

## Class 19: Stress III—more feet

**To do:** prepare presentation for Friday!

### 1. Overview

Last time we discussed some arguments for feet (and ways to undermine them). This time we'll look at a famous asymmetry in the *inventory* of feet, which in a way is also an argument for feet.

### 2. Hayes (1995) argues that the inventory of feet is asymmetric

	<i>trochees</i>	<i>iamb</i> s
<i>quantity-insensitive</i>	<b>attested</b>	unattested
<i>quantity-sensitive</i>	<b>attested: moraic</b>	<b>attested: “uneven”</b>

### 3. Quantity-insensitive (“syllabic”) trochees

Let L = a light syllable (1 mora, like CV)

Let H = a heavy syllable (2 moras, like CVV or CVC)

Any two syllables can form a trochee—moras don't matter.

(*ÍL*), (*ÍH*), (*ÍL*), (*ÍH*) vs. \*(*ÍL*), \*(*ÍH*), except maybe for leftover syllables at an edge

Pintupi, aka Pintupi-Luritja (Australian, 390 speakers; Hansen & Hansen 1969 via Hayes)

(pá.ŋa)	‘earth’
(tʰú.ʈa)ya	‘many’
(má.ʎa)(wà.na)	‘through from behind’
(pú.ʎiŋ)(kà.la.)tʰu	‘we (sat) on the hill’
(tʰá.mu)(lìm.pa)(tʰùŋ.ku)	‘our relation’
(kú.ra)(nʰú.lu)(lìm.pa)(tʰù.ʎa)	‘the first one (who is) our relation’
(yú.ma)(ŋiŋ.ka)(mà.ra)(tʰù.ʎa)ka	‘because of mother-in-law’

But what if coda consonants simply aren't moraic in this language, so that all the syllables are light? More convincing is an example from a language with contrastive vowel length:

Votic, aka Vod (Uralic language from Russia, severely endangered; data from Ariste 1968)

IPA stress marks used below; otherwise, Ariste's transcription. Macron (̄) indicates vowel length.

(ˈka.na)	‘hen’
(ˈtüt.tö)	‘girl’
(ˈsā.mā)	‘to get, obtain’
(ˈā.pa)	‘aspen tree’
(ˈko.tō)	‘home (ill.)’
(ˈpa.ʎa).(ˌva)	‘hot’

( <sup>l</sup> li.säu).( <sub>g</sub> ō)	‘let it increase’
( <sup>l</sup> vē.ret).( <sub>t</sub> ēB)	‘it rolls’
( <sup>l</sup> so.pi).( <sub>z</sub> im.ma)	‘we got along’
( <sup>l</sup> bö.ri).( <sub>z</sub> e.mā)	‘to roar, rumble’

#### 4. Quantity-sensitive (“moraic”) trochees

A foot is composed of two moras, whether they come from one syllable or two.  
But a foot can’t begin or end in the middle of a syllable.

(<sup>l</sup>L), (<sup>h</sup>H) vs. \*(<sup>l</sup>LH), \*(<sup>h</sup>HH), \*(<sup>l</sup>L) [except leftovers]  
always hard to say whether (<sup>h</sup>L) or (<sup>h</sup>)L—see Hayes p. 78 for extrametricality arguments

Cahuilla (Uto-Aztecan, S. California, severely endangered; Seiler 1957, 1965, 1967, 1977)<sup>1</sup>

In this language, a syllable with a long vowel, diphthong, or coda [ʔ] counts as heavy.

- Draw in the foot boundaries for the simple cases—what happens to leftover syllables?

tá.ka.lì.čẽm	‘one-eyed ones’
táx.mu.ʔàt	‘song’
háʔ.tìs.qal	‘he is sneezing’
mú:t	‘owl’
páʔ.lì	‘the water (objective case)’
qá:n.kì.čẽm	‘palo verde (pl.)’
táx.mu.ʔàʔ.tì	‘the song (objective case)’

- What happens when a heavy syllable is awkwardly placed?

sú.kàʔ.tì	‘the deer (objective case)’
pú.kàw.tè.mih	‘gopher snakes (obj. pl.)’
kíh.mày.ʕù.qal	‘wonder why’
pá.làw.wè.net	‘that which is beautiful, pretty’
hé.ʔi ká.kàw.là:.qà	‘his legs are bow-shaped’

- Lexical phonology review: what could we do about these prefixed forms?

pà.pen#tú.le.qà.le.vèh	‘where I was grinding it’
ne#yú:l	‘my younger brother’
nè.sun#ká.vì:.čì.wen	‘I was surprised’
tax#kí.ʕìw.kà.tem	‘companions’
pen#pé.nì:.čì.ni.qà	‘translate’

<sup>1</sup> Data sanitized a bit: optional de-stressing suppressed even in forms where only one transcription is given. See Hayes for discussion of final degenerate feet—they are probably de-stressed by a late rule.

### 5. Quantity-sensitive (“uneven”) iambs

Here, a heavy syllable can form a foot only on its own or with a preceding L. That is, H can’t be the weak member of a foot.

(L $\acute{L}$ ), (H $\acute{H}$ ) vs. \*(H $\acute{L}$ ), \*(H $\acute{H}$ ), \*( $\acute{L}$ ) [except for a leftover syllable]  
hard to say whether (L $\acute{H}$ ) or L( $\acute{H}$ )

Muskogee (a.k.a. Seminole/Creek, Muskogean, U.S., 4,300 speakers; Haas 1977; Tyhurst 1987; Jackson 1987 via Hayes)

- Use iambic feet to explain why stress is sometimes final, sometimes penultimate:

co.kó	‘house’
ni.háa	‘lard’
hok.tíi	‘woman’
íc.ki	‘mother’
o.sá.na	‘otter’
ko.fóc.ka	‘mint’
ak.cáwh.ka	‘stork’
hi.to.tíi	‘snow’
ak.ha.síi	‘lake’
ha.liis.síi	‘moon’
tíi.níit.kíi	‘thunder’
taas.ki.tá	‘to jump (sg. subj.)’
a.pa.ta.ká	‘pancake’
taas.ho.kí.ta	‘to jump (dual subj.)’
a.no.ki.cí.ta	‘to love’
to.koł.ho.kí.ta	‘to run (dual subj.)’
a.ti.loo.yi.tá	‘to gather’
ij.ko.sa.pi.tá	‘one to implore’
i.si.ma.hi.ci.tá	‘one to sight at one’
naf.ki.ti.kaa.yi.tá	‘to hit (pl. obj.)’

### 6. An asymmetric inventory

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.

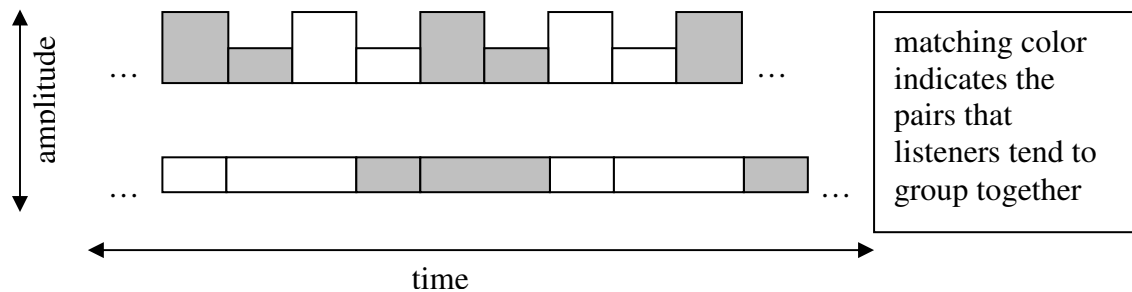
### 7. Why?

Moras correspond roughly to duration: H syllables last longer than L syllables.

Hayes cites psychological research on how people group rhythmic sequences of sounds, and concludes that (weak-strong) groupings have a greater affinity for durational differences...

## 8. Rice 1992, ch. 5

Reviews and replicates Woodrow 1909, 1911, 1951b.<sup>2</sup> 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 guess 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)

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

## 9. Hayes cites also<sup>3</sup>

- 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

<sup>2</sup> I tried to read Woodrow 1909 but in the 30 minutes I could spare for the task it was just about impenetrable, so unfortunately I have none of his raw results to share with you.

<sup>3</sup> Sorry, couldn't get my hands on the originals in time.

- 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

- a. Elements contrasting in intensity naturally form groupings with initial prominence.
- b. Elements contrasting in duration naturally form groupings with final prominence.” (p. 80)

### 10. Iambic lengthening

Hixkaryana (Carib language with 550 speakers in Brazil. Derbyshire 1985 via Hayes)

- Vowel length is not contrastive; all these long vowels are derived by rule. What is it?

k <sup>w</sup> á:.<ja>	‘red and green macaw’
ne.mò: .ko.tó:.<no>	‘it fell’
a.tʃó: .wo.<wo>	‘wind’
to.ró:.<no>	‘small bird’
àk.ma.tá:.<ri>	‘branch’
òw.to.hó:.<na>	‘to the village’
tòh.ku.r <sup>j</sup> é: .ho.<na>	‘to Tohkurye’
tòh.ku.r <sup>j</sup> è: .ho.nà: .ha.fá:.<ka>	‘finally to Tohkurye’
nàk.pòh.jàtʃ.ke.ná:.<no>	‘they were burning it’
mì.hà: .na.níh.<no>	‘you taught him’
k <sup>h</sup> a.nà: .níh.<no>	‘I taught you’

Asymmetry: Trochaic lengthening is much rarer.

But, in moraic-trochee languages there is sometimes *shortening* of the strong syllable! Hayes proposes that this is to allow more syllables to get included in feet: e.g., /LLHL/ → [(<sup>́</sup>LL)(<sup>́</sup>LL)] instead of [(<sup>́</sup>LL)(<sup>́</sup>H)L].

- Let’s talk about Samoan!

### 11. Trochaic shortening example

In Fijian, vowel length is contrastive, but its distribution is limited. (Based on data from Schutz 1985, 1978 and analysis by Hayes.) Mostly loan words are shown below because, as in English, they’re the best source of long, monomorphemic words.

[Fijian: Austronesian language from Fiji with 334,000 speakers]

- What are the footing rules of Fijian?

láko	‘go’	<sup>n</sup> dòketá:	‘doctor’
tálo	‘pour’	palàsítá:	‘plaster’
βináka	‘good’	mìnìsìtirí:	‘ministry’
atómi	‘atom’	terènisìsitá:	‘transistor’
<sup>n</sup> dìkonési	‘deaconess’	<sup>n</sup> dàjrèkitá:	‘director’
prèsité <sup>n</sup> di	‘president’	<sup>n</sup> rè: <sup>n</sup> ré:	‘difficult’
<sup>m</sup> bàsikètépólo	‘basketball’	<sup>m</sup> bè:léti	‘belt’
seŋáj	‘no’	taràwsése	‘trousers’
<sup>m</sup> basá:	‘bazaar’	<sup>m</sup> bèle <sup>m</sup> bò:tómu	‘bellbottoms’
		mì:sìni <sup>l</sup> gáni	‘machine gun’

- Account for shortening in Standard Fijian:

<sup>m</sup> bú:	‘grandmother’	<sup>m</sup> bú- <sup>l</sup> gu	‘my grandmother’
tá:	‘chop’	tá-ja	‘chop-transitive-3 sg. obj.’
<sup>n</sup> ré:	‘pull’	<sup>n</sup> ré-ta	‘pull-trans.’
ðaðá:	‘lots of bad things’	ðaðá- <sup>l</sup> gu	‘my bad things’ <sup>4</sup>
sì:βí-ta	‘exceed-trans.’	síβi	‘exceed’
ráj	‘see’	ráj-ðá	‘see it’

The curved diacritic over the vowel in ‘see it’ indicates that the vowel is short (it is also stressed). Assume that the resulting rime [áj] has only one mora.

- Here’s another dialect to account for (examples partly fabricated but the dialect is real):

sì:βí-ta	‘exceed-trans.’	síβi	‘exceed’
ráj	‘see’	ré-ðá	‘see it’
láv	‘wug’	ló-ðá	‘wug it’

- And another dialect:

sì:βí-ta	‘exceed-trans.’	síβi	‘exceed’
ráj	‘see’	ra.í.-ðá	‘see it’
láv	‘wug’	la.ú.-ðá	‘wug it’

- One last dialect:

ráj	‘see’	rá-ðá	‘see it’
láv	‘wug’	lá-ðá	‘wug it’

## References—see web version for next page

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<sup>4</sup> Made-up form.

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