Class 18: Stress II—feet and ALIGN constraints

To do
- Next assignment to be posted tonight; due Friday, Dec. 6 (end of Week 10)
- No more readings
- Be writing your paper. Writing will help you figure out what you understand so far and what remains unclear, where the analysis works and doesn't—plus it means less writing later.

Overview: We'll add more structure to the grid, which will help us with more-complicated stress systems. Next week 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:

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        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
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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: foot
  / \
  σ σ

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** and see where we run into problems.

  - Make a guess about the two basic "perfect-grid" parameters. You can assume for now that secondary stress gets assigned and then wiped out by a later rule.

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

  - 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)'	
h	ša.ja.ra.tu.hú.maa	'their (dual) tree (nom.)'	
i	ša.ja.rá.tun	'tree (nom.)'	
j	haj.jáat	'pilgrimages'	
k	fí.him	'he understood'	(not Classical)

  - These data should be problematic...

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

  - If we want to use feet, should they be trochaic or iambic?

  - Try drawing some feet on the surface forms.

- For practice, we'll implement it in OT. First, let's review available constraints.

3. Generalized Alignment (McCarthy & Prince 1993)

ALIGN(*Cat1*, *Side1*; *Cat2*, *Side2*)
where *Cat1* and *Cat2* ∈ {PhonoWord, 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, with commonly used nicknames

"**EDGEMOST-L**" = ALIGN(PWord,L; Foot,L) good: (Ca.na)da, (but.ter)
bad: ba(na.na), a(lu.mi)num

EDGEMOST-R good: ba(na.na), (but.ter)
bad: (Ca.na)da, a(lu.mi)num

- How do you count violations?
- Though there's no slot for a "counting-type" 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 * per non-aligned *Cat1*).
  - count syllables that intervene [typical for a foot-aligning constraint]: *ba(na.na)*: *, hypothetical *a.ba(na.na): ***
  - count segments that intervene: *ba(na.na)*: **, *a(lu.mi)num:* *
  - count feet that intervene (not applicable for EDGEMOST)

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-mora/syll-stress/footing: the last mora/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 sylls in a row

- or, NOCLASH-grid: * *x x* / *x x*

- and NOLAPSE-grid: * *x* / *x x x*, * *x* / *x x x*

Why NONFINALITY but not NONINITIALITY?

Just because that's what the typology indicates.

See Lunden 2006 on extrametricality for a perceptual explanation of much but not all non-finality.

- 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)

- Go for it—here are the crucial candidates (next page). Moras shown only when not obvious.
  - Tip: start by finding constraints that are violated by some losing candidates given here but by no winning candidates (and can therefore be top-ranked).

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	

- If you finish before the rest of us: try these items

h	ʔad.wi.ya.tú.hu.maa	'their (dual) drugs'	
i	bée.tak	'your (m.sg. house)'	(not Classical)
m	ka.tábt	'I wrote'	(not Classical)

6. An argument for feet: 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 discussion of duplication problem; Prince 1980): **≥ two moras, word-final C doesn't count** (see Lunden 2006)

/tänava/	tänav		'street (nom.sg.)'
/konna/	konːn		'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 just 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?

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

- There are languages with a single foot type but different alignment in different contexts
  - With feet this is describable in terms of a single parameter setting that changes according to context
  - With the peak-first/trough-first, left-to-right/right-to-left system, both parameter settings would usually have to change (I can draw an example)

[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.

- Trochaic languages are far more common than iambic
  - With feet, we can characterize one parameter setting as more common
  - But with just the grid, we have to describe certain *combinations* of parameter settings as common

- Various consonantal rules 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) ← this one is crucial

- Latin enclitic stress (Steriade 1988; Jacobs 1997):
  - Latin stresses the penult if it's heavy, otherwise the antepenult (data from Jacobs/Hayes).
  - Basic analysis:
    - final syllable doesn't want to be in a foot
    - heavy syllable must be stressed (unless final: NONFINALITY>>WEIGHTTOSTRESS)
    - trochaic feet

(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 ("=" boundary):

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

  - Steriade's cyclic solution: when a clitic is attached, only still-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 enclitics resist footing (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...

Tuesday (no class Thursday!): More about moras, and heavy vs. light syllables

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