Class 15: Stress II—more grid, and feet

To do
- Read Hayes; SQs due Monday.
- Get started on Nanti, due in a week.

1. The perfect grid—describing four basic stress systems
Prince proposes that the four basic stress types of Hayes (1981) can be achieved through setting two parameters for lining up syllables with a perfect grid:

```
  x  x  x
  ... x x x x x x ...
```

(a) where to start on the grid: peak or trough
(b) where to start in the word: beginning or end

- What are the parameter settings for each of the following four languages (don’t worry about primary vs. secondary stress)?

**Maranungku** (data originally from Tryon 1970; Australian lang. w/ 15-20 speakers in 1983)
- tí.ralk ‘saliva’
- mé.re.pèt ‘beard’
- yán.gar.mà.ta ‘the Pleiades’
- lángkaràtetì ‘prawn’
- wélepènemànta ‘kind of duck’

**Weri** (data orig. from Boxwell & Boxwell 1966; Trans-New Guinea lang. in PNG w/ 4,163 speakers)
- ŋin.típ ‘bee’
- kù.li.pú ‘hair of arm’
- u.lù.a.mít ‘mist’
- à.ku.nè.te.pál ‘times’

**Warao** (data orig. < Osborn 1966; lang. isolate from Venezuela, Guyana, Suriname w/ 18,000 speakers)
- yi.wà.ra.ná.e ‘he finished it’
- yà pu.ru.ki.tà.ne.há.se ‘verily to climb’
- e.nà.ho.ro.a.hà.ku.tá.i ‘the one who caused him to eat’

**Araucanian** (data orig. < Echeveria and Contreras 1965; family of two languages, Mapudunun from Chile & Argentina w/ 440,000 speakers, and Huilliche from Chile w/ several thousand speakers.
- wu.lé ‘tomorrow’
- ţi.pán.to ‘year’
- e.lú.mu.yú ‘give us’
- e.lú.a.e.new ‘he will give me’
- ki.mú.ba.lù.wu.lày ‘he pretended not to know’
Additional parameter: add an extra grid mark at either the beginning or the end of the word.

- Which setting does each of the four languages above have?

- Consider Araucanian *e.lú.mu.yù*: how does the extra grid mark end up in the right place?

2. Extrametricality

In order to analyze some languages’ stress systems, it is necessary to suppose that certain material at the beginnings or ends (usually ends) of words is ‘left out’ of the grid-mark assignment (*extrametrical*).

Hayes (1981) proposes that only constituents (segments, syllables, feet [which we’ll get to later], phonological words, or affixes) may be made extrametrical.

*Example*: Winnebago/Hocąk (data originally from Miner 1979, Hale & White Eagle 1980). Siouan language from Wisconsin, with a settlement in Nebraska; about 885 speakers total? (All the hooks under vowels—which indicate nasalization—should be going the other way.)

- What are the parameter settings for Winnebago, and what has to be extrametrical?

```
ha.ki.rú.jik.šà.nq 'he pulls it taut'
hi.ra.wá.haz.rà 'the license'
ho.ki.wá.ro.kè 'swing'
ho.čí.čí.nìk 'boy'
hi.jo.wí.re 'fall in'
hi.pi.rák 'belt'
hiš.ja.sú 'eye'
```

- How are these forms different? Any ideas about why?

```
wa.jé 'dress'
wi.júk 'cat'
```

⇒ Most languages require every content word to have a stress. When a word is otherwise unstressable, a special rule steps in.

- Let’s try to formulate Winnebago’s rule for otherwise unstressable words.

3. Moras

In order to look at the next example, we need to introduce the *mora*, a unit of weight (abbreviated μ). Weight is sort of an abstract version of duration. In most languages, short vowels have one mora and long vowels have two. In many languages, some or all coda consonants also get one.

(the variety of Classical Arabic spoken in Cairo—I believe these data represent a formal style)

Build the grid on moras rather than syllables. You can assume that secondary stressed gets assigned and then wiped out by a later rule.

- First make a guess about the basic grid parameters
  
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<tbody>
<tr>
<td>a</td>
<td>ká.ta.ba</td>
<td>‘he wrote’</td>
</tr>
<tr>
<td>b</td>
<td>ša.ja.rá.tu.hu</td>
<td>‘his tree’</td>
</tr>
<tr>
<td>c</td>
<td>ka.ta.bí.tu</td>
<td>‘she wrote it’</td>
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</tbody>
</table>

  (not Classical, but apparently words of this shape are stressed the same in Classical and Colloquial Cairene)

- What’s going on here?
  
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<tbody>
<tr>
<td>d</td>
<td>?ad.wi.ya.tú.hu</td>
<td>‘his drugs (nom.)’</td>
</tr>
<tr>
<td>e</td>
<td>?in.ká.sa.ra</td>
<td>‘it got broken’</td>
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<tr>
<td>f</td>
<td>qat.tá.la</td>
<td>‘he killed’</td>
</tr>
<tr>
<td>g</td>
<td>haa.ðáá.ni</td>
<td>‘these (m. dual)’</td>
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- The ends of the words are problematic:—how can we use extrametricality to help?
  
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<tbody>
<tr>
<td>h</td>
<td>ša.ja.ra.tu.hú.maa</td>
<td>‘their (dual) tree (nom.)’</td>
</tr>
<tr>
<td>i</td>
<td>fí.him</td>
<td>‘he understood’</td>
</tr>
<tr>
<td>j</td>
<td>ša.ja.rá.tun</td>
<td>‘tree (nom.)’</td>
</tr>
<tr>
<td>k</td>
<td>?ad.wi.ya.tú.hu.maa</td>
<td>‘their (dual) drugs’</td>
</tr>
<tr>
<td>l</td>
<td>bée.tak</td>
<td>‘your (m.sg. house)’</td>
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  (not Classical)

- These data are also relevant to determining what’s extrametrical.
  
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<tbody>
<tr>
<td>m</td>
<td>ka.tábt</td>
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<tr>
<td>n</td>
<td>haj.jáat</td>
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  cf. (e) fí.him
5. What are feet?
The foot is a concept from poetic metrics. There, a foot is a grouping of stressed (or “long”, a term used more properly for Latin verse than for English) and unstressed syllables. [I’m collapsing the first two layers of the grid, using . for unstressed and x for stressed.]

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 usually (but not always!) has all trochees or all iambs. English is said to have trochaic feet:

```
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
```

○ Which parameter from last time would be replaced by an iambic/trochaic parameter?

For those who have studied metrics, note that metrical feet— [ ] below—are not the same as linguistic feet—marked approximately with ( ):

```
[(Tró)(chèe)]   [(tríps) from]   [(lón) to]   (shört);
From   [(lóng) to]   [(lóng) in]   [(sólemn)]   (sór).
[(Slów) (Spón)]   [(dèe) (stálks)],   [(stróng) (fóot)!],   [(yèt) (ill)]   -(áble)
[(éver) to]   [(kéep) (ùp) with]   [(Dáctyl)'s (trí)]   [(sýlla)ble.]
[I(ám)]   [bics]   (márch)]   [from (shórt)]   [to (lóng).]
[With a (léap)]   [and a (bóund)]   [the (swift) (Á)]   [na(pèsts) (thróng)].
[(Ône) (sýlla)]   [ble (lóng), with]   [(ône) (shórt) at]   (each) (síde),
[(Am)(phìbra)]   [chys (hástes) with]   [a (státely)]   (stríde);
[(Fírst) and (lâst)]   [(béîng) (lóng),]   [(míddle) (shórt),]   [(Ámphi)(mà]cer)
[(Stríkes) his (thún)]   [der(jing) (hóofs)]   [(like) a (próud)]   [(hîgh)-(brèd) (Rá]cer).
```

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

```
        foot / \             \
               σ σ
```
6. **Cairene Arabic revisited**

- If we use feet, can we modify the analysis from above to deal with these data? What assumptions do we need to make about feet in Cairene?

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

7. **Example: Bedouin Hijazi Arabic**

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

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> 'tied (fem. sg.)'
- mak.túub 'written'
- máa.la.<na> 'our property'
- ?ín.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'
  - /saHábat/ sHá.<bat> 'she pulled'
  - /?ín.kasaR<at/ ?ín.ká.<Rat> 'she got broken'

  *compare to ?ín.ki.<saR>*

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

  - x  
    - x  
    - x  
    - x  
    - ?ín. ka sa <Rat>

- Ideas from the study questions about how to do this without feet? Some of you suggested that maybe the real predictors would be parameter settings in the perfect-grid theory.
8. 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.

Dorsey’s Law: C C V \rightarrow 1 3 2 3
[+son]
1 2 3

/ho+š+waža/ hošawažá ‘be sick’
/hi+kro+ho/ hikorohó ‘prepare, dress (3 sg.)’

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

I know this might seem weird, but: let’s assume that if the final syllable is left unfooted by the
basic stress rule, it can form a (“degenerate”, because too small) foot. But, final stress is deleted
by a late rule if it clashes with a penultimate stress.

In that case, is this word consistent with what we’ve seen so far?

/ha+ra+ki+š+rujik+šnà/ harakíšurujikšnà ‘pull taut (2d)’

Here come the interesting cases:

/ha+ki+rujik+šnà/ hakirújikšnà ‘pulls taut (3d)’
/hi+ra+kro+ho/ hirakórohó ‘prepare’
/maq+š+rač/ maqšarač ‘you promise’
/hi+ra+kro+ho+nirà/ hirakórohônirà ‘prepare, dress (2 d.)’
/wakripuras/ wakiripáras ‘flat bug’

Do the following forms help narrow it down how disyllabic words get stress?

/hö+kwe/ hokewé ‘enter’
/š+wažok/ šawažók ‘mash’

(There is more to this story, and Hayes’ analysis is quite different.)
9. Minimality
McCarthy & Prince 1986 (see them for references): It is common for languages to impose a minimum size on content words.

Estonian (recall from our discussion of the duplication problem): at least two moras—word-final C doesn’t count

/ťänava/ tänav ‘street (nom.sg.)’
/konna/ konnn ‘pig (nom. sg.)’
/kana/ kana (*kan) ‘chicken (nom. sg.)’

Kahnawake Mohawk: at least two syllables

/k+tats+s/ fktats ‘I offer’
/hs+ya?ks+s/ ñhsya?ks ‘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.

Consider Pitta-Pitta, whose words also must be at least two syllables:

káku ‘older sister’
kákila ‘coolamon, car, buggy’
kálakûra ‘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?

10. Other arguments for feet

• Latin enclitic stress (see Kager)—but some of you had other ideas, like the clitic comes with an floating grid-mark for the preceding syllable, or the stress rule that applies after cliticization is different from the earlier stress rule, or that –que is /kue/ instead of /kwe/, or that enclitics are exempt from extrametricality, or that the /k/ is syllabified as a coda just for this morpheme...

• Phenomena in prosodic phonology (reduplication, truncation)—see next quarter, maybe.

• 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 with no secondary stress). See González 2003.

• Expletive infixation (see McCarthy 1982 LI article)


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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.