The plausibility of feet in two stress languages

Guilherme D. Garcia\textsuperscript{1} and Heather Goad\textsuperscript{2}

\textsuperscript{1}Université Laval, \textsuperscript{2}McGill University

\texttt{guilherme.garcia@lli.ulaval.ca} \quad \texttt{heather.goad@mcgill.ca}

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(Brazilian) Portuguese and English have similar stress patterns (primary and secondary)

- Only English offers strong evidence for metrical feet

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

- Despite surface similarities between the two languages, the systems are formally different
Stress in non-verbs:

- Right-to-left moraic trochees + final syllable extrametricality

\[ \text{agenda} \left[ \varepsilon_{\mu} \left( \widehat{d_{\xi}} \varepsilon_{\mu} n_{\mu} \right) \text{Ft} \left( d_{\varnothing} \right) \right]_{\text{PWD}} \quad \text{Canada} \left[ \left( k_{\varepsilon_{\mu}} n_{\varepsilon_{\mu}} \right) \text{Ft} \left( d_{\varnothing} \right) \right]_{\text{PWD}} \]

- Binary feet also regulate minimal word size

\[ \text{chemistry} \rightarrow [k_{\varepsilon_{\mu}}], *[k_{\varepsilon}] \quad \text{Elizabeth} \rightarrow [l_{\varepsilon_{\mu}}], *[l_{\varepsilon}] \]

No subminimal \((CV_{\mu})\) lexical words

Truncation and hypocorization never result in \((CV_{\mu})\)

In line with notion that lexical words must contain \(\geq 1\) binary foot

(McCarthy and Prince 1986)
Stress in non-verbs:

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

\[
papel \left[ pa_\mu \left( \text{pE}_\mu \text{l}_\mu \right)_\text{Ft} \right]_{\text{Pwd}}
\]

\[
sapato \left[ sa_\mu \left( \text{p}_\mu \text{to}_\mu \right)_\text{Ft} \right]_{\text{Pwd}}
\]

Subminimal words tolerated & generated productively

Lexical words

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

Hypocorization

\[
Fernanda \rightarrow [fe]
\]

≈70% of possible CV words are real words
Stress in non-verbs:

- Regular stress: [HI] or [XL]
- Exceptional stress:
  - [LI] (3%)
  - [XH] (11%)
  - [XX] (12%)

This has led authors to propose different foot types:
- Trochees
- Trochees and iambs
- Trochees, iambs, and dactyls

(See Garcia 2017)

papél ‘paper’, sapáto ‘shoe’
café ‘coffee’
nível ‘level’
patético ‘pathetic’

(Bisol 1992)
(Lee 2007)
(Wetzels 2007)
Aside from extrametricality, Portuguese stress is similar to English stress. However, there are two important differences:

1. Violations of word-minimality
2. Indeterminacy of foot type

1-2 may challenge the foot as a prosodic domain in Portuguese.
Proposal

Stress without feet?

Today: a **third** difference

3. **Weight effects**
   
   reveal more problems for the foot in Portuguese, but further motivate it for English
Weight effects in antepenultimate (APU) syllables

- APU stress in 12% of Portuguese non-verbs
  
  Previous studies: **exceptional extrametricality**

\[ \text{patético} \quad \left[ \begin{array}{l} p_{\mu} \left( t_{\mu}, t_{\mu} \right) (k_{\mu}) \end{array} \right] \quad \text{‘pathetic’ (LLL)} \]

\[ \text{fósforo} \quad \left[ \begin{array}{l} f_{\mu} \left( s_{\mu}, f_{\mu} \right) (r_{\mu}) \end{array} \right] \quad \text{‘match (n)’ (HLL)} \]

Weight effects problematic in APU position

**Marked metrical structure unavoidable**

- \[ \text{HLL} \rightarrow (\text{HL})\langle\text{L} \rangle \] (uneven trochee)
- \[ \text{HLL} \rightarrow (\text{H})\langle\text{L} \rangle \] (medial unfooted syllable)
- cf. \[ \text{LLL} \rightarrow (\text{LL})\langle\text{L} \rangle \]
Weight effects in antepenultimate (APU) syllables

Trisyllabic shortening

- English
  
  *sane* → *sanity*
  
  *serene* → *serenity*

  Shortening is consistent with metrical optimization (moraic trochees)

  \[*[(\text{"se}_{\mu} \text{I}_{\mu}) \text{n}_{\mu} \text{ti}_{\mu}], [(\text{"sæ}_{\mu} \text{n}_{\mu}) \text{ti}_{\mu}]\]

  \[*[(\text{"sæ}_{\mu} \text{n}_{\mu}) \text{ti}_{\mu}], [(\text{"sæ}_{\mu} \text{n}_{\mu}) \text{ti}_{\mu}]\]

  **No similar process observed in Portuguese**
Weight effects in APU syllables

Predictions

- If Portuguese and English build feet:
  Should not find £LL > £LL
  Weight-sensitivity should \textbf{not} be present in APU syllables

- If Portuguese and English don’t build feet:
  Weight-sensitivity should not be blocked in APU syllables

Questions

- Which profile – £LL or £LL – do native speakers favour?
- How do Portuguese and English compare?
Experimental design

- Two forced-choice auditory tasks involving nonce words (based on Garcia 2019)
  - Speakers of Brazilian Portuguese ($n = 26$) and English ($n = 25$)
  - Minimal pairs of nonce words with different stress location
    - Antepenult (APU) vs. penult (PU) stress
    - Portuguese ($n = 240^1$) English ($n = 180$)

Three weight profiles: LHL, HLL, LLL

Por: [gu.pla.ro] (LLL) [bron.da.le] (HLL) [bo.gren.da] (LHL)
Eng: [ki.me.se] (LLL) [lm.sê.kêf] (HLL) [te.prêj.kêl] (LHL)

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1 Also included penult vs. final stress
Experimental design

Example from English experiment

Which of these two words sounds more natural?

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

1. Replicate results from Garcia (2019): $\text{HLL} \succ \text{LLL} \rightarrow$ positive weight effects

2. Different pattern for English: $\text{HLL} \approx \text{LLL} \rightarrow$ no positive weight effects

Figure 1: Portuguese

Figure 2: English
Experimental results and analysis

• Hierarchical logistic regressions using Stan in R

\[
\text{response} \sim \text{weight} + \\
(1 + \text{weight} | \text{speaker}) + \\
(1 | \text{word})
\]

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

- Trends **confirmed** by models: positive HLL effect for Portuguese, not English

Figure 3: Portuguese

- Figures show % of posterior distribution found within ROPE (gray area), mean \( \hat{\beta} \), 95% HDI

Figure 4: English
Experimental results and analysis

Direct HLL comparison

- HLL posterior distributions: almost entirely positive for Portuguese (white)
Experimental results and analysis

Sonority effects

- Positive sonority effects in Portuguese ($\hat{\beta} = 0.40, 95\% \text{ HDI} = [0.00, 0.82]$), but not in English
- **Sonorant** (vs. obstruent) codas in APU position $\rightarrow$ APU stress favoured more often
English
consistent with foot-based approach
- ĖLL ~ ĖLL
- No subminimal words
- No APU sonority effects captured
  - Weight effects regulated by moraic trochees + extrametricality

Portuguese
questions foot-based approach
- ĖLL > ĖLL
- Subminimal words
- APU sonority effects captured
  - Weight effects seemingly not regulated by footing (see also gradual weight effects)
Discussion and conclusion

- **Questioning phonological universals:**
  - features
  - syllable
  - foot (e.g., French, Turkish)
  - prosodic word (e.g., Vietnamese)
  - constraints

(Pierrehumbert 2003; Blevins 2004)
(Pulleyblank 2006; Mielke 2008)
(Kaye et al. 1990; Steriade 1999)
(French: Jun and Fougeron 2000; Turkish: Özçelik 2017)
(Newell 2017; Vietnamese: Schiering et al. 2010)
(Hayes 1999)

- **Questioning relationship between stress and feet:**
  - Feet and lexical stress are **independent**
  - Alternatives to feet (grid-based approaches, Accent-First Theory)

(Vaysman 2009)
(Gordon 2002; Kager 2012; van der Hulst 2012)
Thank you!

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References III


