

Class 14: Structure above the segment II

To do

- Kalinga assignment (on last week's material) is due Friday
- Next reading Hall 2006 (due Tuesday)
- Project: have talked to me a second time by the end of next week

Overview: Last time we reviewed evidence for skeleta, syllables, and moras. This time let's see grids, feet, and prosodic words.

1 Reasons to handle stress with a metrical grid

- Stress relations are often represented as a *grid* (Lieberman 1975).
 - Rows (a.k.a. 'layers') represent degrees of stress; columns are associated with stress-bearing units (syllables, typically).

					x	
	x				x	
	x		x		x	
	x	x	x	x	x	x
	re	con	ci	li	a	tion

(example from Hayes)

- Grids are subject to the inviolable **Continuous Column Constraint**: for every grid mark (except on the bottom layer) there must be a grid mark in the same column on the layer below.
- Locality
English phrasal stress rule (a.k.a. nuclear stress rule): place main stress on last word of phrase¹
 - But sometimes main stress ends up several syllables from the end of the phrase—makes for an awkward rule
 - Example from Hayes: *hypothetical imitators* (or maybe *hypothetical imitators*).

Grid version of the rule is local:

$$\begin{bmatrix} \\ \text{x x} \end{bmatrix} \rightarrow \begin{bmatrix} \text{x} \\ \text{x x} \end{bmatrix}$$

= "if the top layer of the grid has exactly two marks, add another mark to the second one"

- Any amount of white space is allowed between and on either side of xs on the same layer when matching representations up to the structural description
 - The structural description could match any (adjacent) rows of the grid
- Draw grids for *hypothetical* and *imitators* in isolation; put them together and apply this rule.

¹ This can be overridden by focus. Also, watch out for compounds.

- The optional English rhythm rule (Prince 1983): really an interaction between a constraint NOCLASH and a rule Move-X.

NOCLASH: * x x (if two grid marks are adjacent on their layer, the grid marks under
 x x them can't also be adjacent on their layer)

Move-X: Move one grid mark along its layer (triggered by NO-CLASH)

English-specific detail: only leftward movement is allowed here.

- Draw the grids for *Mississippi* and *legislators*. If you put them together, is NO-CLASH violated?
- Apply Move-X if necessary—where can X move to without violating the Continuous Column Constraint?
- In what way might this operation appear non-local? In what way is it local?
- The rich get richer: in the rhythm rule, Prince notes that the stress retracts onto the strongest preceding syllable. Here are some of Hayes's examples...
- Draw grids for *Sunset Park* and *Zoo*, and then put them together and apply Move-x to resolve/alleviate the clash. Where can the moved x land?
- Let's use the rhythm rule to figure out grids for *totalitarian tendencies* (more than one possible outcome?) and *Constantinople trains*

- And the poor get poorer (Hayes): Consider the derivation of *paréntal* from *párent*. When *-al* is added, assume that stress rules add stress to the new penult (*páréntal*). Then main stress is assigned (*pàréntal*).
- Draw the grid for *pàréntal*. What constraint is now violated? Can Move-X help?
- Assume a rule ‘Delete (one) *x*’ that can be triggered by constraint violation (though not by NOCLASH, apparently). What options do we have for applying that rule?

2 Reasons to add feet

- Minimality: size restrictions on content words
 - Estonian (Prince 1980): \geq two moras, word-final C doesn’t count

/tánava/	tánav	‘street (nom.sg.)’
/konna/	kon:n	‘frog (nom. sg.)’
/kana/	kana (*kan)	<i>V-deletion blocked</i> ‘chicken (nom. sg.)’
 - Mohawk, Kahnawake dial. (Iroquoian, Canada & US, 3,760 speakers; Michelson 1981): \geq 2 sylls.

/k+tats+s/	íktats	‘I offer’
/hs+ya?ks+s/	íhsya?ks	‘you are cutting’
 - These look suspiciously like feet: maybe moraic trochees for Estonian ((LL) or (H)), syllabic trochees for Mohawk ($\sigma\sigma$)
 - Hayes 1995: Can we just say that “every word must be able to undergo the stress rule” (without invoking feet in the stress rule)? Try it for Mohawk, which has penultimate stress.
 - From Hayes 1995: Pitta-Pitta [Australian, prob. no speakers]—words also must be \geq 2 sylls.²

káku	‘older sister’
kákila	‘coolamon, car, buggy’
kálakùra	‘type of corroboree’
- What would be the main stress rule for Pitta-Pitta?
- Does our rule exclude subminimal words (*ka)? What about other formulations of the rule?

But: There is much debate about how well minimum-word requirement really lines up with foot shape crosslinguistically: see Golston 1991, Garrett 1999, Blumenfeld 2011.

² Data warning: To get these examples I took words from Blake’s “Pitta Pitta wordlist” (coombs.anu.edu.au/SpecialProj/ASEDA/docs/0275-Pitta-Pitta-vocab.html), which doesn’t mark stress, and then added in the stresses according to Hayes’ reporting of Blake’s (1979) description.

• Asymmetric foot inventory

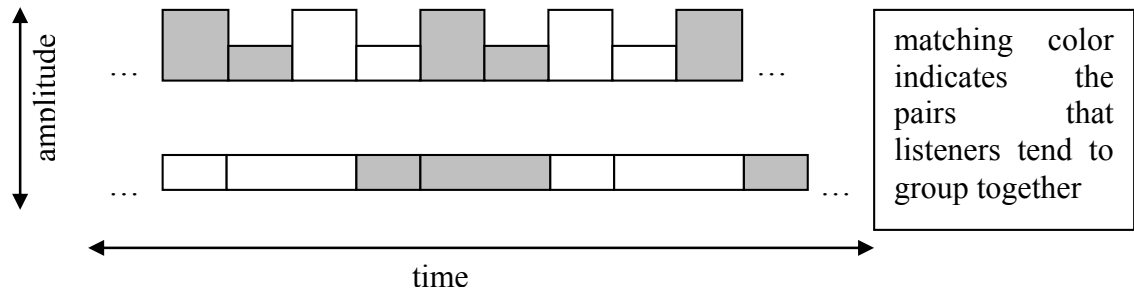
	<i>trochees</i>	<i>iamb</i> s
<i>quantity-insensitive</i>	attested	unattested
<i>quantity-sensitive</i>	attested: moraic (LL), (H)	attested: “uneven” (LH), (H), (LL)

- Hayes (1995) argues, through an extensive typological survey, that these 3 are the only foot types. There are claimed to be no languages with syllabic iambs.

[Altshuler 2006 gives a convincing counterexample—Osage—complete with acoustic data: there is a length distinction in vowels, but still stress on all even-numbered syllables, regardless of length. There are words with stress on all the odd-numbered syllables, suggesting trochees, but Altshuler argues from suffixation that those are exceptions; the language is iambic by default.]

3 Why the asymmetry? (skip if short on time)

- Rice 1992, ch. 5 Reviews and replicates Woodrow 1909, 1911, 1951b.³ Schematically,



- Grouping preference is stronger for duration-varying stimuli than for amplitude-varying stimuli.
- Subjects were played various binary, 7-repetition sequences of tones varying in tone duration, intertone pause duration, and tone pitch (Rice didn't test intensity; Woodrow did) and had to say whether each was weak-strong or strong-weak.

Percent trochaic (strong-weak) response (Rice p. 195)

	Stimulus 1	Stimulus 2	Stimulus 3	
Group 1	59.62	67.31	71.15	equal duration, equal pitch, equal pause
Group 2	46.15	38.46	32.69	alternating duration, equal pitch, equal pause
Group 3	57.69	50.00	59.62	equal duration, equal pitch, alternating pause
Group 4	51.92	57.69	44.23	equal duration, alternating pitch, equal pause

difference increases ----->
(except Group 1, where duration changes)

³ I tried to read Woodrow 1909 but in the time I could spare for the task it was just about impenetrable, so unfortunately I have none of his raw results to share with you. Apparently Fraisse 1963 is a good source on classic time-perception research too, if you're interested.

=> The duration-alternating stimuli (Group 2) produce the most “iambic” responses, more strongly so as the duration difference increases.

Hayes 1995 cites also

- similar evidence from musicians’ judgments Cooper & Meyer 1960: “Durational differences...tend to produce end-accented groupings; intensity differentiation tends to produce beginning-accented groupings” (p. 10; as quoted by Hayes p. 80)
- a study of Swedish poetry Fant, Kruckenberg, & Nord 1991 in which...
 - reciters produced greater durational contrasts in iambic verse than in trochaic
 - musicians transcribing verse into musical notation “likewise reflected the pattern of the law in their choice of note values”
 - poets use greater contrast in number of phonemes (for accented vs. unaccented syllables) in iambic verse than in trochaic
 (see also Newton 1975 for English verse)

→ “Iambic/Trochaic Law (Hayes 1995, p. 80)

- a. Elements contrasting in intensity naturally form groupings with initial prominence.
- b. Elements contrasting in duration naturally form groupings with final prominence.”

4 A consequence of the asymmetry: trochaic shortening

Middle English. This is apparently a bit controversial, but here’s the standard story (Mellander 2004):

- Assume footing as shown—I’m leaving as open/unsolved why these footings (issues: is it extrametricality or non-finality? which consonants are moraic?)
- How can we analyze these?

(sú:ð)	‘south’	(sú.ðer)<ne>	‘southern’
di(ví:n)	‘divine’	di(ví.ni)<tie>	‘divinity’
- I couldn’t get clear Middle English data easily, so here are some Modern English examples that reflect the same phenomenon (whether or not it’s now synchronically real), from Prince 1990, pp. 13-14, with a couple of substitutions:
 - Analysis from above should extend straightforwardly:

(ó:mən)	‘omen’	(ámə)nəs	‘ominous’
(sé:n)	‘sane’	(sæ̀nə)ri	‘sanity’
 - How do these work? (These examples show that “trisyllabic shortening” is a bit of a misnomer) [Prince, following Myers 1987, says that the suffix *-ic* is, exceptionally, not extrametrical.]

(kó:n)	‘cone’	(ká.ník)	‘conic’
(má:jm)	‘mime’	(mí.mík)	‘mimic’

- Can we explain the different pronunciations of the prefix? (Never mind why the final syllable is now getting footed—probably something to do with the = boundary)

(rɛ.bəl)	‘rebel’	(rɪː)(bè:t)	‘rebate’
(rɛ.kərd)	‘record’ (noun)	(rɪː)(flɛks)	‘reflex’
(rɛ.zɪ)(dén.ʃəl)	‘residential’	(rɪː)(læk)(séː)ʃən	‘relaxation’
(pɛ.fəs)	‘preface’	(pɪː)(fɛkt)	‘prefect’
(pɛ.lət)	‘prelate’	(pɪː)(lè:t)	?
(pɛ.məs)	‘premise’	(pɪː)(fɪks)	‘prefix’
(pɛ.zən)(téː.ʃən)	‘presentation’	(pɪː)(mè.rɪ)(téː)ʃən	‘premeditation’

5 Turning our attention to larger constituents: Why do words matter in phonology?

- This was already an issue in SPE. Take a rule like...

{u,i} → Ø / +__# (Chomsky & Halle 1968, p. 239)
accounts for alternations in *bile-bilious*, *reptile-reptilian*

- What determines whether there’s a #? In SPE...
 - some #s are generated by syntactic brackets
 - some affixes have a # in their lexical entry (/#iv/)
 - #s can also be deleted, inserted, or changed by phonological rules
- OT stress and other constraints often refer to the word or to word boundaries:

ALIGN(Word, L; Foot, L), * $\begin{bmatrix} -\text{son} \\ +\text{voice} \end{bmatrix}$ #

6 What counts as a word? Descriptive example from Samoan

- The domain of footing in Samoan is a lexical root (Noun, Verb, Adj), plus any associated bound morphemes after it (Zuraw, Yu & Orfitelli 2014):
 - *Primary stress is trochee at right edge:*

la(váː)	‘energized’	le(léi)	‘good’	(mánʻu)	‘bird’	ma(nónʻi)	‘smell good’
				(sámʻi)	‘sea’	pu(línʻi)	‘pudding’
				(átʻa)	‘picture’	i(ηóa)	‘name’
(ηífo)	‘tooth’	ηi(fó-a)			‘having teeth’		
sa(válʻi)	‘walkv’	(sáva)(lí-ηʻa)			‘paraden’		
(màfa)(tía)	‘stress outv’	(màfa)ti(á-ηʻa)			‘distress _N ’		

- *In a compound, each root starts its own stress domain:*

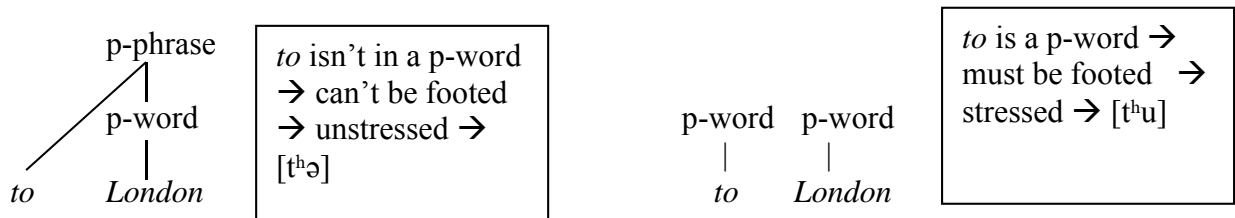
a(lòfi)-(váe)	‘sole of foot’ (assembly+foot)	* (àlo)fi-(váe)
(àηa)-le(áηʻa)	‘bad behavior’ (bad+behavior)	* a(ηàle)(áηʻa)

8 English example

- Many English function words (i.e., not Nouns, Verbs, or Adjectives) have weak and strong forms.

	<i>strong</i>	<i>weak</i>
<i>to</i>	t ^h u	t ^h ə
<i>at</i>	æt	ət
<i>for</i>	fɔː	fə
<i>a</i>	eɪ	ə
<i>and</i>	ænd	n̩

- I'm going __ London next summer. Where are you going __?
 - I'm looking __ Campbell Hall. What are you looking __?
- Selkirk 1995 proposes two possible structures:



- To avoid cluttering the tableau, assume that the “t[u]”s form a foot with stress; “t[ə]”s are unfooted.

	to London	ALIGN (LexWd,L,PWd,L)	ALIGN (PWd,R,LexWd,R)	FOOTMUST BEDOMINATED BYPWORD
<i>a</i>	[t ^h u London] _{PWd}	*!		
<i>b</i>	[t ^h ə London] _{PWd}	*!		
<i>c</i>	t ^h u [London] _{PWd}			*!
<i>d</i>	t ^h ə [London] _{PWd}			
<i>e</i>	[t ^h u] _{PWd} [London] _{PWd}		*!	
<i>f</i>	[t ^h ə] _{PWd} [London] _{PWd}		*!	

(Focus changes things: *I need a flight TO London, not FROM London.*)

- looking at*: draw a phonological tree that causes *at* to be pronounced in its full form

- What should happen to function words, like pronouns and determiners, assuming the same ranking?

/[rip]v [ən] _{det} [kat] _N / called a cat				ONS	NoCODA
(rip.)(ən.)(kat)					
(ri.pən)(kat)					

10 More evidence in Dutch: long-vowel diphthongization (p. 252)

- /e:, ø:, o:/ become [e^ə, ø^ə, o^ə] before [r], regardless of syllabification:

[me ^ə r] _N	‘more’	[kø ^ə .‘ra:l] _N	‘coral’
[χø ^ə r] _N	‘smell’	[[ko ^ə r]v ɪŋ] _N	‘test’

- Why doesn’t the alternation apply here:

[[[me: [rei.z]v]_{v-n}]_v ‘to accompany’ [[kø:]_N [rɪŋ]_N]_N ‘cue ring’

[[mil.jø:]_N [ri.zi.kø]_N]_N ‘environmental hazard’ [ne:.o: [[re:v]_N ians]_A]_A ‘neo-Revian’

11 More evidence in Dutch: conjunction reduction (see also Booij 1985)

just spelling here, not IPA

[[land]_N[bouw]_N]_N en [[tuin]_N[bouw]_N]_N *optionally becomes* land en tuinbouw
 agriculture and horticulture agri- and horticulture

but: [[absurd]_Aiteit]_N en [[banal]_Aiteit]_N *cannot become* *absurd en banaliteit
 absurdity and banality absurd- and banality

- Why not **absurd en banaliteit*?

12 The phonological word in some other languages

- Sanskrit, Turkish, Hungarian, Malagasy, Tagalog, Bengali, and Italian have pretty much the same p-word boundaries as Samoan or Dutch, with some slight wrinkles.
- In Italian, for example, only prefixes that are semantically transparent stand outside the stem’s p-word (Peperkamp 1997, van Oostendorp 1999):
 - (a)-(sociale) ‘asociale’ *but* (re-sistenza) ‘resistance’
 - Provides a way to test Italian speakers’ morphological intuitions: see Baroni 2001 on N. Italian intervocalic voicing of /s/, which applies only if the surrounding vowels are in the same p-word.

- *Yidin'* (Australian language, with very few remaining speakers. Nespor & Vogel 1986, data from Dixon 1977)
 - Penults of odd-syllabled p-words lengthen—no long vowels otherwise.

gu.da:.ga	‘dog’	gu.da.ga.-gu	‘dog- <i>purp.</i> ’
mu.ɖam	‘mother’	mu.ɖa:m.-gu	‘mother- <i>purp.</i> ’
ma.dj:n.da-ŋ	‘walk up- <i>pres.</i> ’	ga.li:.-na	‘go- <i>purp.</i> ’
ga.liŋ	‘go- <i>pres.</i> ’	ŋu.naŋ.ga.ra:-n.da	‘what- <i>dat.</i> ’

- Based on the data above, are suffixes part of the p-word?
- So what should we make of examples like these, with longer suffixes:

gu.ma:.ri-da.ga:.-ŋu ‘red-*inch.-past*’ ma.dj:n.da-ŋa.liŋ ‘walk up-*pres*’

13 Do we need the p-word?

In 2006, a group of us spent about 40 hours debating the issue (see www.linguistics.ucla.edu/people/zuraw/courses/prosword_2006.html for handouts).

Results were inconclusive:

- Often, interleaving phonology and morphology can do the job (add some affixes too late for certain processes to see them).
- But there was a residue of cases where it seemed like we really might need the p-word. The last handout at the link above sums up the pro and con arguments.

To sum up

- We’ve seen various ways we might want to enrich representations “above” the segment.
- Next week, I want to look at representations “below” the segment (autosegmentalism, underspecification, a little feature geometry) and their relationship to phonetics.

References

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