, whereas the primary 'stress' location is often subject to lexical irregularity, the distribution of rhythmic beats appears to always be fully regular and 'automatic'. This suggest that rhythm is not lexical. Here, I will not discuss the assignment of rhythm (but see van der Hulst 2014 for an extensive account). However, I will locate the rhythmic module in the overall architecture of phonology.

Another problem with metrical phonology is that criteria for weight influence can differ for primary stress location and secondary stresses. See Goedemans and van der Hulst (2013).

How does MT work?



In many cases where rhythmic beat are mentioned in the descriptive literature, the metrical analysis seems to work like this: if foot assignment goes from left-to-right, the first foot is selected as the head of the whole word, and vice versa. This correlation between directionality of foot assignment and the edge where primary stress occurs was the first issue that made me think that we should reverse the order of determining primary stress and rhythmic stress. If primary stress is assigned first, we could simple say that rhythm 'ripples' away from the primary stress like an 'echo'.

There are some systems in which the location of primary stress seems to be dependent on doing rhythm first, which I call 'count systems'. I will return to an analysis if such systems at the end of this hand out.

But the second and more powerful argument for primary stress first is that primary stress is often subject to lexical exception which suggest that primary stress location is lexical. Rhythm on the other hand always seem to be fully predictable and not ever dependent on lexical marking of rhythmic beats. This suggests that rhythm is 'post-lexical'.

(41) TWO GENERAL QUESTIONS (for discussion)

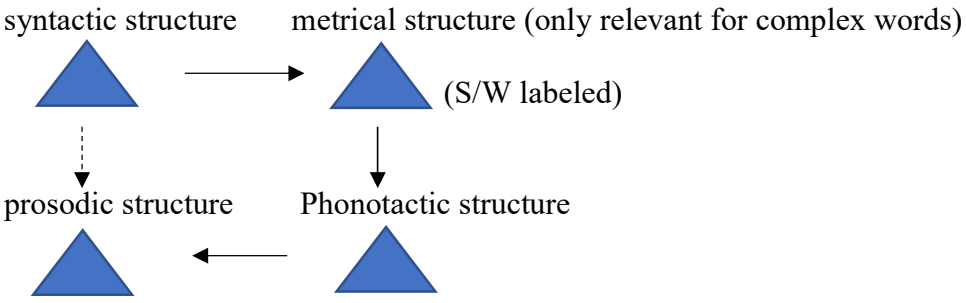
- *Are all languages accentual?* No. But I would maintain that all word in all languages have a D-structure which then could account for predictable 'word prominence' which is not accent-based. I hypothesize that representing the sequences of syllables that make up words as a D-structured, headed object is a *cognitive mandate* that facilitates memory, storage and retrieval. This would allow for there being no phonetic manifestation of the location of the word head.

- *Are there other factors that can cause the perception of a word-level prominence peak?* It has been suggested that the perception of a prominence peak can be due to something else than word headedness (with or without an accent), such as a boundary tone, increased duration or a rhythmic beat to mark the edge of a domain that is identified with words.

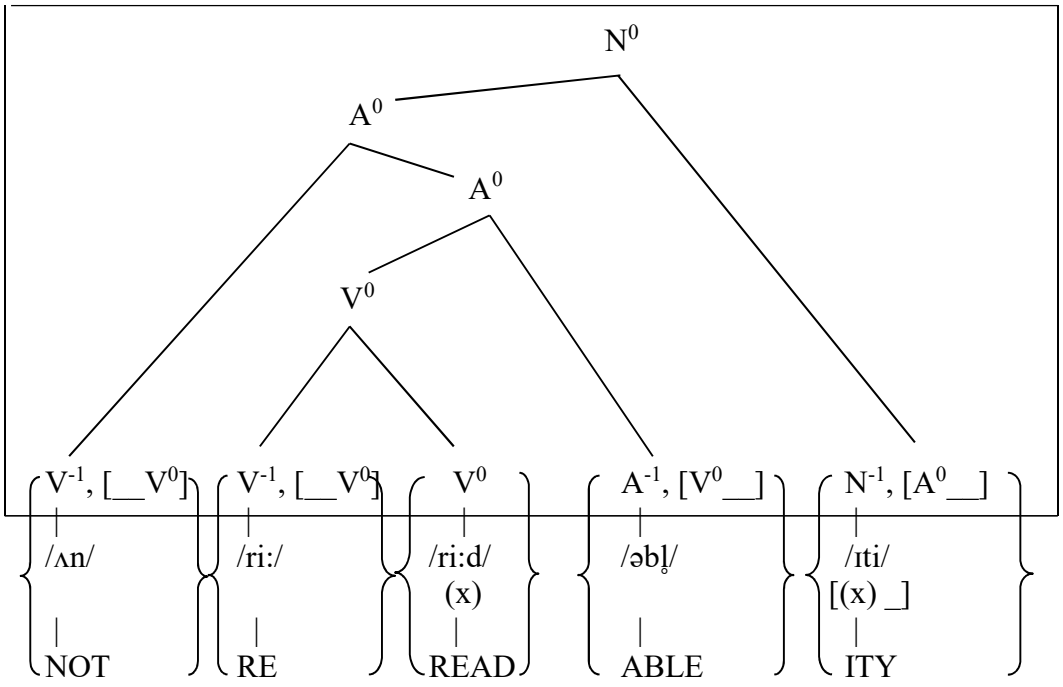
(42) Having discuss phonological and lexical factors, we now turn to the role of *morphology*

(43) I start with my assumptions about mapping from morphological structure to phonological structure

(44) **Three levels of phonological structure**



(45) **Syntactic (morphological) structure for the word *unreadability***



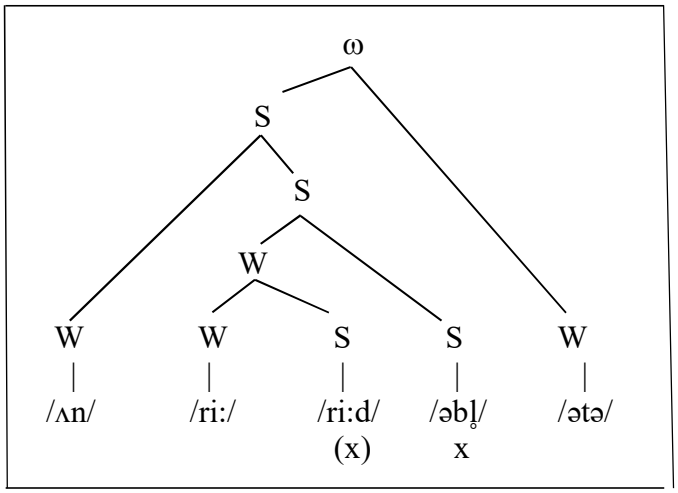
X^{-1} = affix, X^0 = free morpheme; '[(x) _]' = pre-accent

Following early work in Metrical Theory in Mark Liberman (1975), as well as earlier work by the Danish linguist Jorgen Rischel (summarized in his 1983 article), I adopt the view that the morphological structure (or more generally the morphosyntactic structure) is 'metrically interpreted' (as Zubizaretta and Vergnaud put it). This approach is also pursued in work by Heinz Giegerich and Bod Ladd. I here use the S/W labelling convention to indicate the relative strength of morphemes with respect to word accent.

Thus, we essentially preserve the morphosyntactic structure, but augment the nodes with a S/W labelling.

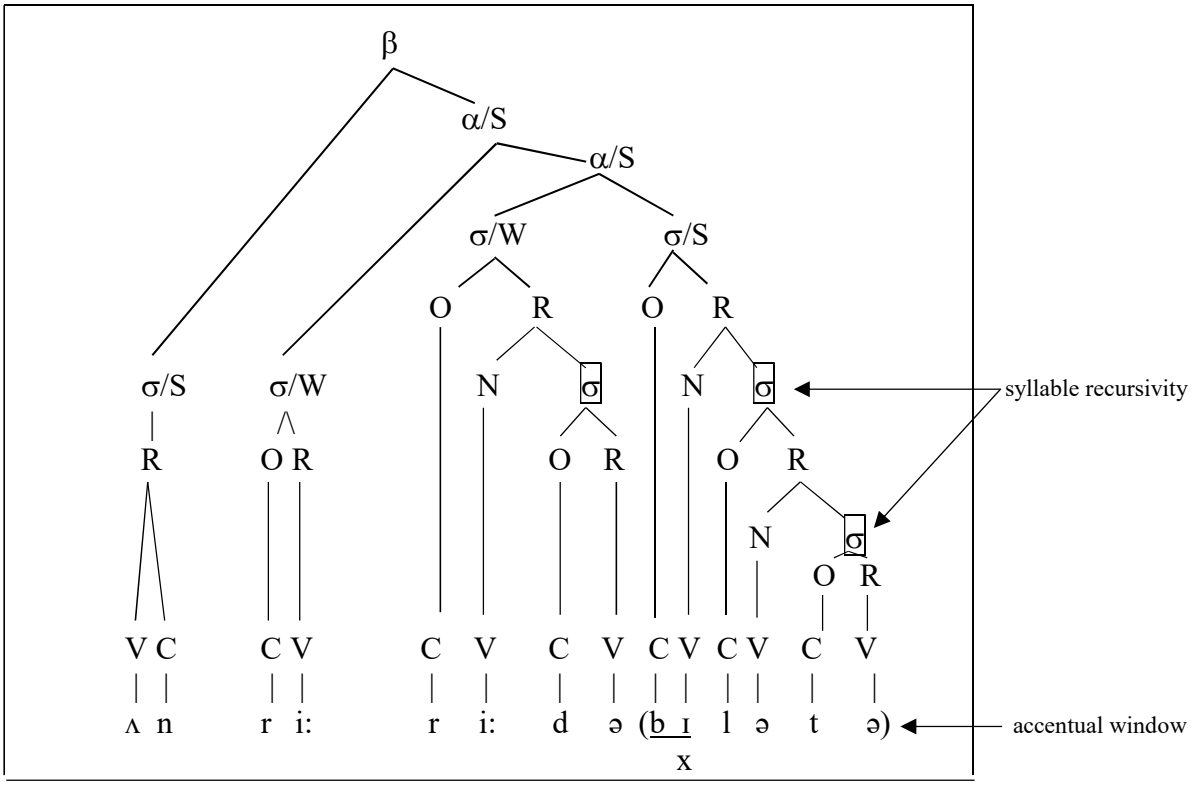
In compounds and phrases, as explored in the work of Giegerich, this metrical structure can be 'flattened' to achieve greater rhythmicity, but I will not go into that today, here focusing on complex word derived through affixation.

(46) **Metrical structure ("metrically-interpreted" syntactic structure)**



Labelling rule
(x) ⇒ S (absence of (x) implies W)
For English: [AB], B is Strong if accented
(x) = **hierarchically licensed** if there is a path to the root node with only S-labelled nodes

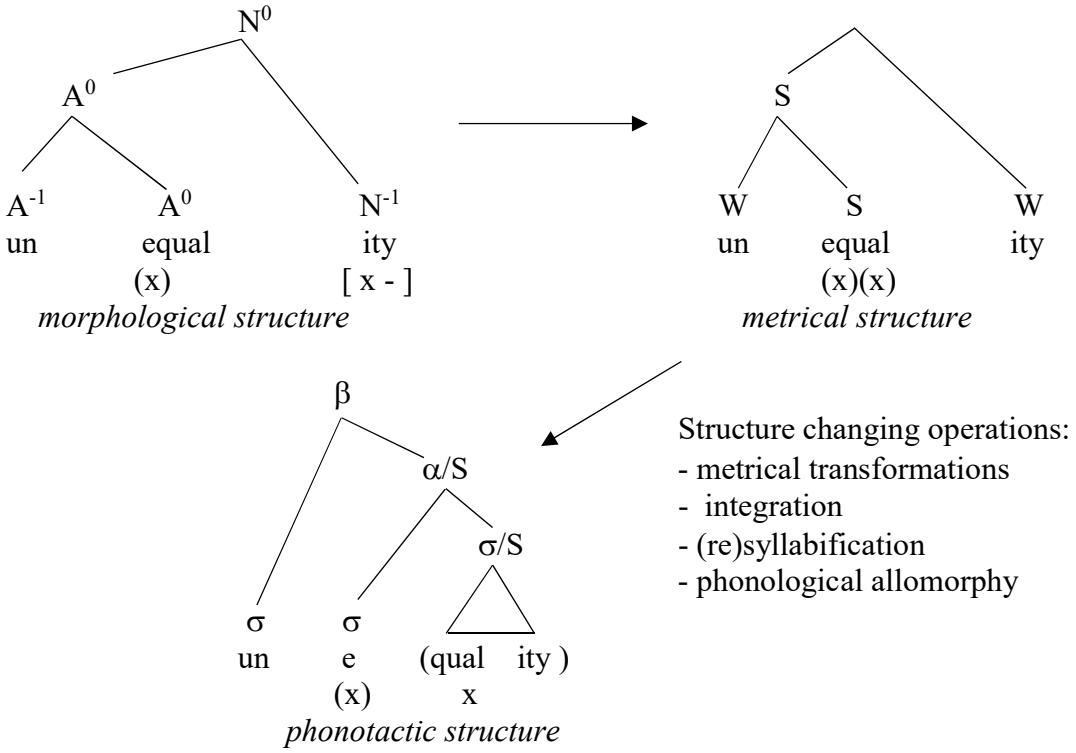
(47) **Phonotactic structure (due to structure-changing <u>integration</u>)**



α = 'Pstem', β = 'Pword', σ = (super)syllable, O = onset, R = rhyme

(In van der Hulst 2010, I show that the so-called 'feet' are syllables that contain other syllables.)

(48) For non-compound complex words, the drive behind the restructuring of the metrically-interpreted representation into the phonotactic representation is a property of affixes as being '**cohering**' (also called '**integrating**'). In a sense such affixes act as 'phonological clitics' at the word level.



(49) Now we must add the term **domain accent** to **word accent**. While we can say that the most prominent syllable in an English word has the word accent, in this language, it is actually the case that the accentual algorithm applies within a subdomain of the word, here labelled α. This explains why so-called level II affixes are 'stress-neutral'.

The α- and β-domain. constitute separate **accentual domains**, which can have their own accentuation algorithm. Potentially, we can say that English has an accent rule for the larger β-domain which locates an accent on the first syllable (which accounts for the generalization that English have an initial 'secondary stress' in addition to the right-edge 'primary stress').

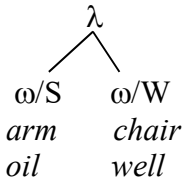
As I show in van der Hulst (2022) is it is not a universal fact that the α-domain prevails over the β-domain. In the language Mapudungun (see section 7.1.3 in that article) the accent of the β-domain is the most prominent (Molinaux 2022):

(50) Thus far we have seen that licensing is '**linear**' (i.e., first/last). We also need to reckon with **hierarchical licensing**, which is at play when the morphological structure (via the metrical structure) impacts accent placement.

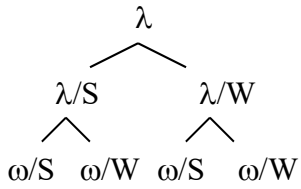
I refer to can der Hulst (2022) for an analysis of several languages that seem to demand hierarchical licensing which reveals the impact of; see Revithiadou (1990) and Bogomolets (2020).

(51) **Accent in compounds is morphologically-driven**
At the metrical level, we assign to compound a S/W labeled structure, which in English is such that the first member of the compound will have the primary compound stress. This labelling persists at the phonotactic level (which does not differ because there is no integration):

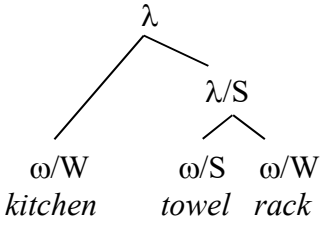
a.



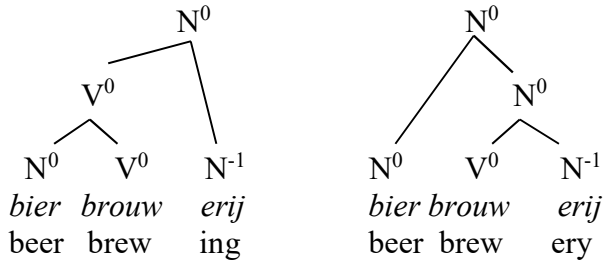
b.



c.

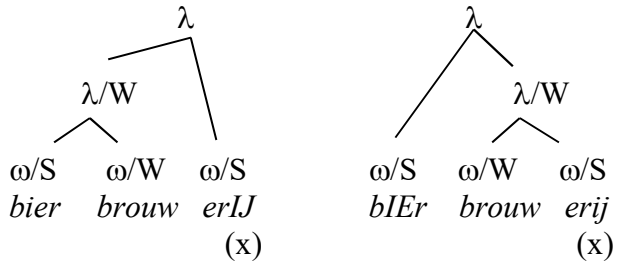


(52) **Synthetic compounds reveal the crucial role of morphological/metrical structure**
Dutch has a suffix /-ərɛɪ/ (spelled <erij>, '-ery or 'ing') which is marked with a diacritic accent. Now compare the two following possible structures:



'the activity of brewing beer' 'a place where they brew beer'

As shown, the two structures correspond to two meanings. For the first meaning (the 'activity' meaning) one would use the suffix *-ing* in the corresponding English word. In Dutch, the suffix *-erij* is ambiguous between the 'activity' meaning and the 'place' meaning. The corresponding phonotactic structures reflect the morphological structure:



The structure on the left adds the accented suffix to the compound which causes it to get word accent. The second structure adds the suffix to the verb *brouw*, forming *brouwerij* which then becomes the second member of the compound. As a result, the accent that is assigned by the compound accent rule prevails. This is a clear example in which the morphological structure has a direct impact on the stress pattern of words. (This is also the first case that I know in which accent is brought to bear on the debate concerning the proper structure of synthetic compounds.)

(53) **Count systems**

Finally, let me return to rhythm-only languages. If there is no accent, but there is rhythm (possible combined with weight) will it necessarily be the case that all rhythmic beats are equally strong? Of course it may be the case that rhythmic beat on heavy syllables might be perceived as more salient than rhythmic beats of light syllables. However, it might also be possible that there is a rhythmic principles that promotes a beat near one of the edges as the strongest beat. If we would reckon with such a 'beat strengthening' process, it seems that we are effectively reinstating the full apparatus of classical metrical theory. To keep analytic options to a minimum, I therefore will refrain from postulating such an edge based rhythmic beat strengthening process.

Nonetheless, it seems that in non-accentual languages, whether rhythmic or not, we may find that a syllable on the left, or, more typically, right edge, is perceived as prominent. As said, we must reckon with the fact that when words appear on the edge of larger prosodic units, their edge syllables may be the anchor point for intonational tones (*pitch accents*) or boundary phenomena (tonal or segmental) which create the perceptual sensation of these syllables being prominent. The linking of intonational pitch movement or other properties to edges of phrases, and thus edges of words that are peripheral in phrases, may lead to the *illusion* of the words having primary 'stress', while, synchronically speaking, there is no primary word stress at all. This kind of analysis has been proposed for French 'word' stress. In van der Hulst (1997) I argue that this phrasal-intonational effect may be the factor that leads to languages in which rhythm seems to crucially feed the assignment of primary stress. In the model proposed here in which primary 'stress' results from accent which, being lexical, precedes rhythm, which is post-grammatical, such a state of affairs is *not* possible. Therefore, I suggest that those languages are unaccentual, having rhythm and a post-grammatical phrasal anchoring of intonational pitch movements or phrasal edge strengthening.

Conclusions

In accentual languages, the location of a variable syllabic accent as the domain accent can be due to **linear licensing** or **hierarchical licensing**. The difference may be had to notice when the accentual window is bounded, but both types of licensing can occur in bounded and unbounded systems. A licensed variable accent becomes the head of the accentual domain. When a word has no accent (in the relevant window) a default D-structure determines the location of the head of the accentual domain. In non-accentual languages, the head of the 'accentual domain' (which in that case would better be called the 'prominence domain') is always determined by the D-structure.

Rhythm is an independent phenomenon that does not feed the algorithm for **accent location**, but there are systems (called 'count systems') in which this is seemingly the case. Such systems have not been discussed here. The idea is that such systems as non-accentual prominence systems that have a rhythmic pattern, in which the illusion of 'word stress' is caused by the perception of extra prominence of the left-most or right mist rhythmic beat.

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