1 Review of Metrical Parameters

- **Last Time:** Metrical Parameters for Foot-Construction

1. **Foot Size**
   - (i) Bounded
   - (ii) Unbounded
   \[ \implies \text{Bounded feet are usually minimally binary, under either a moraic or syllabic analysis:} \]

   (1) Epenthesis in Levantine Arabic (Broselow 1995)
   a. /sʔal/ [sʔaal] ‘ask\textsubscript{MASC.SG}’
   b. /drus/ [idrus] ‘study’

2. **Foot Headedness**
   - (i) Right-Dominant
   - (ii) Left-Dominant

   Iamb (Iambic Foot)  
   \[ \sigma \sigma \]

   Trochee (Trochaic Foot)  
   \[ \sigma \]

3. **Directionality**
   - (i) Right-to-Left
   - (ii) Left-to-Right
   \[ \text{Left} \rightarrow \text{Right} \]
   \[ (\sigma \sigma) (\sigma \sigma) \sigma \]

   \[ \text{Left} \leftrightarrow \text{Right} \]
   \[ \sigma (\sigma \sigma) (\sigma \sigma) \]

- **Word Headedness**
  - (i) Right-Dominant
  - (ii) Left-Dominant

5. **Extrametricality**
   - (i) None
   - (ii) Right
   - (iii) Left

6. **Quantity Sensitivity**
   - (i) Quantity-Insensitive
   - (ii) Quantity-Sensitive: Long Vowels
   - (iii) Quantity-Sensitive: Long Vowels and Closed Syllables

   \[ \rightarrow \text{In addition to stress being drawn to long vowels, there is also a tendency for stressed vowels to lengthen} \]

- **In OT:** Parameters are, of course, formalized as **violable constraints**!

2 Metrical Parameters as OT Constraints

- **Observation:** No language employs contrastive metrification (i.e., the process of parsing syllables into feet)$^1$

  \[ \text{eg.} \ (\sigma \sigma) (\sigma) \text{ VS } (\sigma)(\sigma \sigma) \]

- **Conclusion:** Foot structure is not present in underlying representations

- **I.e.,** metrification is derived via constraint interactions

- **So why have feet at all?**

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$^1$Most linguists assume the same for syllabification, although there are controversial cases.
• **Note:** Stress patterns like (\(\acute{o}\)\(\tilde{o}\) \(o\)) dispreferred cross-linguistically:

(3) **CLASH:** No stressed syllables are adjacent

• So how do we derive the different kinds of foot structure?

### 2.1 Foot-Headedness

- **Observation:** Feet have heads\(^2\)

(4) **HEADEDNESS (Ft):** Every foot is headed by a syllable

\[
\begin{align*}
\text{Iambic Foot } & \checkmark \\
\text{Trochaic Foot } & \checkmark \\
\text{Headless Foot } & \times
\end{align*}
\]

- This rules out headless feet like (\(o\sigma\))

\[
\begin{align*}
\sigma & \sigma \\
\sigma & \sigma \\
\sigma & \sigma
\end{align*}
\]

- Whether or not a language has iamb or trochee depends on the relative ranking of:

(5) **RhType=I:** Feet have final prominence  
**RhType=T:** Feet have initial Prominence

- **Student Question:** How could you formalize iamb and trochee in terms of generalized alignment?

- The traditional terms iamb and trochee refer to bisyllabic feet, but the above constraints don’t place any restriction on foot size

\(^2\)Well, some people have argued for headless feet as well. Kager 1999 gives a footnote citing Crowhurst & Hewitt 1995, and also cites Bye 1996 as arguing for double-headed feet.

### 2.2 Foot Size

- Another constraint to encode **FOOT-BINARITY**

(6) **Fr-Bin:** Feet are binary under moraic or syllabic analysis i.e., a foot must either contain two moras (H or LL), or two syllables (\(o\sigma\))

<table>
<thead>
<tr>
<th>(\text{L: Quantity Sensitive} )</th>
<th>(\text{L: Quantity-Insensitive} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{H Foot } \checkmark )</td>
<td>(\text{LL Foot } \checkmark )</td>
</tr>
<tr>
<td>(\phi )</td>
<td>(\phi )</td>
</tr>
<tr>
<td>(\sigma )</td>
<td>(\sigma )</td>
</tr>
<tr>
<td>(\mu )</td>
<td>(\mu )</td>
</tr>
<tr>
<td>(\phi )</td>
<td>(\phi )</td>
</tr>
<tr>
<td>(\sigma )</td>
<td>(\sigma )</td>
</tr>
<tr>
<td>(\sigma )</td>
<td>(\sigma )</td>
</tr>
</tbody>
</table>

- This constraint bans **DEGENERATE FEET** - i.e., a single light syllable as a foot

- It also rules out ternary, quaternary, ...n-ary (where \(n > 2\)) feet eg., (\(\acute{o}\sigma\sigma\)) (\(\tilde{o}\sigma\sigma\))

### 2.3 Word-Headedness

- Why bother have a level of prosodic word (primary vs secondary stress)?

(7) **GrWd=PrWd:** A grammatical word must be a prosodic word

- Words also have heads:

(8) **HEADEDNESS (PrWd):** Every PrWd is headed by a foot

\[
\text{(Assign a violation for every PrWd not headed by a foot)}
\]

- Whether or not the head of the word is the rightmost or leftmost foot depends on the relative ranking of:
### 2.4 Directionality

- Outside of a rule-based system, directionality is not a real phenomenon, but an artifact of interacting constraints
- L-to-R and R-to-L parsing of syllables depends on the relative ranking of:

\[
\text{(9) Leftmost: The head foot is leftmost in PrWd} \\
\text{(ALIGN(HD-Ft, L, PrWd, L))}
\]

\[
\text{Rightmost: The head foot is rightmost in PrWd} \\
\text{(ALIGN(HD-Ft, R, PrWd, R))}
\]

- **Student Question:** How would violations of **Leftmost** and **Rightmost** be assessed?

#### (10) All-Ft-Left: = (ALIGN(Ft, L, PrWd, L))
Assign a violation for every syllable between the left edge of a foot and the left edge of the PrWd

**All-Ft-Right:** = (ALIGN(Ft, R, PrWd, R))
Assign a violation for every syllable between the right edge of a foot and the right edge of the PrWd

- **Note:** “Directionality” is only an issue with bounded feet (i.e., cases where Ft-Bn is highly ranked), and cases with an uneven number of syllables

### 2.5 Extrametricality

- **Student Question:** What is the optimal candidate if Ft-Bn is ranked below All-Ft-L and/or All-Ft-R?

### (11) Non-Finality: No prosodic head is final in PrWd

- If this outranks Parse-Syll, we derive word-final invisibility
2.6 Quantity Sensitivity

- The **Weight-to-Stress Principle** can be reformulated as a constraint

\[
\text{WSP:} \quad \text{Heavy syllables are stressed}
\]

- Languages with a high-ranking WSP are quantity sensitive
- Syllables with V: nuclei always count as heavy (µµ); whether or not closed syllables count as heavy depends on:

\[
\text{Weight-By-Position:} \quad \text{Coda consonants are moraic}
\]

- If this outranks **Dep-IO(µ)**, then coda consonants will always be moraic

\[
\text{Dep-IO(µ):} \quad \text{Moras in the output have a correspondent in the input.}
\]

- The observation that stress often leads to weight-gain can be formalized by constraints like:

\[
\text{Uneven Iamb:} \quad (\text{LH}) \gg (\text{LL}), (\text{H}) \\
\text{(Assign a violation to (LL) and (H) feet)}
\]

- This likewise interacts with **Dep-IO(µ)**
- **Student Exercise:** Assess the violations in the following tableau to determine the optimal candidate

<table>
<thead>
<tr>
<th></th>
<th>RH-Type=I</th>
<th>Uneven-Iamb</th>
<th>Dep-IO(µ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>kᵉµ.taµ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>keµ.taµ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>kᵉµ.taºµμ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>keµ.taºµμ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.6.1 Note on Moras and Underlying Representations

- **Question:** Are moras present in underlying representations?
- Or are moras, like syllable and feet, derived via constraint interaction?

**Hypothesis 1:** Every segment is assigned a mora underlyingly; moras are lost or shared in output forms\(^a\) (Hyman 1985)

\(^a\)Rephrased in OT terms.

**Hypothesis 2:** Long vowels and geminate consonants have underlying moras; all other moras derived. (McCarthy & Prince 1988)

**Hypothesis 3:** Long vowels and geminate consonants underlying have two moras; short vowels with one mora. All other moras are derived. (Hayes 1989)

- The literature has largely adopted Hayes 1989’s approach as the standard moraic theory
- i.e., there are underlying moras, but moraic codas and stress-induced weight-gain are due to interacting constraints
3 Exercises

What constraint rankings would you use to account for the data sets we analyzed in terms of parameters last week?

(16) Maranungku Stress

a. táralk
b. mérépèt
c. yángarmàta
d. lángkarâtëti
e. wélépènemànta

(17) Weri Stress

a. nmtíp
b. kólîpó
c. ulômît
d. ákunêtepál

(18) Warao Stress

a. yiwaranàé
b. yápurûkikàneháse
c. nàhorôahâkutái
d. enàhorôahâkutái

References


