Feet are parametric
even in languages with stress

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Goal: To show that Portuguese has lexical stress, but no feet

1. Word-minimality
2. Indeterminacy of foot types
3. Antepenultimate weight effects

Despite surface similarities between Portuguese and English stress, the systems are formally very different
Stress in non-verbs:

- Right-to-left moraic trochees + final syllable extrametricality
  
  \[\text{agenda} \left[ \theta_{\mu} (\widetilde{d\varepsilon_{\mu} n_{\mu}})_{\text{Ft}} \langle d\varepsilon_{\mu} \rangle \right]_{\text{PWd}}\]
  
  \[\text{Canada} \left[ (\widetilde{k\varepsilon_{\mu} n\varepsilon_{\mu}})_{\text{Ft}} \langle d\varepsilon_{\mu} \rangle \right]_{\text{PWd}}\]

- Binary feet also regulate minimal word size
  
  \[\text{chemistry} \rightarrow [k\varepsilon m], *[k\varepsilon]\]
  
  \[\text{Elizabeth} \rightarrow [l\acute{I}z], *[l\acute{l}]\]

- No subminimal \((CV_{\mu})\) lexical words
  
  Truncation and hypocorization never result in \((CV_{\mu})\)
  
  \textit{Lexical words must contain one binary foot}  
  
  (McCarthy and Prince 1986)
Stress in non-verbs:

- Right-to-left moraic trochees capture regular stress patterns

  \[
  \textit{papel} \left[ \text{\textipa{pa$_\mu$ (\textipa{pe$_\mu$}1$_\mu$)$_{Ft}$}} \right]_{PWd} \quad \text{‘paper’}
  \]

  \[
  \textit{sapato} \left[ \text{\textipa{sa$_\mu$ (\textipa{pa$_\mu$} to$_\mu$)$_{Ft}$}} \right]_{PWd} \quad \text{‘shoe’}
  \]

- But subminimal words tolerated & generated productively

  \[
  \textit{pá} \left[ \text{\textipa{pa}} \right] \quad \text{‘shovel’}
  \]

  \[
  \textit{dou} \to \left[ \text{\textipa{do}} \right] \quad \text{‘(l) give’}
  \]

  \[
  \textit{Fernanda} \to \left[ \text{\textipa{fe}} \right]
  \]

- \( \approx 70\% \) of possible CV words are real words
Portuguese

**Stress in non-verbs:**

- Regular stress: ́H] or ́XL]  
  - *papél* ‘paper’, *sapáto* ‘shoe’

- Exceptional stress:
  - ́LÍ] (3%)  
    - *cáf é* ‘coffee’
  - ́XH] (11%)  
    - *nível* ‘level’
  - ́XXX] (12%)  
    - *patético* ‘pathetic’

This has led authors to propose **different** foot types:

- Trochees
- Trochees and iambs
- Trochees, iambs, and dactyls

*See Garcia 2017*
Proposal
Stress without feet

- Aside from extrametalricity, Portuguese stress $\sim$ English stress

  But two important differences:
  1. Violations of word-minimality
  2. Indeterminacy of foot type

- 1-2 challenge the presence of the foot in Portuguese
Proposal
Stress without feet

Today: a third difference

3. Antepenultimate weight effects on stress
   Weight effects seal the fate against the foot in Portuguese and further motivate it in English
Weight effects in antepenultimate (APU) syllables

- APU stress in 12% of Portuguese non-verbs
  Previous studies: exceptional extrametricality (Bisol 1992)

  \( \text{patético} \ [\text{pa}_\mu (\text{te}_\mu \text{ti}_\mu)\langle k\text{o}_\mu \rangle] \) 'pathetic' (LLL)

  \( \text{fósforo} \ [\text{(f}s\mu s\mu f\text{o}_\mu)\langle r\text{o}_\mu \rangle] \) 'match (n)' (HLL)

- Weight effects problematic in APU position:
  marked metrical structure unavoidable
  - \( \text{HLL} \rightarrow (\text{HL})\langle \text{L} \rangle \) (uneven trochee)
  - \( \text{HLL} \rightarrow (\text{H})\text{L}\langle \text{L} \rangle \) (medial un footed syllable)
Weight effects in antepenultimate (APU) syllables

Trisyllabic shortening

▶ English

\begin{align*}
\text{sane} & \rightarrow \text{sanity} & \left[\text{'se}_\mu \text{n}_\mu \text{ti}_\mu\right], \left[\text{'s}_\mu \text{n}_\mu \text{ti}_\mu\right] \\
\text{serene} & \rightarrow \text{serenity} & \left[\text{s}_\mu \text{rn}_\mu \text{ti}_\mu\right], \left[\text{s}_\mu \text{r}_\mu \text{n}_\mu \text{ti}_\mu\right]
\end{align*}

Shortening results in more complete parse of the word into feet

ificação  em antepenúltimas (APU) sílabas

Trisílabas de curto

▶ Português

\begin{align*}
\text{sane} & \rightarrow \text{sanidade} & \left[\text{'se}_\mu \text{n}_\mu \text{ti}_\mu\right], \left[\text{'s}_\mu \text{n}_\mu \text{ti}_\mu\right] \\
\text{serene} & \rightarrow \text{serenidade} & \left[\text{s}_\mu \text{rn}_\mu \text{ti}_\mu\right], \left[\text{s}_\mu \text{r}_\mu \text{n}_\mu \text{ti}_\mu\right]
\end{align*}

Acurtamento resulta em uma análise mais completa da palavra em pés

No similar process observed in Portuguese
Weight effects in APU syllables

Predictions

- If Portuguese builds feet:
  Should not find HLL $\succ$ LLL
  I.e.: Weight-sensitivity should not be present in APU syllables

- If Portuguese doesn’t build feet:
  Weight-sensitivity should not be blocked in APU σs
  (weight effects present in final and penult σs)

Which profile – HLL or LLL – do native speakers favor?
How do Portuguese and English compare?
Experimental design

- Two forced-choice auditory tasks involving nonce words
  Speakers of Br. Portuguese \((n = 27)\) and English \((n = 13)\)
  Minimal pairs of nonce words with different stress location
    - Antepenultimate vs. penultimate stress
    - Portuguese \((n = 240^{1})\) English \((n = 180)\)

Three weight profiles: **LHL, HLL, LLL**

<table>
<thead>
<tr>
<th>Pt</th>
<th>En</th>
</tr>
</thead>
<tbody>
<tr>
<td>[gu.pla.ro] (LLL)</td>
<td>[kim.es@r] (LLL)</td>
</tr>
<tr>
<td>[bron.da.le] (HLL)</td>
<td>[lm.se.k@f] (HLL)</td>
</tr>
<tr>
<td>[bo.gren.da] (LHL)</td>
<td>[tε.prim.k@l] (LHL)</td>
</tr>
</tbody>
</table>

\(^{1}\) Also included penult vs. final stress
Experimental design

“Which of these two words sounds more natural?”

[ki.me.sər]  [ki.'me.sər]
Experimental results and analysis

▶ Hierarchical logistic regressions using Stan in R (Carpenter et al. 2017)

response ~ weight +
(1 + weight | speaker) +
(1 | word)

By-speaker random effect + by-item random intercept
Experimental results and analysis

Effects relative to baseline (intercept = LLL)

Posterior distr. + 50% and 95% Highest Density Intervals

English weight effects:
\[ HLL \sim LLL \]

Portuguese weight effects:
\[ HLL \succ LLL \]

Positive distributions → preference for APU stress rel. to LLL
Discussion and conclusion

**English**: consistent with **foot-based** approach

- Weight effects regulated by moraic trochees + $\langle \sigma \rangle_{PWD}$
  - $\text{HLL} \sim \text{LLL}$
  - No subminimal words

**Portuguese**: consistent with **footless** approach

- Weight effects not regulated by footing
  - $\text{HLL} \succ \text{LLL}$
  - Subminimal words

**Are there other languages like Portuguese?**
Discussion and conclusion

French

- Stress at the right edge of the **phrase**, not word
  
  $[\text{lœ grã gar'sõ}], \ast[\text{lœ 'grã gar'sõ}]$ ‘the big boy’

- Subminimal words freely tolerated

  - Lexical words
    
    *lait* $[\text{lɛ}]$ ‘milk’
  
  - Truncation
    
    *chimie* $\rightarrow [\text{ʃi}]$ ‘chemistry’
  
  - Hypocorization
    
    *Myriam* $\rightarrow [\text{mi}]$

- It has been proposed that **French is footless** (Jun and Fougeron 2000)

- Portuguese more like French than like English
Thank you!

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References I


