

## [0] Stress

- Focus of generative study since outset of generative grammar: phrasal stress in Chomsky, Halle, Lukoff 1956, SPE 1968
- Basic parameters known: 510 lgs. by Rob Goedemans
- pervasive effects on phonology: allophony (a[r]om vs. a[t<sup>h</sup>]omic, consti[t<sup>h</sup>]ute vs. consti[t<sup>h</sup>]uent), Truncation (Elizabeth -> Liz, \*Zab), Intonation contour
- demarcative (one stress per word at left or right edge): initial 57/30%, final 59/32%, penultimate 53/28%, peninitial 10/5%, antepenult 7/4% (Gordon 2002)

## [1] SPE model: [±stress]

- unique properties (cf. [±nasal])
- no invariant phonetic correlates: intensity, duration, pitch
- syntagmatic: a syllable is categorized as stressed or unstressed relative to its neighbors
- greater than binary distinctions: Árkansàs vs. Tènnessée; préliminàry vs. assimilation
- never assimilated
- striking nonlocality: Creek: ifá, hicíta, amifocí, imahicíta, isimahicíta, itiwanyipíta
- rhythmic: repetition of a motif: 'Apal'achic"ola, cf. Finnish, Native Australian lgs
- heavy syllables attract stress: CVV (heavy), CV (light), CVC (variable)
- culminativity: one syllable per word/phrase singled out as strongest

## [2] Liberman 1975

- stress is not a feature
- reflects abstract prominence modeled in **metrical grid**
- two dimensional array of positions and prominence
- phonetic rules interpret the grid by assigning length, intensity, mapping intonation contour

line-2	*	*	*
line-1	*	* *	* *
line-0	* * * *	* * *	* * *
	America	Árkansàs	Tènnessée

**Metrical Models**

1. "**grid-only**" (Prince 1983, Selkirk 1984, Goldsmith 1993, Gordon 2002): stress as rhythmic alternation of peaks and troughs with no internal grouping.

Hayes (1981) typology of alternating stress:

Maranungku	"σ σ 'σ σ σ	"σ σ 'σ σ σ 'σ	"σ = main stress
Warao	σ 'σ σ "σ σ	'σ σ 'σ σ "σ σ	'σ = secondary stress
Weri	'σ σ 'σ σ "σ	σ 'σ σ 'σ σ "σ	
Araucanian	σ "σ σ 'σ σ	σ "σ σ 'σ σ 'σ	

(10) a. **Maranungku (Tryon 1970b): Primary stress falls on the initial syllable, and secondary stress falls on every other syllable thereafter.**

tíralk 'saliva', mérepèt 'beard', yángarmàta 'the Pleiades', lánghkaràteti 'prawn', wélepènemànta 'kind of duck'

- b. **Weri (Boxwell and Boxwell 1966):** Primary stress is assigned to the final syllable, and secondary stress is assigned to each preceding alternate syllable.

ŋintíp 'bee', kùlipú 'hair of arm', ulûamít 'mist', àkunètépál 'times'

- c. **Warao (Osborn 1966):** Main stress falls on the penult, with secondary stress appearing on alternating syllables before the main stress.

yiwàranáe 'he finished it', yàpurùkitàneháse 'verily to climb', enàhò-ròahàkutái 'the one who caused him to eat'

- d. **Araucanian (Echeveria and Contreras 1965):** Main stress falls on the second syllable, and secondary stress falls on alternating following syllables.

wulé 'tomorrow', ñipánto 'year', elúmuyù 'give us', elúaènew 'he will give me', kimúbalúwulây 'he pretended not to know'

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- primitive rhythmic alternation of peaks and troughs: ...x x x x x x x .....
- parameters of initial association to {peak/trough} and {left/right} edge of word;
- one-to-one mapping of remaining syllables

Maranungku: peak-first, left-to-right  
 Warao: trough-first, right-to-left  
 Weri: peak-first, right-to-left  
 Araucanian: trough-first, left-to-right

"Grid-only" model abandoned in face of empirical arguments for grouping on the basis of stress shifts under deletion and insertion of vowels and conceptual arguments for particular types of rhythm. These arguments were couched in a theory of rules and it is not clear how well they carry over to the classical (fully parallel) OT model.

2. Alternative **foot** theory: stress reflects a **parsing** of syllables into asymmetric units called feet. There are two basic types of feet: a **trochee** in which the first element is strong and the second weak and an **iamb** in which the first is weak and the second strong. Feet are optimally disyllabic, but a monosyllabic foot can be created as a marked option.

$\begin{matrix} x \\ (x\ x) \end{matrix}$  trochee     
  $\begin{matrix} x \\ (x\ x) \end{matrix}$  iamb     
  $\begin{matrix} x \\ (x) \end{matrix}$  degenerate

Evidence for grouping

### 3. stress shifts resulting from deletion of stressed syllable

Central Yupik: stress syllables with a long vowel and initial syllables closed by a consonant; otherwise assign alternating left-to-right pattern to remaining syllables with no word-final stress. (Jacobson 1985: 30-34)

qayáni 'his own kayak', sagúyáani 'in his (another's) drum', qayápigkání 'his own future authentic kayak', qánrútkaqá 'I speak about them' < /qánrutékaqa/ by deletion of stressed vowel and retraction of stress to the left--not to the right, where it might otherwise be expected.

$\begin{matrix} x \\ x\ x\ x \end{matrix}$  (x x) x     
  $\begin{matrix} x \\ x\ x\ x\ x\ x \end{matrix}$  (x x)(x x) x

qayani -> qayani      qayapigkani ->

$\begin{matrix} x\ x \\ x\ x\ x\ x\ x \end{matrix}$      
  $\begin{matrix} x\ x \\ (x)\ (x\ x)\ x\ x \end{matrix}$

qanrutekaqa     
   
 ▲
   
 Ø

4. quantity changes to yield a bimoraic foot

- Latin -io verbs (Mester 1994)

aud-í:-mus	'hear'	root+theme+desinence	i: ≈ i
sent-í:-mus	'feel'		
aper-í:-mus	'open'		
sepel-í:-mis	'bury'		
cáp-i-mus	'catch'		
fác-i-mus	'make'		

- Italian diphthongs (Prince 1990 after Calabrese 1983)

<u>paroxytone</u>		<u>proparoxytone</u>	
cuore	'heart'	stomaco	'stomach'
miele	'honey'	secolo	'century'
piede	'foot'	medico	'doctor'
uomo	'man'	popolo	'people'
	(x) x	(x x) x	
	pede	medico	

- English trochaic shortening (Myers 1987, Prince 1990)

ōmen	ōmin-ous	metal	metal-ic
divīne	divīn-ity	cōne	cōn-ic

4. Broselow's (2001) OT analysis of Selayarese stress:

sahála	'sea cucumber'	/sahala/	
sáhala	'profit'	/sahal/	
árusu	'current'	cf. Bhasa Ind	árus
bérasa	'rice'		bərás□
karátu	'card'		kártu□
surúga	'heaven'		súrga

- internal epenthesis > penultimate stress > final epenthesis
- wrongly predicts /solder/ -> /soloder/ -> /solóder/ -> \*solódere

solodére	'solder'	B.I.	sólder
karátisi	'ticket'		kárcis

- Head-Dep: the foot containing the main stress must be comprised of stress-bearing elements that have a correspondent in the input (Alderete 1999); Align-PW aligns the right edge of the foot with the right edge of the phonological word to generate penultimate stress
- Align-Prosodic Word: right edge of PW coincides with right edge of a trochaic Foot

/sahala/	Head-Dep	Align-PW-Right
>sa(hála)		
(sáha)la		*!

/sahal/	Head-Dep	Align-PW
> (sáha)la		
sa(hála)	*!	
/kartu/		
> ka(rátu)	*	
(kára)tu	*	*!
/solder/		
> solo(dére)	*	
so(lóde)re	*	*!

- with metrical constituents the contrast between final vs. internal epenthesis can be treated as insertion outside of a constituent vs. internal to one, the latter necessitating a reparsing.

(x x)	(x x)	(x x)	
sahal	kartu	solder	penultimate stress
(x x) x	(x x x)	(x x x) x	
sahala	karatu	solodere	epenthesis
-----	x (x x)	x x (x x)	
	karatu	solodere	reparsing

5. **Rhythmic Units** (WS iambic and SW trochaic and their relationship to quantity) Hayes 1985, 1994, McCarthy & Prince 1986.

rhythmic perception: Woodrow 1909,...Haye & Diehl 2007, Crowhurst & Olivares 2014

- alternating pulses enhanced by intensity group SW
- alternating pulses enhanced by duration group WS

rhythmic **templates**

**syllabic trochee:** ('σσ) and possibly ('σ) as a marked option L = σ/μ H = σ/μμ

**iamb:** (Lσ) and ('H): [i.e. (L'L), (L'H), and ('H)]

**quantitative trochee:** ('LL) and ('H)--not ('HL) or ('L)--strictly bimoraic

7. Cairene Arabic:           light                   CV  
                                  heavy:                CVV, CVC  
                                  super-heavy:        CVVC, CVCC (limited to final syllables)

- classical pronunciation (Al-Azrah University)

ʃájara	‘tree’	ʔadwiyatúhu	‘drugs’
ʃajarátun		ʔadwiyatúhumaa	
ʃajarátuhu			
ʃajaratuhúmaa			

darábt ʔa9máal  
mustáʃfaa, mu9állim, muqáatil, ʃaabáatun  
kaatába, qattálat, maktábah, wálad, ráʔaa, híya, kátaba, ʔinkásara, bulahníyatun, murtabiTátun

- left-to-right moraic trochee parse with main stress on final foot
- final mora is extrametrical

8. Creek accent (Haas 1977)

ifá	‘dog’	hicíta	‘one to see one’
ifóci	‘puppy’	ahicíta	‘one to look after’
amifocí	‘my puppy’	imahicíta	‘one to look after for’
itiwanayipíta	‘to tie each other’	isimahicíta	‘one to sight at one’
cá:lo	‘trout’	wa:kocí	‘calf’
sókca	‘sack’	hoktakí	‘woman’
pocóswa	‘axe’	inkosapítá	‘one to implore’
famí:ca	‘cantaloupe’	alpatóci	‘baby alligator’
aktopá	‘bridge’	yakaphoyíta	‘two to walk’

9. **Homework** Asheninca (Peru) (Payne 1990)

- which metrical parse is relevant for assigning the stress contours?
- what is the direction?
- is syllable quantity relevant? If so, what defines a heavy syllable?
- indicate the metrical structure for the words in bold
- N denotes a syllable-final nasal and ai denotes a diphthong

háka	jína:
nopíto	<b>pà:tikákeri</b>
syoNkíri	pinà:pá:ke
kawíniri	ikyà:pí:Nti
<b>okícoki</b>	nomákoryà:wáitapá:ke
notòNkaméNto	oNkitáitamánake
nokòwawétaka	kaNtimáitacya
<b>hamànaNtákenéro</b>	
pamènakòweNtákeri	

Payne mentions a class of “extra-light” syllables in Asheninca consisting of a short [i] nucleus and voiceless coronal sibilants. These syllables are never stressed and can lose their vowel before a voiceless consonant (cf. Japanese devoicing: desu ne vs. desu ka). Examine the data below and discuss the stress contours and their implications for metrical constituency.

óciti	‘dog’
kóJiri	‘monkey’ sp.
píciciro	‘bird’ sp.
piJitáciri	‘broom’
hàcikawètakána	‘he almost bit me’

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