Го	do		

- Samoan assignment (last one!) due Tues., Dec. 1
- Paper abstract: turn in by Monday mid-day for comments returned to you in class Tues. If you turn it in earlier, I will get you comments earlier

1. What are feet?

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

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 Ra	acer. ""	(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:

		Х	or, equivalently,		Х
Х		Х		Х	Х
Х	Х	Х		(x .)(x	x .)(x .)
(x x	x) (x x	$(\mathbf{x} \mathbf{x})$		A pa la	a chi co la
A pa	a la ch	i 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).

σ σ

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

2. Cairene Arabic revisited

• What potential problems do these data present for the analysis we had last time?

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

• How about an analysis with feet?

3. Generalized Alignment (McCarthy & Prince 1993)

In order to deal with feet in OT, we'll need a bunch of new constraints. McCarthy & Prince proposed a particular family of constraints that can do a lot of work here:

ALIGN(*Cat1*, *Side1*, *Cat2*, *Side2*)

where Cat1 and $Cat2 \in \{PhonologicalWord, LexicalWord, Foot, Syllable, Morpheme...\}$ Side1, Side2 $\in \{Left, Right\}$

 $\forall Cat1 \exists Cat2 \text{ s.t. coincide}(Side1(Cat1), Side2(Cat2))$

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), Gar(a.ni)mals

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 (0 *s) or they don't (1 *).
- count syllables that intervene [typical]: *ba*(*na.na*): *, *Gar*(*a.ni*)*mals*: *
- count segments that intervene: *ba*(*na.na*): **, *Gar*(*a.ni*)*mals*: ***
- 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, Gar(a.ni)mals

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

Constraints like this are also one way to handle directionality in autosegmental spreading.

• 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.
- 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 (or define on grid)
- 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 redundancy: if we have feet, do we need constraints against clash and lapse (maybe yes)? 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)

We need a stipulative constraint (to have an analysis faithful to Hayes's): FINALSYLLABLECOUNTS: a mora can't be extrametrical if it's the only one in its syllable >> FINALMORAEXTRAMETRICAL: the word-final mora is extrametrical

=> Final mora is extrametrical unless it's the only one in its syllable. Below are shown only candidates that survive these two constraints

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)	

?adwiyatuhu	
☞ a (?àd)(wì.ya)(tú)hu	
b (?àd.wi)(yá.tu)hu	

	?adwiyatuhumaa	
°₽ a	(?àd)(wì.ya)(tú.hu)ma <a>	
b	(?àd)(wì.ya)tu.(hú.ma) <a>	
С	(?àd)(wì.ya)(tù.hu)(má) <a>	

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, with two-mora trochees built from right to left (only the last one gets stress):

mak.túu. <fah></fah>	'tied (fem. sg.)'	
mak.túub	'written'	J
máa.la. <na></na>	'our property'	\rightarrow what else must we say?
?ín.ki. <sar></sar>	'he got broken'	J

0	Stress interacts wi	th deletion. What happens if	Twe order stress before deletion? After?
		sá.Ha (maybe)	'he pulled'
		sa.Háb. <na></na>	'we pulled'
	/s a Hab+at/	sHá. <bat></bat>	'she pulled'
	/?ink a saR+at/	?ink.sá. <rat></rat>	'she got broken'
		<i>compare to</i> ?ín.ki. <sar></sar>	

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

x x x x ?in ka sa <Rat>

• Ideas from your study-question answers about how to do this without feet?

7. Example: Winnebago/Hocąk again (based on discussion in Kenstowicz 1994)

If we restrict ourselves to light syllables (those with short vowels), we could say that initial syllables are extrametrical and iambs are formed from left to right. But then there's...

Dorsey's Law:	С	С	V -	$\rightarrow 1323$	(see Hall 2003 for articulatory perspective)
	[[+son]		
	1	2	3		
/ho+š+waž	ža/			hoš a wažá	'be sick'
/hi+kro+h	0/			hik o rohó	'prepare, dress (3 sg.)'

o Based on the data above, which should apply first, basic stress or Dorsey's Law?

In OT, perhaps we could have a constraint against footing epenthetic vowels (see Broselow 1999 on Selayarese, but recall Kiparsky 2000's take on epenthetic vowels in Arabic).

Assume final syllable can form a ("degenerate", because too small) foot: PARSE- σ >> FTBIN.

But, final stress is deleted if it clashes with a penultimate stress: NOCLASH >> PARSE- σ .

- In that case, are these words consistent with what we've seen so far? /ha+ra+ki+š+rujik+šną/ harakíšurujikšąną 'pull taut (2d)'
- Here come the interesting cases—analysis?

/ha+ki+rujik+šną/	hakirújikš ą ną	'pulls taut (3d)'
/hi+ra+kro+ho/	hirak ó rohò	'prepare'
/mąą+š+rač/	mą.ąš á rač	'you promise'
/hi+ra+kro+ho+nira/	hirak ó rohònirà	'prepare, dress (2 d.)'
/wakripras/	wak i rip á ras	'flat bug'

• This looks very Stratal-OT-ish to me: we need feet to be formed before Dorsey's Law, but what happens next looks a lot like constraint satisfaction. Let's sketch something out.

• Last time, we saw that 2-syllable words will still get (final) stress. Let's extend our analysis to include those words and these:

/ho+kwe/	hok e wé	'enter'
/š+wažok/	š a wažók	'mash'
(There is more to this stor	y, and Hayes' analys	sis is quite different.)

8. Minimality

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

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

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

Mohawk, Kahnawake dial. (Iroquoian, Canada & US, 3,760 speakers; Michelson 1981): ≥ 2 sylls./k+tats+s/íktats/hs+ya?ks+s/íhsya?ks'I offer''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.¹ 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?

¹ 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.

9. 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; again, we can characterize one parameter setting as more common with feet, but not with the perfect 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(nonga)-(<u>fucking</u>)-(hela) (Apa)-(<u>fucking</u>)-(lachi)(cola), (Apa)(lachi)-(<u>fucking</u>)-(cola) (Tata)ma-(<u>fucking</u>)-(gouchi), (Tata)-(<u>fucking</u>)-ma(gouchi)
- Latin enclitic stress (Steriade 1988; Jacobs 1997 and refs therein):

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)(tá:)<tem> (sí.mu)<la:> do(més.ti)<cus> a(mí:)<cus> (li:.be)(ra:.ti)(ó:)<nem>

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

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

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)

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

(íd)	'this'	(íd)= <circo:></circo:>	'therefore'	*(id)=(cír) <co></co>
		(id)=(cir)(có:)= <que></que>	'and therefore'	
(quáː)	'which'	(quá:)= <propter></propter>	'wherefore'	*(qua:)=(próp) <ter></ter>
e(á:)	'there'	e(á:)= <propter></propter>	'therefore'	*e(a:)=(próp) <ter></ter>
		e(a:)=(prop)(tér)= <que></que>	'and therefore'	
(ú) <bi></bi>	'where'	$(u)(bi) = \langle li.bet \rangle$	'wherever'	

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

10. Exercise if extra time: Italian

(Indo-European language from Italy and surroundings with 62 million speakers; I didn't write down where I got these data and generalizations!! Some were from a dictionary, Melzi 1976)

Analyze primary stress in these words: 0

a	mé.se	'month'
b	ká.sa	'house'
С	fjá.to	'breath'
d	tér.ra	'earth'
е	dʒór.no	'day'
f	di.ví.sa	'uniform'
g	tri.bú.na	'rostrum'
h	kom.prá.re	'buy'
i	kor.ní.t∫e	'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)?
- ká.li.t∫e 'chalice' k 1 mú.si.ka 'music' *m* ál.be.ro 'poplar' fís.si.le 'fissionable' п
- Some word shapes, however, never show antepenultimate stress. Does this follow from the 0 analysis so far?
- spa.gét.ti 'spaghetti' 0
- a.rán.t∫o 'orange (color)' р
- am.búr.go 'hamburger' q
- 'intent' in.tén.to r
- *á.bur.go S
- *ín.men.to t
- In addition, there are no words with preantepenultimate stress: *é.na.ti.lo Does that follow? 0

There are some words with final stress—they'll need different underlying representations. 0

- 'hummingbird' ko.li.brí и
- 'Thursday' dzo.ve.dí v
- u.ni.ver.si.tá 'university' w 'liberty' li.ber.tá
- x
- dzo.ven.tú 'vouth' y
- 'thus' ko.sí Ζ.
- aa tſit.tá 'city'
- 'why' bb per.ké

- Famous exception: [mán.dor.la] 'almond' (also [pó.lit.tsa] '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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