Overview
- Latin stress revisited
- Segmental constraints
- Homogeneity of target/heterogeneity of process
- The emergence of the unmarked

Latin stress
I was trying to use a definition of NONFINALITY that doesn’t work for Latin. What we need is the following (this follows the original definition of Prince & Smolensky; it’s been controversial, but it works for Latin):

NONFINALITY: the final syllable of a word should be neither stressed nor footed.

[ká.me.ra] shows that NONFINALITY >> ALLFrR, and that TROCHEE >> IAMB

<table>
<thead>
<tr>
<th>/LLL/</th>
<th>TROCHEE</th>
<th>NONFINALITY</th>
<th>ALLFrR</th>
</tr>
</thead>
<tbody>
<tr>
<td>✧ (LL)L</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
</tr>
<tr>
<td>(LL)L</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
</tr>
<tr>
<td>L(LL)</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
</tr>
</tbody>
</table>

[pu.él.la] shows that HEAVY→STRESS is active

<table>
<thead>
<tr>
<th>/LHL/</th>
<th>NONFINALITY</th>
<th>HEAVY→STRESS</th>
<th>ALLFrR</th>
</tr>
</thead>
<tbody>
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<td>(LH)L</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
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<td>✧</td>
<td>✧</td>
<td>✧</td>
</tr>
<tr>
<td>✧ (LH)</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
</tr>
</tbody>
</table>

[má.lum] shows that CUMULATIVITY >> NONFINALITY >> HEAVY→STRESS (similarly for ká.me.rum, a.mí:.kum)

<table>
<thead>
<tr>
<th>/LH/</th>
<th>CUMULATIVITY</th>
<th>NONFINALITY</th>
<th>HEAVY→STRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>✧ (L)</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
</tr>
<tr>
<td>L(H)</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
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<tr>
<td>✧ L</td>
<td>✧</td>
<td>✧</td>
<td>✧</td>
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<td>✧ L(H)</td>
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<td>✧</td>
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</table>

(assume high-ranking RIGHTMOST puts main stress on rightmost foot)
Segmental phonology in OT
So far we’ve seen constraints on syllable structure, and on feet and stress. Constraints that affect things at the root node include...

- constraints on a feature value:
  * [+SPREADGLOTTIS]: active in Korean, which gets rid of aspiration in codas

- constraints on a feature-value combination:
  * [+SONORANT, -VOICE]: arguably active in Polish, where sonorants are exempt from final devoicing

- constraints on local sequences:
  * [+NASAL][-VOICE]: we’ll see this below

These interact with the faithfulness constraints IDENT[F] (a segment must not change its underlying value for the feature [F]), among others.

Target vs. Process
In rule-based phonology, the emphasis is on the processes (rules) that languages share, like...

- deletion
- insertion
- metathesis
- feature-spreading

Little attention is paid to the common targets of these processes (well-formed syllables, good sonority sequencing, etc.).

In OT, the emphasis is on the targets (markedness constraints) that languages share, like...

- avoiding complex onsets and codas
- sonority sequencing

Which process a language uses to achieve the target is determined by the interaction of the markedness constraint with other constraints.

Homogeneity of target
  = languages strive for the same well-formedness conditions on outputs

Heterogeneity of process
  = languages use different means to satisfy the well-formedness conditions
Example: *NC (see paper by Joe Pater on ROA)

*NC is an abbreviation for *[+NASAL][-VOICE]. This constraint seems to have an aerodynamic basis (raising the velum after a nasal → velar leak and ‘velar pumping’ → prolongation of voicing).

What are all the ways we could fix such a sequence?

- **Postnasal voicing /np/ → [mb]**
  Languages that do this: Japanese (but not in mimetics and loans), Puyo Pongo Quechua (only at morpheme boundaries)

  Japanese
  
<table>
<thead>
<tr>
<th>present</th>
<th>past</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ʃin-u</td>
<td>ʃin-da</td>
<td>‘die’</td>
</tr>
<tr>
<td>jom-u</td>
<td>jon-da</td>
<td>‘drink’</td>
</tr>
<tr>
<td>kats-u</td>
<td>kat-ta</td>
<td>‘write’</td>
</tr>
<tr>
<td>kas-u</td>
<td>kat-ta</td>
<td></td>
</tr>
<tr>
<td>wak-u</td>
<td>wai-ta</td>
<td></td>
</tr>
<tr>
<td>ne-ru</td>
<td>ne-ta</td>
<td></td>
</tr>
<tr>
<td>mi-ru</td>
<td>mi-ta</td>
<td>‘look’</td>
</tr>
</tbody>
</table>

  ⇒ *NC >> IDENT[VOICE]

  “Puyo Pongo” Quichua again
  
  | ʃiŋki   | ‘soot’   | tʃuntina | ‘to stir the fire’ |
  | tʃunqa  | ‘ten’     | indi     | ‘sun’             |
  | pampalिणa | ‘skirt’   | ɲuŋkantʃi | ‘we’             |
  | hambi    | ‘poison’  | pundʒa   | ‘day’             |
  | wasi-ta  | ‘house’   | kan-da   | ‘you’             |
  | ajtʃa-ta | ‘meat’    | atan-da  | ‘the frog’        |
  | puru-ta  | ‘gourd’   | wakin-da | ‘others’          |
  | ali-ʃu   | ‘is it good?’ | kan-dʒu | ‘you?’           |
  | lumu-ʃu  | ‘manioc?’  | tijan-dʒu | ‘is there?’ |
  | mana-ʃu  | ‘isn’t it?’ | tʃarin-dʒu | ‘does he have?’ |

  ⇒ IDENT[VOICE]-STEM, *NC >> IDENT[VOICE]

- **Denasalization /np/ → [pp] or [bp]**
  Languages that do this: Magindanaw (only at certain morpheme boundaries), Mandar, Toba Batak, Kaingang.
Magindanaw (Austronesian, 1,000,000 speakers in the Philippines)

\[
\begin{array}{l}
pəm-bəŋun  \text{‘is waking up’} \\
pən-dila  \text{‘is licking’} \\
pəŋ-gəbá  \text{‘is destroying’} \\
pəb-pása  \text{‘is selling’} \\
pəd-sigup  \text{‘is smoking’} \\
pəd-tánda  \text{‘is marking’} \\
pəg-kúpya  \text{‘is wearing a kupia’}
\end{array}
\]

⇒ *NC\textsubscript{g}, IDENT[VOICE], IDENT[NASAL]-STEM >> IDENT[NASAL]

Mandar (Austronesian, 200,000 speakers in Indonesia)

\[
\begin{array}{l}
mat-tunu  \text{‘to burn’} \\
man-dundu  \text{‘to drink’}
\end{array}
\]

(also forbids NC\textsubscript{g} sequences morpheme-internally)

⇒ *NC\textsubscript{g}, IDENT[VOICE] >> IDENT[NASAL]-STEM, IDENT[NASAL]

The two languages differ on whether the denasalized consonant is voiced or voiceless. Could be a difference between IDENT[VIBRATINGVOCALFOLDS] and IDENT[ACTIVEVOICING].

- **Coalescence** /np/ → [m]
  Languages that do this: Indonesian and many related languages (only at morpheme boundaries). This violates a constraint called UNIFORMITY: two separate input segments must not coalesce into a single output segment.

⇒ IDENT[NASAL], IDENT[VOICE], *NC\textsubscript{g} >> UNIFORMITY

(again, we have to be careful about how we deal with [voice])

- **Nasal deletion** /np/ → [p]
  Languages that do this: Kelantan Malay, Venda, Maore, Swahili

⇒ UNIFORMITY, IDENT[NASAL], IDENT[VOICE] *NC\textsubscript{g} >> MAX-C

It’s always the nasal that deletes, perhaps because of MAX-C\_V

- **Epenthesis** /np/ → [nəp]
  Apparently unattested.
  UNIFORMITY, IDENT[NASAL], IDENT[VOICE], MAX-C, *NC\textsubscript{g} >> DEP-V
• **Devoice the nasal** /ŋp/ → [ŋp]
  Apparently unattested.

If *NC is really a constraint against the extra articulatory effort of spreading the vocal folds to prevent voicing, then a devoiced nasal is an even worse violation of that same constraint, so it makes sense that this is unattested.

• **Live with it** /ŋp/ → [ŋp]
  English and many other languages.

⇒ **UNIFORMITY, IDENT[NASAL], IDENT[VOICE], MAX-C, DEP-V >> *NC**

**What’s at the bottom of the grammar?**
Two ways of designing a constraint-based framework:

1. List all the constraints that must be absolutely obeyed for a given language. Other constraints play no role and are freely violated.

2. Crucially rank constraints: some are undominated (always true); some are so low-ranked that they play no role; some are crucially dominated (not surface-true), but still active.

OT chooses option #2, so it’s important to find examples of constraints that are disobeyed in some circumstances, but assert themselves when they get the chance.

Such examples illustrate The Emergence of the Unmarked (“TETU”) (when the constraint in question is a markedness constraint), and people get very excited about them. A major contribution of OT has been to cause researchers to notice many new examples of TETU.

**Example: Timugon Murut**
(Austronesian, about 8,000 speakers in Malaysia)

**ONSET is abundantly violated, even irrelevant, in most words:**

<table>
<thead>
<tr>
<th>am.bi.lú.o</th>
<th>‘soul’</th>
</tr>
</thead>
<tbody>
<tr>
<td>nan.sú.i</td>
<td>‘slanting from vertical’</td>
</tr>
<tr>
<td>ló.go.i</td>
<td>‘the price’</td>
</tr>
</tbody>
</table>

\[
\begin{array}{|c|c|c|c|c|}
\hline
 \text{/logoi/} & \text{DEP} & \text{IDENT[SYLL]} & \text{MAX} & \text{ONSET} & \text{NoCODA} \\
\hline
 a & [lo.go.i] & \text{*} & \text{*} & \text{*} & \text{*} \\
 b & [log.o.i] & \text{**(!)} & \text{*(!)} & \text{*} & \text{*} \\
 c & [lo.go.?i] & \text{*!} & \text{*!} & \text{*} & \text{*} \\
 d & [lo.goj] & \text{*!} & \text{*!} & \text{*} & \text{*} \\
 e & [lo.go] & \text{*!} & \text{*!} & \text{*} & \text{*} \\
\hline
\end{array}
\]
But look at where the reduplicant goes:

bulud  ‘hill’  bu-bulud  ‘ridge’
limo  ‘five’  li-limo  ‘about five’

\textit{REDUPLLEFTMOST} = \texttt{ALIGN(REDUPPLICANT, L, WORD, L)}: count one violation for every segment that separates the left edge of the reduplicant from the left edge of the word.

\begin{tabular}{|c|c|}
\hline
/RED+limo/ & REDUPLLEFTMOST \\
\hline
\textit{a} [li.li.mo] & **!  \\
\textit{b} [li.mo.mo] & **!  \\
\hline
\end{tabular}

abalan  ‘bathes’  a-\textbf{ba}-balan  ‘often bathes’
ulampoj  ‘?’  u-\textbf{la}-lampoj  ‘?’

\begin{tabular}{|c|c|c|}
\hline
/RED+ulampoj/ & ONSET & REDUPLLEFTMOST \\
\hline
\textit{a} [u.u.lam.poi] & **!  &  \\
\textit{b} [u.la.lam.poi] & *  & *  \\
\textit{c} [u.lam.po.poi] & *  & **!  \\
\hline
\end{tabular}

We can’t describe the situation here in terms of simple parameters ([+ONSET] vs. [-ONSET]). Rather, ONSET is outranked by many faithfulness constraints, but still outranks REDUPLLEFTMOST.

\textbf{Example: Gnanadesikan’s 3-year-old daughter, “G”}
Consonant clusters simplify in favor of the least sonorous C:

\begin{tabular}{ll}
\textit{adult} & G  \\
\hline
klin  & kin  ‘clean’  \\
d\textacuten  & d\textacuten  ‘draw’  \\
skai  & gai  ‘sky’  \\
st\textacuten  & d\textacuten  ‘straw’  \\
sno\textacuten  & so  ‘snow’  \\
slip  & sip  ‘slip’
\hline
\end{tabular}

This reflects segment-syllable interface constraints also seen in adult languages that prefer onsets and codas (“margins”) to be as nonsonorant as possible:

\texttt{*MARGINV >> *MARGINGLIDE >> *MARGINLIQUID >> *MARGINNASAL >> *MARGINFRIC >> *MARGINSTOP}
Clusters with a sonorant labial coalesce instead, retaining labial place and the other C’s manner:

<table>
<thead>
<tr>
<th>adult</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>t̠ai</td>
<td>pi</td>
</tr>
<tr>
<td>kw̠aıt</td>
<td>pət</td>
</tr>
<tr>
<td>str̠eŋ</td>
<td>buŋ</td>
</tr>
<tr>
<td>sm̠el</td>
<td>fəw</td>
</tr>
<tr>
<td>sw̠ɛrɔ̞</td>
<td>fərɔ̞</td>
</tr>
</tbody>
</table>

Sequences of labial+round vowel, or labial…labial are generally allowed (in violation of OCP)

<table>
<thead>
<tr>
<th>adult</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>.um</td>
<td>wum</td>
</tr>
<tr>
<td>blu</td>
<td>bu</td>
</tr>
</tbody>
</table>

But coalescence is blocked if it would violate OCP:

<table>
<thead>
<tr>
<th>adult</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>d̠o</td>
<td>dɔ</td>
</tr>
<tr>
<td>st̠o</td>
<td>dɔ</td>
</tr>
<tr>
<td>g̠au</td>
<td>gou</td>
</tr>
<tr>
<td>grænma</td>
<td>gæmə</td>
</tr>
<tr>
<td>d̠ap</td>
<td>dap</td>
</tr>
<tr>
<td>ais k̠im</td>
<td>ais kim</td>
</tr>
</tbody>
</table>

Next time
- Practice with stress and segmental phenomena in OT

For next time (Wed., April 24)
- Project abstracts due

Remember, 2nd exam is in a week (Monday, April 29).