

REVIEW OF LAST TIME

Optimality Theory

Constraints are *ranked*

FTBIN > PARSE- σ ($\acute{\sigma}\sigma$)($\acute{\sigma}\sigma$) σ

PARSE- σ > FTBIN ($\acute{\sigma}\sigma$)($\acute{\sigma}\sigma$)($\grave{\sigma}$)

and *violable* (winners aren't perfect)

Babies are trochaic

New

CULMINATIVITY

WEAKLAPSE

Moraic Trochees

Back to Meter

Homer's *Odyssey*
dactylic hexameter



ἄνδρα μοι ἔννεπε, μοῦσα, πολύτροπον, δς μάλα πολλὰ
πλάγχθη, ἐπεὶ Τροίης Ἱερὸν πτολίεθρον ἔπερσεν:
πολλῶν δ' ἀνθρώπων ἵδεν ἄστεα καὶ νόον ἔγνω,
πολλὰ δ' ὅ γ' ἐν πόντῳ πάθεν ἄλγεα δν κατὰ θυμόν,
ἀρνύμενος ἦν τε ψυχὴν καὶ νόστον ἔταιρων

ἄνδρα μοι ἔννεπε, μοῦσα, πολύτροπον, ὃς μάλα πολλὰ 17 σ
πλάγχθη, ἐπεὶ Τροίης ιερὸν πτολίεθρον ἔπερσεν: 16
πολλῶν δ' ἀνθρώπων ἴδεν ἄστεα καὶ νόον ἔγνω, 15
πολλὰ δ' ὅ γ' ἐν πόντῳ πάθεν ἄλγεα ὃν κατὰ θυμόν, 16
ἀρνύμενος ἦν τε ψυχὴν καὶ νόστον ἔταιρων 14

(ándramo)(jénnepe)(móusapo)(lútropo)(nosmála)(pollà)	6	'dactyls'
(plánk ^h tee)(peìtroí)(ēshie)(rònptolí)(et ^h roné)(persen)	6	
(pollôn)(d'ant ^h rō)(pōníde)(nástea)(kaìnóo)(néñnō)	6	
(pollàdho)(genpón)(tōpát ^h e)(nálgea)(hònkatà)(t ^h ūmón)	6	
(arnúme)(noshēn)(tepsū)(k ^h èkai)(nóstonhe)(taírōn)	6	

($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$)

($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$)

($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\bar{\sigma}$)

($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$)

($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\bar{\sigma}$) ($\bar{\sigma}\sigma\sigma$) ($\bar{\sigma}\bar{\sigma}$)

σ pa, ti, ko...

$\bar{\sigma}$ to:, pai, pan...

$(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$
 $(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$
 $(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})$
 $(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$
 $(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$

$\sigma \quad \mu$ ‘light’
 $\bar{\sigma} \quad \mu\mu$ ‘heavy’

$(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$	$4 \cdot 6 = 24 \mu$
$(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$	24μ
$(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})$	24μ
$(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$	24μ
$(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\bar{\sigma})(\bar{\sigma}\sigma\sigma)(\bar{\sigma}\bar{\sigma})$	24μ

($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)
($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)
($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\bar{\sigma}$)
($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)
($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\bar{\sigma}$)($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$)

δάκτυλος



Greek *probably* had stress (Sauzet 1989, Golston 1990)
but ($\bar{\sigma}\sigma\sigma$)($\bar{\sigma}\bar{\sigma}$) aren't stressed on the first syllable
the meter is generally taken to be about patterns of $\bar{\sigma}$ and σ

Many languages stress

heavy	$\bar{\sigma}$
light	σ

differently:

Weight-to-Stress Principle: $\bar{\sigma}$ is stressed (and footed)
(Prince 1990)

Fijian

(Schütz 1985)



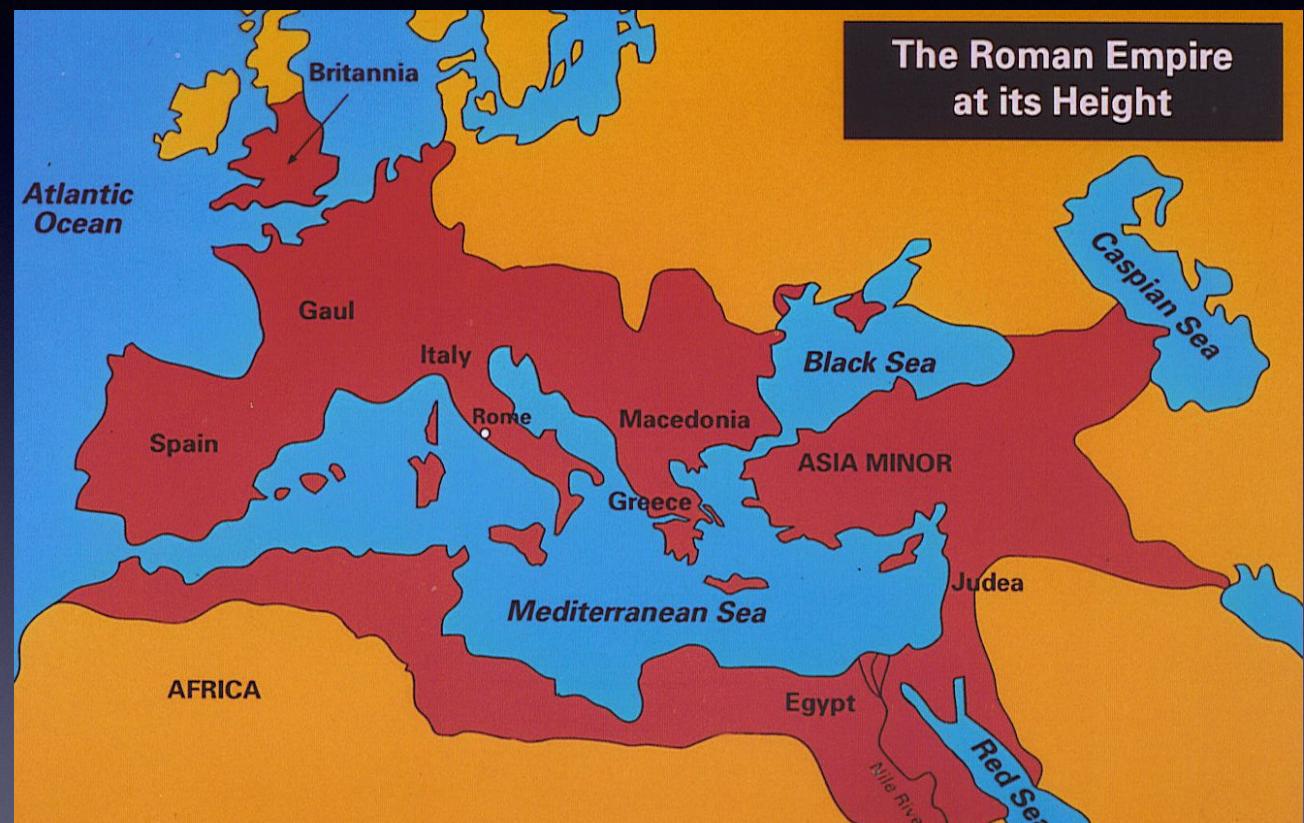
tálo	‘pour’	
atómi	‘atom’	
ndìkonési	‘deaconess’	NOLAPSE, TROCHEE
perèsiténdi	‘president’	
mbàsikètelólo	‘basketball’	

(mbèe)léti	‘belt’	
ta(ràu)sése	‘trousers’	
mbèle(mbòo)tómu	‘bellbottoms’	WSP: $\bar{\sigma}$ is stressed (and footed)
pa(ròo)karámu	‘program’	
(mìi)sìnìngáni	‘machine-gun’	

(́σ)	‘pour’	
σ(́σ)	‘atom’	
(̀σ)(́σ)	‘deaconess’	
σ(̀σ)(́σ)	‘president’	WSP
(̀σ)(̀σ)(́σ)	‘basketball’	TROCHEE
(̀̀σ)(́σ)	‘belt’	NOLAPSE
σ(̀̀σ)(́σ)	‘trousers’	FTBIN
(̀σ)(̀̀σ)(́σ)	‘bellbottoms’	> PARSEσ
σ(̀̀σ)σ(́σ)	‘program’	
(̀̀σ)(̀σ)(́σ)	‘machine-gun’	

Latin

(Jacobs 2003)



spúmidus	‘foaming’	
reféktus	‘rebuilt (pp)’	
refé:kit	‘has rebuilt’	
múrmur	‘murmur’	
múrmuris	‘murmur (gen)’	same as Fijian but no feet word-finally
kònsuè:tù:diná:rius	‘customary’	
èksèrkítá:tio	‘exercise’	NONFINAL: No φ is ω-final.
èksèrkítà:tió:nis	‘exercise (gen)’	
àuktó:ritas	‘authority’	
àuktoritá:tis	‘authority (gen)’	

(spumi)dus	‘foaming’	
re(fek)tus	‘rebuilt (pp)’	
re(fe:)kit	‘has rebuilt’	
(mur)mur	‘murmur’	final syllable
(mur)muris	‘murmur (gen)’	can’t be part of
(kon)(sue:)(tu:)di(na:)ri <u>us</u>	‘customary’	a foot, so I’ve
(ek)(ser)ki(ta:)tio	‘exercise’	greyed it out
(ek)(ser)ki(ta:)ti(o:)nis	‘exercise (gen)’	
(auk)(to:)rit <u>as</u>	‘authority’	
(auk)(tori)(ta:)tis	‘authority (gen)’	

spumidus	‘foaming’	
re(fék)tus	‘rebuilt (pp)’	
re(fé:)kit	‘has rebuilt’	
(múr)mur	‘murmur’	
(múr)muris	‘murmur (gen)’	
(kòn)(suè:)(tù:)di(ná:)rius	‘customary’	WSP
(èk)(sèr)ki(tá:)tio	‘exercise’	
(èk)(sèr)ki(tà:)ti(ó:)nis	‘exercise (gen)’	
(àuk)(tó:)ritas	‘authority’	
(àuk)tori(tá:)tis	‘authority (gen)’	

(́σ)σ	‘foaming’	
σ(́́σ)σ	‘rebuilt (pp)’	
σ(́́́σ)σ	‘has rebuilt’	NONFINAL
(́́́́σ)σ	‘murmur’	WSP
(́́́́́σ)σσ	‘murmur (gen)’	TROCHEE
(́́́́́́σ)σ(́́́́́́́σ)σσ	‘customary’	NO LAPSE
(́́́́́́́σ)σ(́́́́́́́́σ)σσ	‘exercise’	FTBIN
(́́́́́́́́σ)σ(́́́́́́́́́σ)	‘exercise (gen)’	> PARSEσ
(́́́́́́́́́σ)σσ	‘authority’	
(́́́́́́́́́́σ)σσ	‘authority (gen)’	

Moras

$\bar{\sigma}$	$\mu\mu$	pak, pai, pa:	‘heavy’ σ have codas, diphthongs, long vowels
σ	μ	pa, pe, pi	‘light’ σ have none of these, end in a short vowel

All languages have σ and μ (we assume)
Phonology looks at either or both

Minimality

pe	*
sed	‘but’
me:	‘me’

Words in Latin are
minimally μμ: $\bar{\sigma}$ or σ σ
(Golston 1991, Mester 1994)

σ *

$\bar{\sigma}$ ‘but’

$\bar{\sigma}$ ‘me’

minimality based on the foot
(McCarthy & Prince 1986)

σ *
 $\bar{\sigma}$ ‘but’
 $\bar{\sigma}$ ‘me’

FtBin: $\mu\mu$ or $\sigma\sigma$
(Prince 1990)

Cahuilla

(Seiler 1965, 1977)



(only coda ? makes a syllable heavy for some reason)

(táxmu)(?àt)

‘song’

(qá:n)(kìtʃem)

‘palo verde (pl.)’

(pàpen)-(túle)(qàle)(vèh)

‘where I was grinding it’

(sú)(kà?)(tì)

‘the deer (obj)’

$\sigma\sigma\sigma$

$\bar{\sigma}\sigma\sigma$

$\sigma\sigma - \sigma\sigma\sigma\sigma\sigma\sigma$

$\sigma\bar{\sigma}\sigma$

let's do
this one
constraint at a
time

$\sigma\sigma\sigma$

$(\acute{\bar{\sigma}})\sigma\sigma$

$\sigma\sigma-\sigma\sigma\sigma\sigma\sigma\sigma$

$\sigma(\acute{\bar{\sigma}})\sigma$

WSP

($\acute{\sigma}\sigma$) σ

($\acute{\bar{\sigma}}$)($\acute{\sigma}\sigma$)

($\acute{\sigma}\sigma$)–($\acute{\sigma}\sigma$)($\acute{\sigma}\sigma$) σ

$\sigma(\acute{\bar{\sigma}})\sigma$

TROCHEE

$(\acute{\sigma}\sigma)(\acute{\sigma})$

$(\acute{\bar{\sigma}})(\acute{\sigma}\sigma)(\acute{\sigma})$

$(\acute{\sigma}\sigma)-(\acute{\sigma}\sigma)(\acute{\sigma}\sigma)(\acute{\sigma})$

$\sigma(\acute{\bar{\sigma}})(\acute{\sigma})$

NoLAPSE

$(\acute{\sigma}\sigma)(\acute{\sigma})$

$(\acute{\bar{\sigma}})(\acute{\sigma}\sigma)(\acute{\sigma})$

$(\acute{\sigma}\sigma)-(\acute{\sigma}\sigma)(\acute{\sigma}\sigma)(\acute{\sigma})$

$(\acute{\sigma})(\acute{\bar{\sigma}})(\acute{\sigma})$

PARSE- σ

(́σσ)(́σ)

(́́σ)(́σσ)(́σ)

(́σσ)–(́σσ)(́σσ)(́σ)

(́σ)(́́σ)(́σ)

Too much

primary stress!

$(\acute{\sigma}\sigma)(\grave{\sigma})$

$(\acute{\sigma})(\grave{\sigma}\sigma)(\grave{\sigma})$

$(\grave{\sigma}\sigma)-(\acute{\sigma}\sigma)(\grave{\sigma}\sigma)(\grave{\sigma})$

$(\acute{\sigma})(\grave{\sigma})(\grave{\sigma})$

CULMINATIVITY: only one main stress.

LEFTMOST: Leftmost foot of stem is $\acute{\sigma}$



CULMINATIVITY is relevant for all the
languages we've seen this week.

LMOST: First foot of stem/word is σ

RMOST: Last foot of stem/word is σ

Go over your notes and add this in;
it's pretty simple once the rest is clear.

Degrees of
Heaviness

Some languages have degrees of heaviness (Ryan 2020)

CVVC > CVV > CVC > CV

Southeastern Tepehuan (Willett 1982)



Heaviest σ gets main stress
CVV > CVC > CV

If there's a tie, leftmost wins

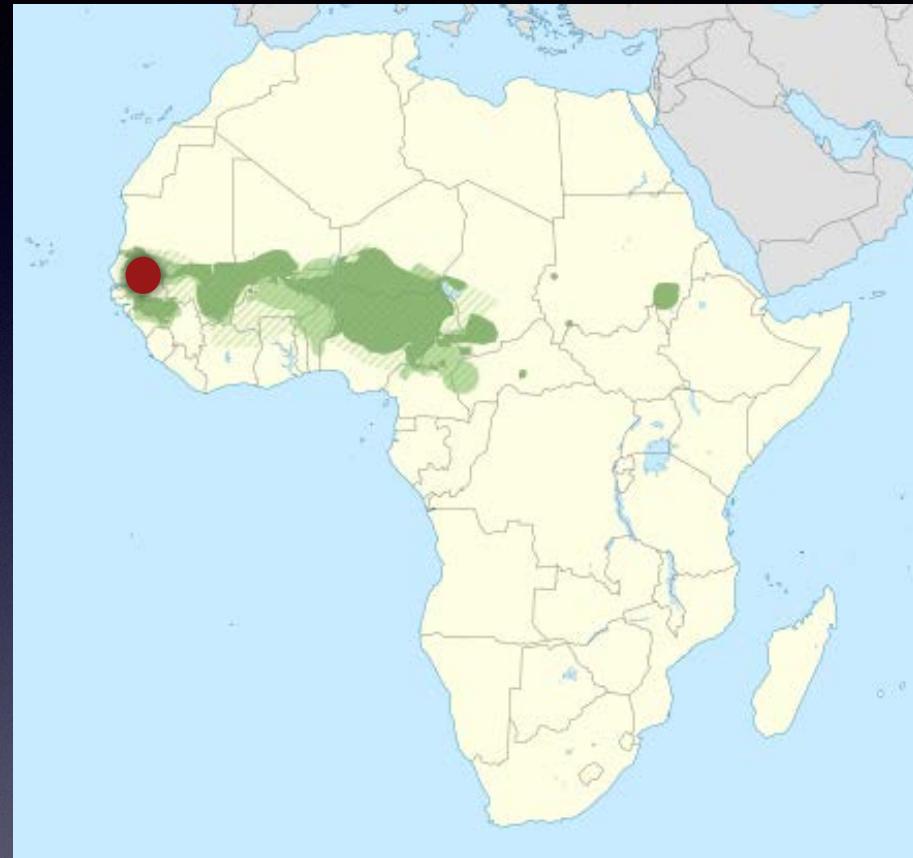
(bá:)(ban)	'coyotes'	CVV > CVC
(ví:)pi	'before'	CVV > CV
sa(póc)	'story'	CVC > CV
(yá:)(tui)	'potato'	TIE
(jó:)(dai)	'stones'	TIE
(cúsu)(paʔa)	'the back of his neck'	TIE

Not clear how to model this with just μ

$$\begin{matrix} \mu & \mu \\ | & | \\ \text{CVV} \end{matrix}$$
$$\begin{matrix} \mu & \mu \\ | & | \\ \text{CVC} \end{matrix}$$
$$\begin{matrix} \mu \\ | \\ \text{CV} \end{matrix}$$

Pulaar dialect of Fulfulde

(Niang 1997)



Heaviest (non-final) syllable gets main stress

CVVC > CVV > CVC > CV

If there's a tie, leftmost wins, others get secondary stress.

hal.káa.de	'to perish'	CVV > CVC > CV
da.dór.de	'waist'	CVC > CV
háal.pu.làar.?en	'Pulaar speakers'	TIE
tállòrde	'place for rolling'	TIE
áduna	'world'	TIE
ásaman	'sky'	TIE

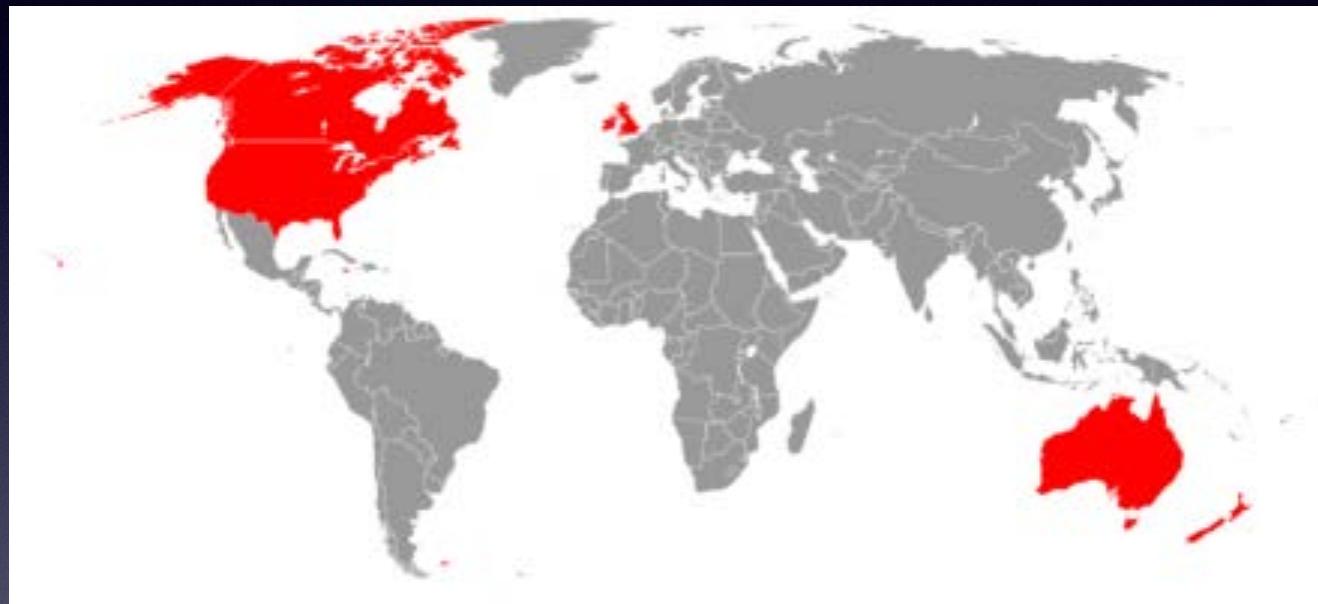
Ghamdi Arabic

AlGhamdi 2016



(ħam)(ma:)(mí:)n	‘two bath’	
(θæ)(læ:)(θæ)h	‘three’	
(tur)(sóm)(ha)	‘she draws it’	
(jeʒ)(rí:)	‘run’	DEFAULT TO OPPOSITE
(ra:)(sí:)n	‘two head’	Rightmost $\bar{\sigma}$,
(síy)(ra)(ta)h	‘his car’	otherwise <i>leftmost</i> σ
(?á)(bu)	‘father’	
(rá)(ħa)(la)	‘he leaves’	Currently no <i>nice</i>
(ʃá)(ʒa)(ra)h	‘tree’	way to model
(jé)(na)(fe)s	‘compete’	DTO languages
(ʃá)(na)(tˤa)(ti)	‘my bag’	
(?é)(ðe)n	‘ear’	

English



English stress (Hammond
part of speech affects stress

many exceptions, often in loan words
 $\frac{1}{3}$ vocabulary from French
lots from Greek and Latin

morphology plays a role too

‘deficit’	('dɛfi)sit
‘entropy’	('ɛn)tərpi
‘polaroid’	('pou)lərəɪd

‘Melinda’	mə('lin)də
‘tomato’	tə('meɪ)to
‘calamity’	kə('læmɪ)ti
‘catastrophe’	kə('tæs)trəfi
‘Arizona’	(,ɛrɪ)(,zou)nə
‘California’	(,kælɪ)(,fɔrni)jə

Nouns like
Latin

NONFINAL
WSP
TROCHEE
NOLAPSE
FTBIN
> PARSE σ

‘employ’	ɛm(‘ploɪ)	
‘delay’	də(‘leɪ)	Verbs and Adjectives
‘inflict’	ɪn(‘flɪk)t	like Fijian,
‘pretend’	pər(‘tɛn)d	with final C ignored
‘suspicious’	sə(‘spɪʃə)s	(see below)
‘solicit’	sə(‘lɪsɪ)t	

Verbs and Adjectives ignore the final C
Nouns ignore the final σ

Leads to many near minimal pairs

récord, N

recórd, V

íncr^{ea}s^e, N

incr^{ea}s^e, V

áb^{str}act, N

abstráct, A/V

ímp^{ort}, N

impórt, V

rélay, N

reláy, V

réfund, N

refúnd, V

pérmit, N

permít, V

ínsult, N

insúlt, V

cónflict, N

conflíct, V

prótest, N

protést, V

cóntest, N

contést, V

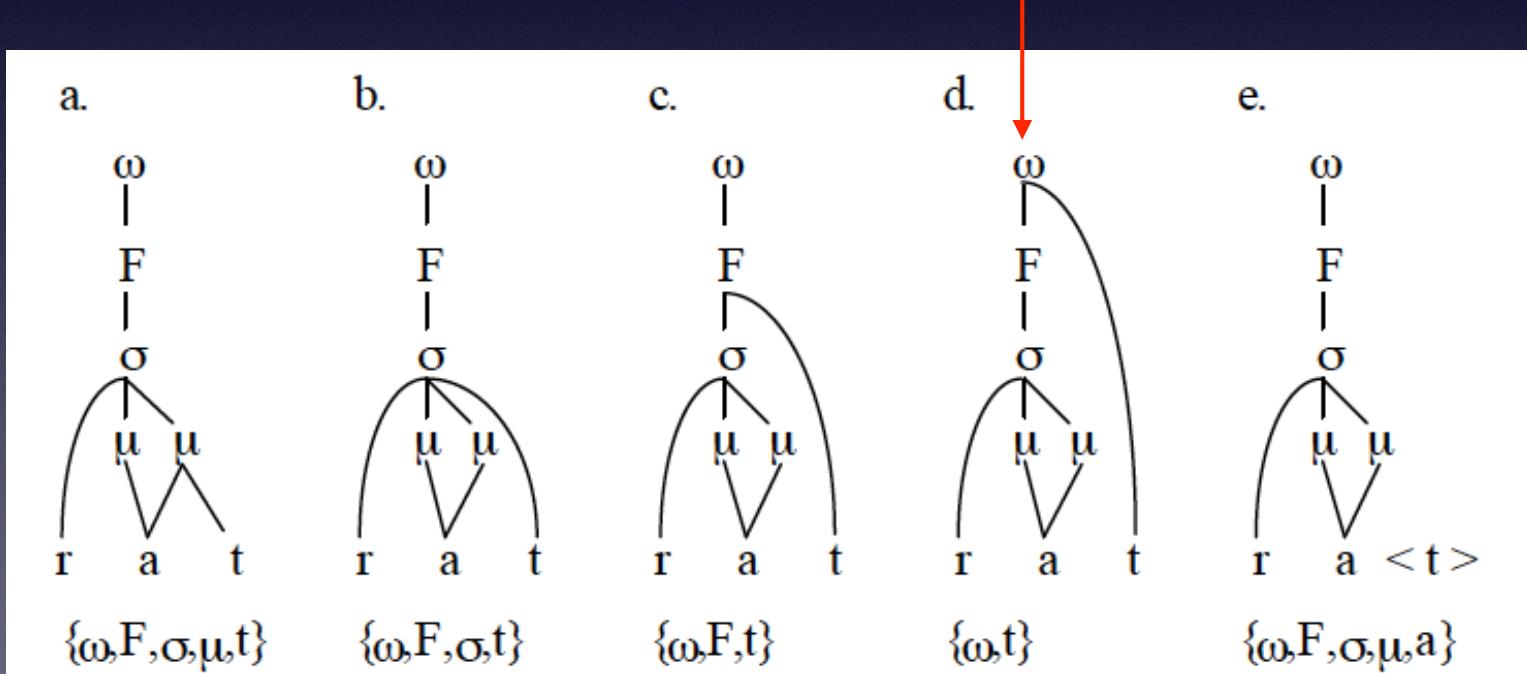
rébel, N

rebél, V

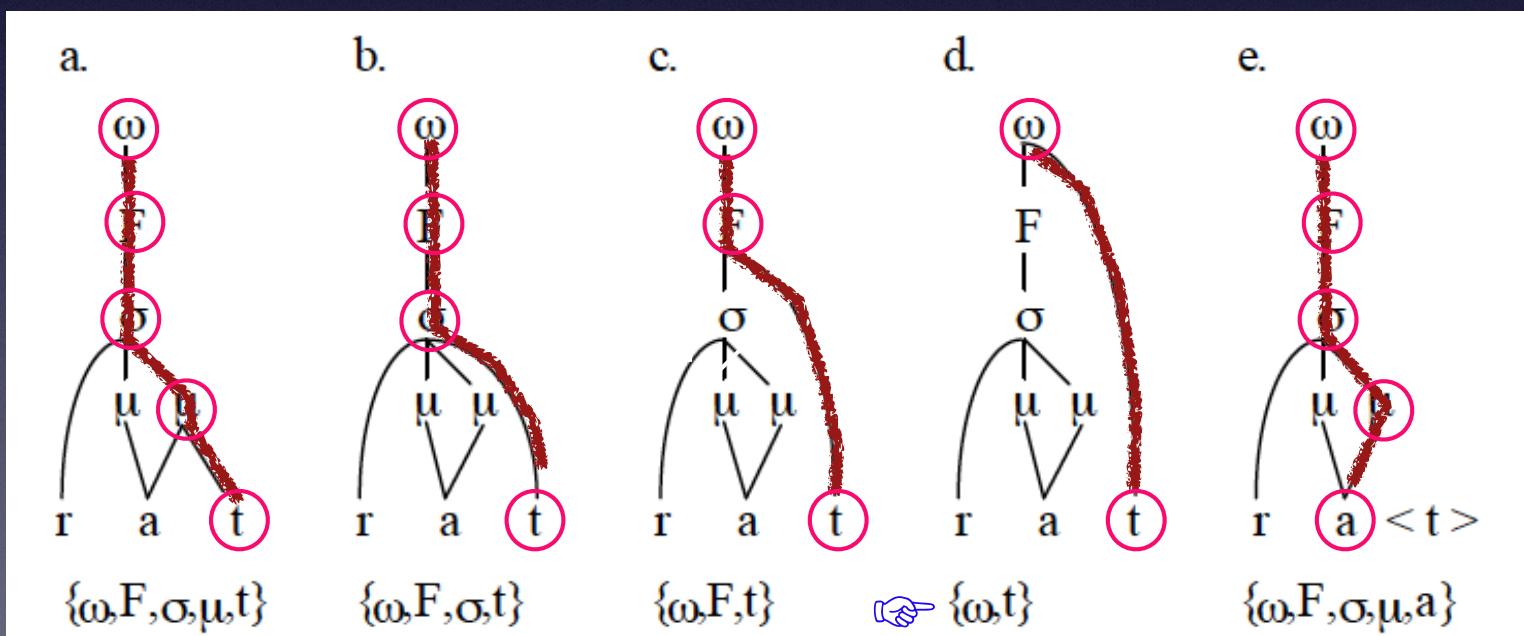
Analysis like Fijian, with
NON-FINALITY(NOUN)
Final C is ignored
how to ignore a Final C is tricky...

WEAKEDGE (Spaelti 2002) makes (d) below the best way to parse a final C
 The less structure the better, word-finally

edge of the word is clean and neat



WEAKEDGE: The right edge of ω should be empty (Spaelti 2002)



A brief vacation



HAWAIIAN

(ELBER & PUKUI 1979)

ʔeléu	‘active, alert’
hahái	‘follow, pursue’
ʔíolo	‘vibrate, whiffle’
ahúe	‘fold’
kéiki	‘child, offspring’
ʔànapáu	‘leap, frolic’
kàmahói	‘wonderful, splendid’
kàakàahóu	‘torture’
makùahíne	‘old man’
èlemakúle	‘old man’

?e(léu)	‘active, alert’
ha(hái)	‘follow, pursue’
?iolo	‘vibrate, whiffle’
a(húa)	‘fold’
(kéi)ki	‘child, offspring’

WSP: $\bar{\sigma}$ is stressed

?ana(páu)	‘leap, frolic’
kama(hói)	‘wonderful, splendid’
(kàa)(kàa)(hóu)	‘torture’
ma(kùa)hine	‘woman’ (LHLL)
elemakule	‘old man’ (LLLL)

ʔe(léu)	‘active, alert’	
ha(hái)	‘follow, pursue’	
ʔi(ólo)	‘vibrate, whiffle’	
a(húa)	‘fold’	TROCHEE
(kéi)ki	‘child, offspring’	FTBIN
(ʔàna)(páu)	‘leap, frolic’	> PARSE- σ
(kàma)(hói)	‘wonderful, splendid’	NOLAPSE
(kàa)(kàa)(hóu)	‘torture’	ALLFTL
ma(kùa)(híne)	‘woman’	
(èle)ma(kúle)	‘old man’	

- AlGhamdi, Rozan. 2016. An optimality theoretic analysis of stress in Ghambi Arabic. MA Thesis, CSU Fresno.
- Elbert, Samuel H. & Mary Kawena Pukui. 1979. *Hawaiian Grammar*. University of Hawaii Press.
- Golston, Chris 1990. Floating H and L* tones in Ancient Greek. *Arizona Phonology Conference*, Vol. 3, 66-82. Tucson, AZ
- Golston, Chris 1991. Minimal word, minimal affix. *NELS 21*, 95-110.
- Hammond, Mike. 1999. *The phonology of English*. OUP.
- Jacobs, Hauke. 2003. On the change from left to right word edge main stress in Icelandic, Polish and Latin. *Nordic Journal of Linguistics* 26.2, 259-282.
- Schütz, Albert J. 1985. *The Fijian Language*. University of Hawaii Press
- Niang, M. O. 1997. *Constraints on Pulaar Phonology*. University Press of America.
- McCarthy, John & Alan Prince 1986. Prosodic morphology. ROA 7.
- Mester, Armin. 1994. The quantitative trochee in Latin. *NLLT* 12.1, 1-61.
- Prince 1990. Quantitative consequences of rhythmic organization. *CLS* 26.2, 355–398.
- Ryan, Kevin. 2020. VV > VC > V for stress: coercion vs. prominence. *LI* 51.1:124-40.
- Sauzet, P. (1989). L'accent du grec ancien et les relations entre structure métrique et représentation autosegmentale. *Langages* 24:81-111.
- Spaelti, Philip. 2002. Weak edges and final geminates in Swiss German. ROA-18.
- Seiler, Hansjakob 1965. Accent and morphophonemics in Cahuilla and in Uto-Aztecán. *IJAL* 31, 50-59
- Seiler, Hansjakob. 1977. *Cahuilla Grammar*. Banning, CA: Malki Museum Press.
- Willett, E. 1982. Reduplication and Accent in Southeastern Tepehuan. *IJAL* 48.2, 168-184.