

Class 13, 5/16/2018: Weight I

1. Assignments

- Read: Ryan, Kevin (2017) “Quantitative meter”, Chap. 4 of his book-in-progress, on course web site.
- Homework #5 (Indonesian stress) is in your hands; due in two weeks (Wednesday 5/30).

2. Announcement

- Bruce away most of next week.
- Kie Zuraw will take one of the classes (TBA) and I will cover the other in finals week at a time we can all come.

3. Go over the Ukrainian homework

- See separate handout

4. Homework prep

- Let us get on the same page with analysis of Indonesian stress by doing the monomorpheme forms together.

<i>1 syllable</i>	[cá:t]	‘print’
<i>2 syllables</i>	[cá:ri]	‘search’
<i>3 syllables</i>	[bi:cá:ra]	‘speak’
<i>4 syllables</i>	[bi:jaksána]	‘wise’
<i>5 syllables</i>	[kòntinuási]	‘continuation’
<i>6 syllables</i>	[òtobiográfi]	‘autobiography’
<i>7 syllables</i>	[àmerikànisási]	‘Americanization’

SYLLABLE WEIGHT

5. A tiny bit of history of syllables

- There was strong pre-generative work, of which my favorite is W. S. Allen (1973) *Accent and Rhythm*, an extensive study of Latin and Greek, with syllables and proto-feet.
- *SPE* was, notoriously, syllable-less, a matter that gave rise to an entertaining sequence of increasingly-perturbed footnotes.
- Early generative syllable theorists: Joan Hooper, Dan Kahn, Lisa Selkirk
- Weight became prominent with John McCarthy’s (1979) dissertation, which cites Allen.

6. What is weight good for? Clearer cases

- Heavy syllables attract stress in many languages.
 - More subtly: they attract foot-headedness: the amazing case of ¹CVCVCV vs. CVC¹CVCV in Cairene Arabic.
- Heavy syllables are the equivalent of *light - light* in many systems of quantitative meter, e.g. the following Hausa example (catalectic *mutadaarik*):

$$\left\{ \begin{array}{c} \cup \cup \\ - \end{array} \right\} - \left\{ \begin{array}{c} \cup \cup \\ - \end{array} \right\} - \left\{ \begin{array}{c} \cup \cup \\ - \end{array} \right\} - \cup -$$

- - ∪ ∪ - - - ∪ -

Nairàa dà kwabòo saabo-n kudii¹
 naira and kobo new-LINKER money
 ‘Naira and kobo, the new money’

- The prosodic templates of the world are definable by syllable weight.
 - Ilokano (Austronesian, Hayes and Abad 1989) has contrasting heavy and light reduplication patterns, with the heavy manifested as CVC- in some cases, CV:- in others.
 - trab-trabaho, da:-daʔt ‘is working, sewing’
 - ʔagin-tra-trabaho, ʔagin-da-daʔit ‘pretends to be working/sewing’
- In many languages, English included, a monosyllable can be a word only if it is heavy.

bay [ˈbeɪ] *bet* [ˈbɛt] **beh* [ˈbe]

- Various phonological processes get rationalized by referring to weight.
 - Open-syllable tonic lengthening; post-tonic gemination
 - Closed-syllable shortening
 - Trochaic and iambic shortening

7. What is it good for: less clear cases

- Heavy syllables often can host contour tones.
 - Caveat: often this involves a special definition of heavy, as in Lithuanian: only sonorant codas are tone-hosting, and obstruent codas are not.
 - See below on process-specific weight.

¹ “Naira da kwabo,” a song by Haruna Oji promulgating the 1973 change to decimalized currency in Nigeria; recorded off the air by Russell Schuh.

8. This and that: Paul Newman on syllable weight in Chadic

- Reference:

SYLLABLE WEIGHT AS A PHONOLOGICAL VARIABLE

The Nature and Function of the Contrast

Between "Heavy" and "Light" Syllables

Studies in African Linguistics

Volume 3, Number 3, December 1972

- Predictable tone in Bolanci verbs is based on whether the first syllable is heavy or not:

----- Heavy -----		----- Light -----	
----- -u -----		----- -aa -----	
ràamú 'to repair'	tónú 'to sharpen'	dámáa 'to sweep'	
sòorú 'to fall'	shírú 'to steal'	kúmáa 'to hear'	
mòyyú 'to wait for'	móyú 'to see'	bídáa 'to wash'	
lèndú 'to lick'	ngádú 'to eat (meat)'		
wùndú 'to call'			

- Look at these plurals in Hausa:

(18)	káskóo		kàsàakée	'bowl'
(19)	jírǵíi		jíràagée	'train'
(28)	káfáa	--->	káfàafée	'hole'
(29)	wúríi	--->	wúràarée	'place'
(30)	dámóo	--->	dàmàamée	'monitor'
(31)	zúgúu	--->	zúgàagée	'roll of cloth'
(32)	kíifíi	--->	kíifàayée	'fish'
(33)	gáuláa	--->	gàulàayée	'idiot'
(34)	zómóo	--->	zómàayée	'hare'
(35)	súnáa	--->	súnàayée	'name'

9. Different criteria for weight

- Some languages make the heavy-light divides at CVV/CVC, CV
- Others at CVV, CVC/ CV

10. The era of explanatory glory in syllable weight: the consistent-in-language hypothesis

- It's a structural principle, set once, obeyed thereafter.
 - Sort of like a parameter setting.

- A case that makes you think this is true: Latin, with CVV, CVC/ CV
 - Mester, Armin. (1994) The quantitative trochee in Latin, *Natural Language and Linguistic Theory* 12. 1-61.
 - Phenomena: stress, Iambic Shortening ('puto: → 'puto 'I believe'), word minimum (/da/ → [da:]), the theme vowel case below; various others

11. Data for the i/i: theme vowel in Latin verbs

-ī-		-ī-		-ī-	
audīmus	'hear'	aperīmus	'open'	capīmus	'catch'
prūrīmus	'itch'	operīmus	'cover'	sapīmus	'taste'
saepīmus	'enclose'	sepelīmus	'bury'	jacīmus	'throw'
sāgīmus	'scent'	amicīmus	'cover'	fugīmus	'flee'
haurīmus	'draw'	reperīmus	'find'	cupīmus	'desire'
farcīmus	'plug'	resipīmus	'taste of'	facīmus	'do'
sentīmus	'feel'			fodīmus	'dig'
dormīmus	'sleep'			rapīmus	'rob'
sancīmus	'consecrate'			parīmus	'bring forth'
vincīmus	'fetter'				

- Or even with the very same stem:

-ī-		-ī-	
parīmus	'bring forth'	re-perīmus	'find'
sapīmus	'taste'	re-sipīmus	'taste of'

- What's up here?

12. The party ended soon

- This didn't last; people found inconsistencies, or indeed triple distinctions: CVV/CVC/CV
 - Hayes (1995, *Metrical Stress Theory*)
 - Matt Gordon (2004) "Syllable weight", in Hayes-Kirchner-Steriade (2004) *Phonetically-based phonology*, Cambridge.

13. An example of a triple distinction²

- Finnish stress is left-to-right syllabic trochees.

ú.jos.tè.le.màt.to.mùu.des.tàn.sa 'from his lack of shyness'

- But you skip a syllable medial, if this will let you form better feet.
 - 'CV CVC, 'CV CVV are bad, producing the skip.

² source: talk handout by Anttila, "Word stress in Finnish", on line; cites others

ká.las.te.lèm.me ‘we are fishing’
 íl.moit.tàu.tu.mi.sès.ta ‘from registering’
 vói.mis.te.lùt.te.le.màs.ta ‘from causing to do gymnastics’
 rá.vin.tò.lat ~ rá.vin.to.làt ‘restaurants’
 fór.ma.li.sòi.da) ‘formalize-INF’

- 'CVC CVV is bad, too
- (hó.ri.son)(tàa.le)ja ‘horizontal-PL-PAR’

14. There is a much better basis for assigning weight: process specificity

- Gordon, Matthew (2006) *Syllable Weight: Phonetics, Phonology, Typology*. New York: Routledge.
- He checks in huge detail/scope with a 400-language database.
- Statistical testing.
- There is *no* evidence to support language-internal consistency.
- But *processes* strongly prefer particular weight criteria:
 - Tone: CVV, sometimes CVR (sonorant coda) are heavy.
 - Meter: CVV, CVC are heavy
 - Stress: a mix of criteria, affiliated (Gordon claims) with the phonetics of the language in question.

15. Ugly little things want to come in and participate in the same area as orthodox weight

- They aren't as “powerful” in effect (readings)
 - Branching onsets make syllables a bit heavier
 - Onsets vs. no onsets make syllables a bit heavier.
 - Non-sonorous onsets make syllables a bit heavier.
 - Lower vowels make syllables a bit heavier

16. Another example from Finnish

- Genitive plural suffix has variants -ja, -ita.
- Anttila shows these are deployed to obtain optimal stress.
- This in turn shows that optimal stress is influenced by vowel height.

“/a, ä, o, ö/ are preferably stressed, /i, e, u, y/ preferably unstressed.”

TYPE	BINARY	TERNARY	DEL%	
LAI	(fi.lo)(sò.fe)ja	(fi.lo.so)(fèi.ta)	90.7%	‘philosopher’
HAI	(pró.fes)(sò.re)ja	(pró.fes.so)(rèi.ta)	84.9%	‘professor’
LIA	(gál.le)(ri.o)ja	(gál.le.ri)(òì.ta)	1.0%	‘gallery’
HIA	(ál.ler)(gi.o)ja	(ál.ler.gi)(òì.ta)	0.3%	‘allergy’

17. What sort of theory do we want?

- We know what factors tend to make syllables prominent.
- We know what factors are stronger
 - We would be surprised to see a language in which CVV is light.
- We want to affiliate weight with processes, not languages.

18. Phonetics offers hope of bring order to the mess

- We can develop a theory of phonetic properties lending auditory prominence, and roughly deduce the typology of what counts as heavy.
- Slogan: *syllables are heavy when they sound heavy*
- Then we need a formal theory that governs/deployes this phonetic influence as phonological grammar.

ELEMENTS OF A PHONETICALLY-GROUNDED THEORY OF WEIGHT

19. Source

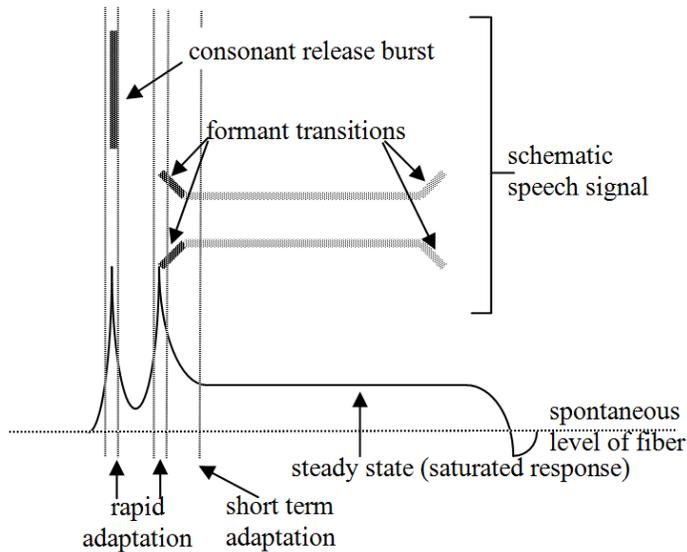
- Gordon readings, also his book cited above.

20. Process specificity

- It stands to reason that vowel duration, or VR rhyme duration, would matter to tone.
- Indeed, in the three known languages where a coda obstruent makes a syllable heavy for purposes of tone, it seems to be due to vowel lengthening in the non-contrastive environment of a closed syllable.

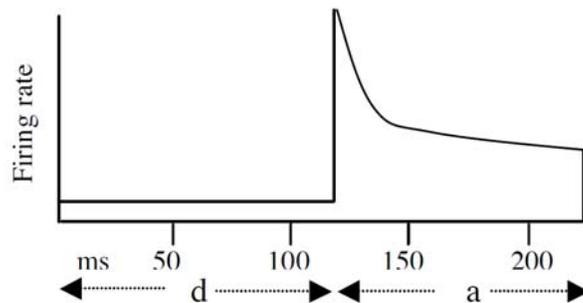
21. Elements that evidently make syllables sound more prominent for stress

- Duration
- Sonority (primarily V vs. C, but also differences among V's and C's)
- The “suddenly-loud” effect of auditory perception.
 - from Richard Wright (2004) Perceptual Cue Robustness and Phonotactic Constraints: Rethinking Sonority. In Hayes/Kirchner/Steriade, *Phonetically Based Phonology*



- Gordon's schematized version has a gentle downward slope during the main part of the vowel:

Auditory nerve response to /da/ stimulus



- Either way, it implies the striking effect that *less* sonorous consonants imply greater weight than more sonorous ones.
- Gordon measures perceptual salience of syllables by integrating over sonority, with a boost for post-quiet things — the quieter, the greater the boost.
 - The unit of measure emerges as the **decibel-millisecond**.

22. Phonological changes that might be thought of as weight-enhancing

- Uncontroversial are the rhyme changes: lengthening of vowels, gemination of posttonic consonants.
- But also (Gordon): glottal stop insertion, which in some dialects of British English is only pretonic.

Kafka ['kæfkə]
Kafka is ... ['kæfkəɪz...]

Kafka election ['kæfkəɪə'lekʃən] *Kafka elephants* ['kæfkə'ʔeləfənts]
Kafka-ish ['kæfkəɪʃ] *Kafkaesque* ['kæfkə'ʔesk]

23. The problem of quantitative variation and structure

- Actual energy-integral values form, presumably, a messy, overlapping distribution in reality.
- This is true for any appeal to phonetic principles in phonology.
- A repeatedly-adopted strategy is *generalization from phonetic maps*, which Gordon adopts.

24. Phonetic maps

- Articulation: Hayes on voicing difficulty:
 - Hayes, Bruce (1999) "Phonetically-Driven Phonology: The Role of Optimality Theory and Inductive Grounding" in Michael Darnell, Edith Moravscik, Michael Noonan, Frederick Newmeyer, and Kathleen Wheatly, eds., *Functionalism and Formalism in Linguistics, Volume I: General Papers*, John Benjamins, Amsterdam, pp. 243-285

Landscape of Difficulty for Voiced Stops: Three Places, Four Environments

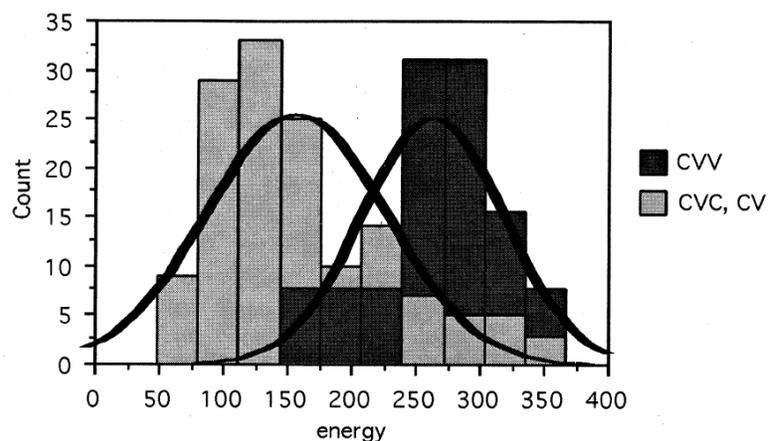
	b	d	g	
[-son] ____	43	50	52	
# ____	23	27	35	
[+son, -nas] ____	10	20	30	
[+nas] ____	0	0	0	contour line: 25

- Perception: Steriade on the P-map:
 - Steriade, Donca. 2009. [The Phonology of Perceptibility Effects: the P-map and its consequences for constraint organization](#). in Kristin Hanson and Sharon Inkelas (eds.) *The Nature of the Word: Studies in Honor of Paul Kiparsky*, pp. 151-79..

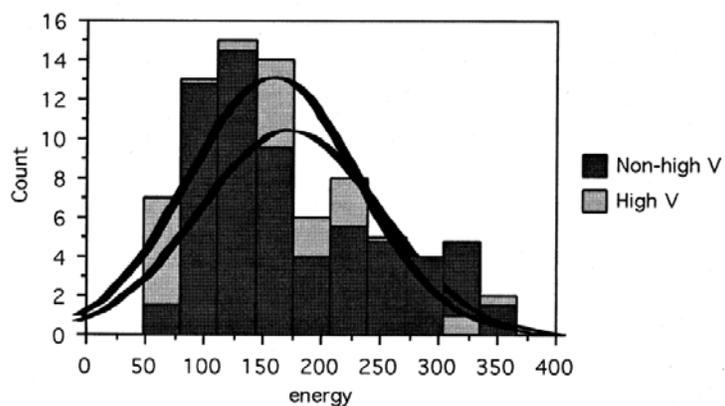
25. The two criteria languages use in “selecting” a weight criterion

- **Fit to map**
 - sample comparison:

Effective distinction (Khalkha energy: CVV > CVC, CV)



Ineffective distinction (Khalkha energy: Non-high V > High V)



➤ He finds an appropriate statistic to assess this degree of fit

- **Simplicity**

➤ Book, p. 134: "A weight distinction is complex iff: it refers to more than one place predicate OR it makes reference to disjoint representations of the syllable."

	Predicates	Dimension	
		Non-place	Place
CVV(C) heavy	$\begin{array}{cc} [X]_R & [X]_R \\ & \\ +\text{syllabic} & +\text{syllabic} \end{array}$	4	0
CVV(C), CVC heavy	$\begin{array}{cc} [X]_R & [X]_R \end{array}$	2	0
CVV(C), CVR heavy	$\begin{array}{cc} -\text{const.gl.} & -\text{const.gl.} \\ & \\ [X]_R & [X]_R \\ & \\ +\text{sonorant} & +\text{sonorant} \end{array}$	6	0
CVVC, CVCC heavy	$\begin{array}{ccc} [X]_R & [X]_R & [X]_R \end{array}$	3	0
Non-high V heavy	$\begin{array}{c} -\text{high} \\ \\ [X]_R \\ \\ +\text{syllabic} \end{array}$	2	1
Low V heavy	$\begin{array}{c} +\text{low} \\ \\ [X]_R \\ \\ +\text{syllabic} \end{array}$	2	1

26. Allowed under the complexity criterion

- vowel height cutoffs, alone
- branching rhyme
- [+syllabic] segments
- has onset, no onset

27. Not allowed

- E.g., blend of the above: “Stress the leftmost long low vowel of the word.”

28. Success

- The observed criteria do seem to single out what gets used; and both of them are needed.
- The theory has teeth: it is *committed* to some consistent relative patterns, which emerge from the map.
 - CVV is always heavier or equal to CVC
 - CVC always heavier or equal to CV
 - Onset-based distinctions will not trump rhyme ones
 - Vowel height distinctions will not trump rhyme-length distinctions
 - No reversed vowel height distinctions

29. Gordon’s exterminationism with respect to moras, etc.

- Moras provide little explanatory payoff if they are not a parameter set by language.

- Indeed, they fail to cover compensatory lengthening under onset loss, which exists; work of Kavitskaya, Loporcaro, Topintzi
- So Gordon is an exterminationist regarding syllable structure and segmental slots:
 - Segment slots are X's (one per "segment")
 - Vowels bear the good-old feature [+syllabic]
 - All the work goes into the constraint system, which refers to the structural properties relevant to weight.

GRADIENCE AND RYAN'S LAW

30. Ryan's Law

- Where syllable weight is treated gradiently/statistically, virtually all criteria get accessed.

31. An early study: Kelly on English

- Source
 - Michael H. Kelly (2004) Word onset patterns and lexical stress in English. *Journal of Memory and Language* 50: 231–244.
- (See also his prescient work with Martin
 - Michael H. Kelly and Susanne Martin (1994) Domain-general abilities applied to domain-specific tasks : Sensitivity to probabilities in perception, cognition, and language. *Lingua* 92: 105-140.)
- Basic generalization: the more consonants an English disyllable begins with, the more likely it will have initial stress.
- Corpus study (electronic lexicon):

Number of onset consonants	Number trochaic	Number iambic	Proportion trochaic
0	441	806	.35
1	2862	295	.69
2	783	158	.83
3	40	1	.98

- This is *superposed* on the well-known noun-verb difference (*SPE*); so there is ganging:

Number of onset consonants	Number trochaic	Number iambic	Proportion trochaic
Nouns	2411	646	.79
0	274	102	.73
1	1689	475	.78
2	429	68	.86
3	19	1	.95
Verbs	648	1228	.35
0	43	485	.08
1	468	667	.41
2	129	76	.63
3	8	0	1.00
Adjectives	966	183	.84
0	107	90	.54
1	632	81	.89
2	214	12	.95
3	13	0	1.00

- Wug test: “how would you stress this?” Pairs with C-, CC-, splitting subjects so no one sees both in the same pair.

No prefix	Prefix
beldop–breldop	colvane–crolvane
bolay–brolay	conzee–cronzee
botest–blotest	covact–clovact
corlax–clorlax	formand–flormand
dolmak–drolmak	fornay–fornay
feslak–freslak	pernew–spernew
fonjoob–flonjoob	pernor–spernor
fontrain–flontrain	renell–drenell
garlag–glarlag	telmate–trelmate
menlee–smenlee	telpez–trelpez
mernak–smernak	
pinjub–plinjub	
ransfoe–gransfoe	
rignaz–grignaz	
roncerp–troncerp	
ronvoon–gronvoon	
seldiz–sneldiz	
torvoot–tworvoot	
wispay–swispay	
bendict–brendict	
bontoon–brontoon	
delpeen–drelpeen	
delray–drelray	
deltain–dreltain	
delvoe–drelvoe	
lesbect–klesbect	

pamdeen–plamdeen
 peltact–pleltact
 pomset–plomset
 ponveen– plonveen
 pelcrack–prelcraK
 ponsect–pronsect
 sestrow–slestrow
 merset–smerset
 pemit–spemit
 solray–spolray
 torpez–storpez

- Result:

Mean Proportion of trochaic stress judgments in study 2 as a function of pseudoword onset (C or CC) and prefix on C pseudowords (present or absent)

Prefix	Onset structure	
	C	CC
Present	.67	.71
Absent	.60	.80

➤ Note the rather larger effect in non-prefixed forms.

32. Where we are headed with Ryan

- Quantity in classical metrics (Greek, Latin, Sanskrit) is not as clear as we thought: careful examination of *different kinds of heavy-requiring metrical position* diagnoses a stochastic criterion of weight that:
 - tends to combine in one system *all* known typological criteria for weight
 - but also includes a strict, categorical criterion, the topic of all previous research