Typology of stress systems

February 27, 2012

Review

• Stress: basic facts
  – Prominence of syllables
  – Phonetically realized in many different ways across languages, but often thought to be a single system nevertheless
  – If we can find cross-linguistic commonalities in how stress systems work, we can support this intuition

• Started with English stress: basic facts
  – Surprising amount of regularity that native speakers know about, despite frequent complaints that English stress is “unpredictable”
  – Q1: where do stresses go (ignoring primary/secondary/etc)?
  – Procedural. First step:
    ✷ Nouns:
      · Last syllable (ultima) if tense; otherwise:
      · Second-last syllable (penult) if tense; otherwise:
      · Second-last syllable (penult) if there are at least two consonants following the vowel; otherwise:
        · Third-last syllable (antepenult)
    ✷ Verbs: similar to nouns, except everything that took place with respect to the second-last syllable now takes place with respect to the last
      · —
        · Last syllable (penult) if tense; otherwise:
        · Last syllable (penult) if there are at least two consonants following the vowel; otherwise:
        · Second-last syllable (antepenult)
  – Second step (recursive):
    ✷ With respect to an existing stress (one we’ve already “placed”), place a stress:
      · Two syllables before if tense; otherwise:
      · Two syllables before if there are at least two consonants following the vowel; otherwise:
Three syllables before

- **Q2:** How prominent are stresses wrt to each other?
  - Primary stress for verbs:
    - **Last stress** (usually)
  - Primary stress for non-verbs:
    - **Second last stress** if the last stress is on the last syllable and there are two stresses
    - **Last stress** otherwise
  - Some exceptions mostly associated with particular affixes and pseudo-affixes: *fricassee, di-vorcee, absentee, Tennessee*, // *affair, corsair, debonair*, // *engineer, lavalier, chandelier*, // *guitar, bizarre, cigar*, // *flambeau, chateau, portmanteau*
  - Some distinctions between various secondary levels of stress?

- **Vowel reduction** applies to unstressed vowels
  - Interesting exception driven by morphology
    - Contrasts like *orch@strati@n*/infEstati@n
    - Same stress, different reduction pattern
    - Explanation: the verb gets a stress, so the derived noun gets protected from reduction there
  - Some complications with +tense vowels: sometimes they get reduced (as in *explanation*), oftentimes they don’t (*psychology, gargoyle*)
    - Don’t reduce tense vowels in initial position
    - Second syllable of *gargoyle* actually has secondary stress (consider first clause above; only issue is why the “alternating” stress goes on the first syllable, different theories handle this in different ways)
    - LP77 seem to have some trouble putting this together with the “infestation” facts

- **Theories:**
  - **SPE:**
    - Use the positional stress placement rules to determine stress and have enough of them so that they can apply several times
    - Determine relative prominence by how many times they’ve applied to a particular syllable
  - **LP77:**
    - Use the positional stress placement rules to determine stress (get better coverage by having them apply recursively)
    - Determine relative prominence by separate principles that just look at the pattern of stresses

- **Insights:**
  - **Stress placement:**
    - Sensitive to tenseness of the vowel, how many consonants follow the vowel (*quantity-sensitive*)
    - Every two syllables, kind of (kind of like *binary*)
    - Ignores the last syllable, kind of (kind of like *extrametricality*)
    - Starts on the right (*right-to-left*)
  - **Relative prominence:**
SPE: The “rules” behind where the relative prominence is are actually encoded in the ordering of the rules

- Disadvantage: If there are multiple stresses then generally the only way of getting the prominence of the final stress is by having multiple cycles, or by having alternating stress assigned by the “wrong” rule, e.g. Monongahela

* Insight of LP77 theory:
  - Stress placement rules implicitly group syllables while relative prominence rules group stresses
  - The rules are different: the feeding relation between repeated applications of the “place stress” rule does not match the relative prominence rule (in fact, it’s usually the opposite!)
  - If you don’t care about (questionable) tertiary and quaternary stresses, then you can get a very simple statement of the pattern out of some rules for grouping stresses (they encode these as tree-building principles

  - Reduction: applies to unstressed syllables, some interesting effects of cyclic derivation

- Today: the same things come up again in other languages

**Jeff Heinz’s Stress Pattern Database**


**Even or odd**

For the moment let’s look at languages that have binary alternating stress patterns. It turns out there are a lot! Maranungku (i2@1L: 39 languages marked with this pattern, though not necessarily to the exclusion of others)

<table>
<thead>
<tr>
<th>Respective Stress Pattern</th>
<th>Word</th>
<th>Syllable Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>tīralk</td>
<td>C V CVCC</td>
</tr>
<tr>
<td>3</td>
<td>mērepèt</td>
<td>C V CVC V C</td>
</tr>
<tr>
<td>4</td>
<td>yángarmàta</td>
<td>C V CVC 2 CV</td>
</tr>
<tr>
<td>5</td>
<td>lángkaràtetì</td>
<td>C V CCVC V CVC 2</td>
</tr>
<tr>
<td>6</td>
<td>wélepènèmánta</td>
<td>C V CVC V CVC CCV</td>
</tr>
</tbody>
</table>

Araucanian (i2@2L: 5 languages marked with this pattern, though not necessarily to the exclusion of others)

<table>
<thead>
<tr>
<th>Respective Stress Pattern</th>
<th>Word</th>
<th>Syllable Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>wulé</td>
<td>CVC 1</td>
</tr>
<tr>
<td>3</td>
<td>tipánto</td>
<td>CVC V CCV</td>
</tr>
<tr>
<td>4</td>
<td>elúmuyù</td>
<td>CVC 1 V CVC 2</td>
</tr>
<tr>
<td>5</td>
<td>elúaènew</td>
<td>CVC 1 V V CVC 2</td>
</tr>
<tr>
<td>6</td>
<td>kimúbalùwulày</td>
<td>CVC 1 V CVC 2 CVC 2</td>
</tr>
</tbody>
</table>
Left or right

For now let’s ignore which end the main stress is on. Consider that, if we are going to be dealing with even or odd, it probably matters where we start counting. Let’s look at some patterns that look similar to the previous two.

Weri (i2@1R: 9 languages marked with this pattern, though not necessarily to the exclusion of others)

2  njintíp “bee” CVCC V C
3  kùlipú “arm hair” C V CVC V
4  ulùamít “mist” VC V VC V C
5  àkunètepál “times” ² V CVC ² V CVC ² V C

Warao (Ura) (i2@2R: 29 languages marked with this pattern, though not necessarily to the exclusion of others)

2  tíra “woman” C ¹ V CV
3  koránu “drink it!” CVC V CV
4  rùhunáe “he sat down” C ² V CVC ¹ V V
5  yiwàranáe “he finished it” VC V CVC ¹ V V
6  (no examples)
7  
8  yàpurùkitàneháse “verily to climb” ² V CVC ² V CVC ² V CVC ² V CVC V CV
9  enàhoròahàkutái “the one who caused him to eat” VC V CVC ² V CVC ² V VC ² V CVC ¹ V V

Now—which language looks like which? What if we remove the numbers?

<table>
<thead>
<tr>
<th>Maranungku</th>
<th>Araucanian</th>
<th>Weri</th>
<th>Warao</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 ¹ V V</td>
<td>¹ V V</td>
<td>¹ V V</td>
<td>¹ V V</td>
</tr>
<tr>
<td>3 ¹ V V</td>
<td>² V V</td>
<td>² V V</td>
<td>² V V</td>
</tr>
<tr>
<td>4 ¹ V V ² V</td>
<td>¹ V V</td>
<td>² V V</td>
<td>² V V</td>
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<tr>
<td>5 ¹ V V ² V</td>
<td>² V V</td>
<td>² V V</td>
<td>² V V</td>
</tr>
<tr>
<td>6 ¹ V V ² V</td>
<td>¹ V V</td>
<td>² V V</td>
<td>² V V</td>
</tr>
</tbody>
</table>

Stress placement rules

Can we come up with some recursive (LP77-type) stress placement rules to handle these four cases? Again, don’t worry about relative prominence for now.

A simplified version of the metrical tree theory

Recall that we constructed a metrical tree, with each node marked as s or w so that we could read columns of s syllables off of it. What we got in the end was a grid. Now we are going to pare that theory down a bit
to get the basics of the *metrical grid* theory. The stresses we just marked form the basic line of a grid (say of x’s)—typically called Line 1 (there is also usually a Line 0, but it is almost always just one mark for each syllable—and, simplifying, we’ve been just thinking of “vowels” instead of syllables—and we can continue to do so for current purposes). Now to find the main stress we apply one of two rules:

1. \[
\frac{2}{1} \ x \rightarrow \ 
\begin{array}{c}
x \\
x
\end{array}
/ \ # \ (Left \ end \ rule)
\]

2. \[
\frac{2}{1} \ x \rightarrow \ 
\begin{array}{c}
x \\
x
\end{array}
/ \ # \ (Right \ end \ rule)
\]

**Primary stress**

It would be interesting if the primary stress end always aligned with the end that we started placing stress on. Usually, this is true. But not always. Is the following language left-to-right or right-to-left? Even or odd?

**Malak-Malak**

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<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>wúru</td>
<td>“arm”</td>
<td>CV CV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>melpápu</td>
<td>“father”</td>
<td>CVCC CV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>múnankàra</td>
<td>“beautiful”</td>
<td>C CV CC VC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>arkíniyàŋka</td>
<td>“we are all going to stand”</td>
<td>VCC VC VC CC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>nénkøerënøyůŋka</td>
<td>“you pl will lie down”</td>
<td>C CCVC CC VC CC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>wuwúntunùnuwàkna</td>
<td>“he would have given you sg meat”</td>
<td>CVC CCVC CC VC CC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>nùŋkurùntuwòròwàkka</td>
<td>“you pl would have given them meat”</td>
<td>C CCVC CC VC CC CC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This language is extremely unusual, however. A generalization that has been arrived at is that languages tend to like to have main stress placed a consistent number of syllables from the word edge. But this can’t really be true, because the main stress in English doesn’t obey this at all.

**Another dimension**

**Aklan:** What’s going on here? What kind of stress assignment rule would you write? What would you do in the grid? What is the problem?

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</thead>
<tbody>
<tr>
<td>pitú</td>
<td>“seven”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>suyúd</td>
<td>“room”</td>
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<tr>
<td>bítbit</td>
<td>“carry”</td>
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<tr>
<td>hámbəy</td>
<td>“speak”</td>
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<tr>
<td>gástà</td>
<td>“spend”</td>
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<tr>
<td>bisá</td>
<td>“kiss”</td>
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<tr>
<td>pàligús</td>
<td>“bathe”</td>
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<tr>
<td>?ásírtər</td>
<td>“lucky”</td>
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<tr>
<td>suyúgùúŋ</td>
<td>“servant”</td>
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<tr>
<td>?atùbaŋján</td>
<td>“genitals”</td>
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</tr>
<tr>
<td>màpanjìsdə?</td>
<td>“will go fishing”</td>
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</tr>
<tr>
<td>màgmayáŋhùd</td>
<td>“more than two siblings”</td>
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</tr>
</tbody>
</table>