Class 17: Stress II—feet

To do
- Chaha assignment due Fri., Nov. 26 (but earlier is fine—you know everything you need)
- Samoan assignment due Fri., Dec. 3
- No more readings.
- Work on final paper. I'll e-mail you comments on your abstracts over the weekend.

Overview: We'll add more structure to the grid, which will help us with more-complicated stress systems. Next class finishes up stress by discussing weight effects and foot asymmetries.

1. What are feet?

Concept originally from poetic metrics, where a foot is a grouping of stressed and unstressed syllables (or "long" and "short", terms used more properly for Latin verse than for English) .

Trochee trips from long to short;	(x .)
From long to long in solemn sort.	
Slow Spondee stalks, strong foot!, yet ill-able	(x x)
Ever to keep up with Dactyl's trisyllable.	(x . .)
Iambics march from short to long.	(. x)
With a leap and a bound the swift Anapests throng.	(. . x)
One syllable long, with one short at each side,	(. x .)
Amphibrachys hastes with a stately stride; --	" "
First and last being long, middle short, Amphimacer	(x . x)
Strikes his thundering hoofs like a proud high-bred Racer. " "	(Coleridge)

Linguistic feet seem to be trochees and iambs only. A language <u>usually</u> has all trochees or all iambs. English is said to have trochaic phonological feet, regardless of poetic meter:

	x	*or, equivalently,*		x
x	x		x	x
x x	x		(x .)(x .)(x .)	
(x x) (x x) (x x)			A pa la chi co la	
A pa la chi co la				

Here's the poem again, with [] for metrical feet and () for phonological feet:

[(Tró)(chèe)] [(tríps) from] [(lóng) to] (shórt);
From [(lóng) to] [(lóng) in] [(sólemn)] (sórt).
[(Slów) (Spón)] [(dèe) (stálks)], [(stróng) (fóot)!], [(yèt) (ìll)] -(áble)
[(éver) to] [(kéep) (ùp) with] [(Dáctyl)'s (trì)] [(sýlla)ble.]
[I(ám] [bics) (márch)] [from (shórt)] [to (lóng).]
[With a (léap)] [and a (bóund)] [the (swìft) (Á] [na)(pèsts) (thróng)].
[(Òne) (sýlla)] [ble (lóng), with] [(òne) (shórt) at] (èach) (síde),
[(Àm)(phíbra)] [chys (hástes) with] [a (státely)] (stríde);
[(Fírst) and (lást)] [(béing) (lóng),] [(míddle) (shórt),] [(Ámphi)(mà]cer)
[(Stríkes) his (thún] [der)ing (hóofs)] [(lìke) a (próud)] [(hígh)-(brèd) (Rá]cer).

Crucially, feet group syllables, not segments or moras directly:

2. Exercise: fragment of Cairene Classical Arabic

=the variety of Classical Arabic spoken in Cairo. Data taken from **Hayes 1995, Kenstowicz 1994**, orig. from **Mitchell 1960, Kenstowicz 1980**—probably resulting in contradictions.

To start, let's try building a grid on moras.

- First make a guess about the basic grid parameters. You can assume that secondary stressed gets assigned and then wiped out by a later rule.

a	ká.ta.ba	'he wrote'	
b	ša.ja.rá.tu.hu	'his tree'	
c	ka.ta.bí.tu	'she wrote it'	(not Classical, but apparently words of this shape are stressed the same in Classical and Colloquial Cairene)

- What's going on here?

d	ʔad.wi.ya.tú.hu	'his drugs (nom.)'
e	ʔin.ká.sa.ra	'it got broken'
f	qat.tá.la	'he killed'
g	haa.ðáa.ni	'these (m. dual)'

- The ends of the words are problematic:—how can we use extrametricality to help?

h	ʔad.wi.ya.tú.hu.maa	'their (dual) drugs'	
i	bée.tak	'your (m.sg. house)'	(not Classical)
j	ša.ja.ra.tu.hú.maa	'their (dual) tree (nom.)'	
k	fí.him	'he understood'	(not Classical)
l	ša.ja.rá.tun	'tree (nom.)'	
m	ka.tábt	'I wrote'	(not Classical)
n	haj.jáat	'pilgrimages'	

- These data should be problematic...

o	ka.táb.ta	'you (m.sg.) wrote'	
p	mu.dár.ris	'teacher'	(not Classical)
q	mu.dar.rí.sit	'teacher (f. construct)'	(not Classical)

- How about an analysis with feet?

Now that we have feet, I think we can construct a fully parallel OT analysis (i.e., no need for a later level that erases the secondary stresses). First, let's review available constraints.

3. Generalized Alignment (McCarthy & Prince 1993)

We reviewed these last time because of Chaha, but here's a tidier version to consult:

ALIGN(*Cat1*, *Side1*, *Cat2*, *Side2*)
where *Cat1* and *Cat2* ∈ {PhonologicalWord, LexicalWord, Foot, Syllable, Morpheme...}
Side1, *Side2* ∈ {Left, Right}
∀*Cat1* ∃*Cat2* s.t. coincide(*Side1*(*Cat1*), *Side2*(*Cat2*))
i.e., "for every instance of *Cat1* in the candidate, there must exist some instance of *Cat2* such that the *Side1* edge of *Cat1* coincides with the *Side2* edge of *Cat2*.

Sample constraints of this format

EDGEMOST-L = ALIGN(PWord,L,Foot,L) good: (ca.ta)pult, (but.ter)
bad: ba(na.na), a(lu.mi)num

How do you count violations? Though there's no place for that argument in the ALIGN(*Cat1*, *Side1*, *Cat2*, *Side2*) template, it's an additional part of the definition that must be precised.

- binary: either they coincide (no *s) or they don't (one *).
- count syllables that intervene [typical for a foot-aligning constraint]: *ba(na.na)*: *, *a(lu.mi)num:* *
- count segments that intervene: *ba(na.na)*: **, *a(lu.mi)num:* *
- count feet that intervene (not applicable here, since we're only interested in the closest foot)

EDGEMOST-R good: ba(na.na), (but.ter)
bad: (ca.ta)pult, a(lu.mi)num

ALLFEETLEFT = ALIGN(Foot,L,PWord,L) [usu. counts intervening syllables]
ALLFEETRIGHT
LEFTMOST = ALIGN(HeadFoot,L,PWord,L) [usu. counts intervening feet]
RIGHTMOST

- Let's take some English words with straightforward footing and check how many times each violates each of these constraints.

4. More OT constraints for stress

Some from Prince & Smolensky 1993/2004, some from McCarthy & Prince 1993, others in general use but whose origin I didn't track down.

- TROCHAIC/IAMBIC: the first/last element of each foot is more prominent than any other element of that foot (if the foot's just one syllable, no violations).
- WEIGHTTOSTRESSPRINCIPLE: a heavy syllable must be stressed (pre-OT work by Prince)
- FOOTBINARITY-moraic/syllabic: a foot must consist of exactly two moras/syllables
- FOOTBINARITY-general: a foot must consist of exactly two moras or exactly two syllables
- NONFINALITY-stress/footing: the last syllable of a word must not be stressed/footed
- PARSE-σ: every syllable must be in a foot
- NOCLASH/NOLAPSE: don't have two stressed/unstressed syllables in a row

Why NONFINALITY but not NONINITIALITY?
For typological reasons, but I don't know if anyone has a good explanation.

- or, NOCLASH-grid: * x x / x x
- and NOLAPSE-grid: * x / x x x , * x / x x x
- CULMINATIVITY: every content word has exactly one main stress (or, combined effect of one constraint requiring a content word to project a phonological word and another requiring every phonological word to contain at least one foot).

Possible redundancies, debate ongoing: if we have feet, do we need constraints against clash and lapse? If we have constraints against clash and lapse, do we need feet?

5. OT analysis of Classical Cairene (assume secondary stresses are deleted post-lexically)

To have an analysis faithful to Hayes's, but in the spirit of Lunden, we need this constraint

FINAL{VV,VC}GETSONEMORA [1]

I think this has a similar effect as saying "final mora is extrametrical unless it's the only one in its syllable."
Below are shown only candidates that obey this constraint; moras shown only when not obvious.

	šajaratuhu	
☞ *a*	(šà.ja)(rá.tu)hu	
b	(šá.ja)(rà.tu)hu	
c	(šà.ja)ra(tú.hu)	
d	ša(jà.ra)(tú.hu)	
e	(šá.ja)ra.tu.hu	
f	(šà.ja)(rà.tu)(hú)	

	ʔadwiyatuhu	
☞ *a*	(ʔàd)(wì.ya)(túhu)	
b	(ʔàd.wi)(yá.tu)hu	

	ʔadwiyatuhumaa	
☞ *a*	(ʔàd)(wì.ya)(tú.hu)maa \ / μ	
b	(ʔàd)(wì.ya)tu.(hú.maa) \ / μ	
c	(ʔàd)(wì.ya)(tù.hu)(máa) \ / μ	

[1] So how do we represent the difference between final VV and final V? It can't be just mora count. I guess we need the CV skeleton here.

6. Example: Bedouin Hijazi Arabic

(dialect of Hijazi Arabic, an Afro-Asiatic language with 6,000,000 speakers in Saudi Arabia—data from Al-Mozainy, Bley-Vroman, & McCarthy 1985, via Kager 1995)

Last syllable is extrametrical unless superheavy (CVVC) or unless word has just two syllables.
Two-mora trochees built from right to left (only the last one gets stress):

mak.túu.<fah>	'tied (fem. sg.)'	
mak.túub	'written'	} what else must we say?
máa.la.<na>	'our property'	
ʔín.ki.<saR>	'he got broken'	

- Stress interacts with deletion. What happens if we order stress before deletion? After?

	sá.Ha<b> *(maybe)*	'he pulled'
	sa.Háb.<na>	'we pulled'
/s**a**Hab+at/	sHá.<bat>	'she pulled'
/ʔink**a**saR+at/	ʔink.sá.<Rat>	'she got broken'
	compare to ʔín.ki.<saR>	

- Another way of thinking about it: how does an *x* "know" where to go after its syllable is deleted?

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        x
  x x   x   x
  ʔin   ka  sa <Rat>
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- Ideas from your study-question answers about how to do this without feet?

7. Minimality

McCarthy & Prince 1986 (see there for references and details): It's common for languages to impose a minimum size on content words.

Estonian (recall from our discussion of the duplication problem; Prince 1980): ≥ two moras, word-final C doesn't count

/tänava/	tänav		'street (nom.sg.)'
/konna/	kon:n		'pig (nom. sg.)'
/kana/	kana (*kan)	*V-deletion blocked*	'chicken (nom. sg.)'

Mohawk, Kahnawake dial. (Iroquoian, Canada & US, 3,760 speakers; Michelson 1981): ≥ 2 sylls.

/k+tats+s/	**í**ktats	'I offer'
/hs+yaʔks+s/	**í**hsyaʔks	'you are cutting'

- How can we describe all these minimums?

Hayes 1995: Can we also say that "every word must be able to undergo the stress rule"? If so, must that rule refer to feet? Try it for Mohawk, which has penultimate stress.

from Hayes 1995: Pitta-Pitta [Australian, prob. no speakers]—words also must be ≥ 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 your rule exclude subminimal words (*ka)? What about other formulations of the rule?

8. Other arguments for feet, the first 2 of which you read about in Hayes

- There are languages with the same foot type but different alignment in different contexts; with feet this is describable in terms of a single parameter (not so with the peak-first/trough-first, left-to-right/right-to-left system ["perfect grid"]).

- Trochaic languages are far more common than iambic; with feet, we can characterize one parameter setting as more common; but not with just the grid.

- Various consonantal rules that apply to the "strong" or "weak" syllable of a foot, even if the foot is not supposed to have any stress (i.e., in languages reported to have no secondary stress). See González 2002 for a case of this and a case of something even more complicated.

- Expletive infixation in English (McCarthy 1982):
  Mo(nònga)-(fucking)-(héla)
  (Òs)-(fucking)-(wégo)
  (Àpa)-(fucking)-(làchi)(cóla), (Àpa)(làchi)-(fucking)-(cóla)
  (Tàta)ma-(fucking)-(góuchi) ~ (Tàta)-(fucking)-ma(góuchi)

- Latin enclitic stress (Steriade 1988; Jacobs 1997):

  Latin stresses the penult if it's heavy, otherwise the antepenult (data from Jacobs/Hayes):

(cá.me)<ram>	(ár.bo)<rem>	pe(dés)<trem>	vo(lup)(táː)<tem>
(sí.mu)<laː>	do(més.ti)<cus>	a(míː)<cus>	(liː.be)(raː.ti)(óː)<nem>

  But, it's different when you add an enclitic: Steriade proposes that

(í)<ta>	'so'	(i)(tá)=<que>	'and so'	*(í.ta)=<que>
(mú)<sa>	'Muse'	(mu)(sá)=<que>	'and the Muse'	*(mú.sa)=<que>
(líː.mi)<na>	'thresholds'	(liː.mi)(ná)=<que>	'and the thresholds'	*(liː)(mí.na)=<que>
(no)<bis>	'us'	(no)(bís)=<cum>	'with us'	
		(no)(bis)=(cúm)=<que>	'and with us'	

  Steriade's solution: when a clitic is attached, only previously unfooted material can be footed: old feet can't be readjusted (let's step through a couple of these)

[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.

To deal with the following data, Jacobs proposes that not only final syllables, but also final enclitics are extrametrical:

(íd)	'this'	(íd)=<circoː>	'therefore'	*(id)=(cír)<co>
		(id)=(cir)(cóː)=<que>	'and therefore'	
(quáː)	'which'	(quáː)=<propter>	'wherefore'	*(quaː)=(próp)<ter>
e(áː)	'there'	e(áː)=<propter>	'therefore'	*e(aː)=(próp)<ter>
		e(aː)=(prop)(tér)=<que>	'and therefore'	
(ú)<bi>	'where'	(u)(bí)=<li.bet>	'wherever'	

- Bring on the dissent and counter-analysis for all of these...

9. Exercise if extra time: Italian

(Indo-European language from Italy and surroundings with 62 million speakers; I didn't write down where I first got these data and generalizations. A lot are from a dictionary, Melzi 1976)

- Analyze primary stress in these words:

a	mé.se	'month'
b	ká.sa	'house'
c	fjá.to	'breath'
d	tér.ra	'earth'
e	dʒór.no	'day'
f	di.ví.sa	'uniform'
g	tri.bú.na	'rostrum'
h	kom.prá.re	'buy'
i	kor.ní.tʃe	'cornice'
j	me.ta.fo.ní.a	'metaphony'

- Here are some words with a different stress pattern. There is no other systematic (synchronic) difference between these words and the basic words in (a), so something has to be different about their underlying representations. Ideas for what it could be (various options exist)?

k	ká.li.tʃe	'chalice'
l	mú.si.ka	'music'
m	ál.be.ro	'poplar'
n	fís.si.le	'fissionable'

- Some word shapes, however, never show antepenultimate stress. Does this follow from the analysis so far?

o	spa.gét.ti	'spaghetti'
p	a.rán.tʃo	'orange (color)'
q	am.búr.go	'hamburger'
r	in.tɛ́n.to	'intent'
s	*á.bur.go	
t	*ín.men.to	

- In addition, there are no words with preantepenultimate stress: *é.na.ti.lo Does that follow?

- There are some words with final stress—they'll need different underlying representations.

u	ko.li.brí	'hummingbird'
v	dʒo.ve.dí	'Thursday'
w	u.ni.ver.si.tá	'university'
x	li.ber.tá	'liberty'
y	dʒo.ven.tú	'youth'
z	ko.sí	'thus'
aa	tʃit.tá	'city'
bb	per.ké	'why'

- Famous exception: [mán.dor.la] 'almond' (also [pó.lit.t͡sa] 'policy', [á.ris.ta] 'pork loin'). We would like to account for these few words without opening the door to completely free stress placement. Speculate on how these words' underlying representation might look.

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