

## Class 18: Stress III—more feet

**To do:** Samoan (last assignment) due Friday

### 1. Overview

Last time we started discussing some arguments for feet (and ways to undermine them). After finishing up last time's handout, 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.

(**Ĺ**L), (**Ĺ**H), (**Ĥ**L), (**Ĥ**H) vs. \*(**Ĺ**), \*(**Ĥ**), except maybe for leftover syllables at an edge

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

(pá.ŋa)	‘earth’
(tʰú.ʃa)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.ʃa)	‘the first one (who is) our relation’
(yú.ma)(ŋiŋ.ka)(mà.ra)(tʰù.ʃa)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.

( <sup>1</sup> ka.na)	‘hen’
( <sup>1</sup> tüt.tö)	‘girl’
( <sup>1</sup> sā.mā)	‘to get, obtain’
( <sup>1</sup> ā.pa)	‘aspen tree’
( <sup>1</sup> ko.tō)	‘home (ill.)’
( <sup>1</sup> pa.ʎa).( , va)	‘hot’
( <sup>1</sup> li.säu).( , gō)	‘let it increase’

( <sup>1</sup> vē.ret).( <sub>1</sub> tēB)	‘it rolls’
( <sup>1</sup> so.pi).( <sub>1</sub> zim.ma)	‘we got along’
( <sup>1</sup> bö.ri).( <sub>1</sub> ze.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>1</sup>L), (<sup>1</sup>H) vs. \*(<sup>1</sup>LH), \*(<sup>1</sup>HH), \*(<sup>1</sup>L) [except leftovers]  
always hard to say whether (<sup>1</sup>HL) or (<sup>1</sup>H)L—see Hayes p. 78 for extrametricality arguments

Cahuilla (Uto-Aztec, 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.li.čem	‘one-eyed ones’
táx.mu.ʔàt	‘song’
háʔ.tis.qal	‘he is sneezing’
mú:t	‘owl’
páʔ.li	‘the water (objective case)’
qá:n.ki.čem	‘palo verde (pl.)’
táx.mu.ʔàʔ.ti	‘the song (objective case)’

- What happens when a heavy syllable is awkwardly placed?

sú.kàʔ.ti	‘the deer (objective case)’
pú.kàw.tè.mih	‘gopher snakes (obj. pl.)’
kíh.màʔ.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.vi:čì.wen	‘I was surprised’
tax#kí.ʕiw.kà.tem	‘companions’
pen#pé.ni: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<sup>́</sup>), (H<sup>́</sup>) vs. \*(H<sup>́</sup>L), \*(H<sup>́</sup>H), \*(L<sup>́</sup>) [except for a leftover syllable]  
hard to say whether (L<sup>́</sup>H) or L(H<sup>́</sup>)

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’
tii.niit.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’
iŋ.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.

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

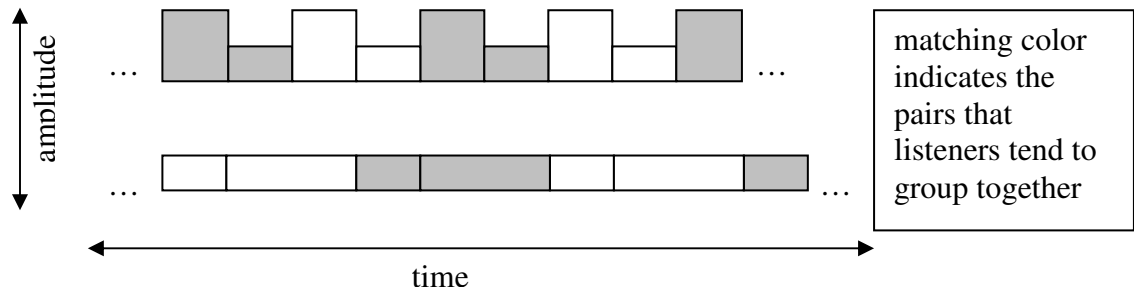
## 7. Why?

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.

<sup>2</sup> 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.

## 9. Hayes 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

- 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.ǰá:.<ka>	'finally to Tohkurye'
nàk.nòh.jàtʃ.ke.ná:.<no>	'they were burning it'
mi.hà:na.níh.<no>	'you taught him'
k <sup>h</sup> a.nà:níh.<no>	'I taught you'

## 11. Asymmetry: Trochaic lengthening is much rarer

See Revithiadou 2004 for a review of cases of trochaic lengthening and a different view of the typological bias (her explanation—foot-final lengthening—still relies on feet, though).

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/ → [(LL)(LL)] instead of [(LL)(H)L].

## 12. Trochaic shortening example

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? Draw in the feet.

(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'	(sénə)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 anomalous in not being extrametrical.]

(kó:n)	'cone'	(ká.nɪk)	'conic'
(má:jm)	'mime'	(mí.mɪk)	'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'	(rɪ)(bè:t)	'rebate'
(rɛ.kərd)	'record' (noun)	(rɪ)(flɛks)	'reflex'
(rɛ.zɪ)(dén.ʃəl)	'residential'	(rɪ)(læk)(sé:)ʃən	'relaxation'
(pɹɛ.fəs)	'preface'	(pɹɪ)(fɛkt)	'prefect'
(pɹɛ.lət)	'prelate'	(pɹɪ)(lè:t)	?
(pɹɛ.məs)	'premise'	(pɹɪ)(fɪks)	'prefix'
(pɹɛ.zən)(té:ʃən)	'presentation'	(pɹɪ)(mè.rɪ)(té:)ʃən	'premeditation'

## References—see web version for next page

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