Binary rhythm and syllable weight in Portuguese

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Intro

Secondary stress typically **not** affected by weight (Gordon 2006)

Finnish:

Primary stress is word initial

Secondary stress affected by weight[1] (Lehiste 1965)

☞ Light syllables skipped if followed by heavy syllable

[1] Also see Pater (2000) for English.

Finnish

a. ká.las.tè.let ‘you are fishing’

b. ká.las.te.lèm.me ‘we are fishing’ skipping with H

c. fí.lo.sò.fìs.sa ‘philosopher-INE’ no skipping with H

d. á.te.ri.à.na ‘meal-ESS’ skipping with L

e. pró.fes.so.rìs.sa ∼ pró.fes.sò.ris.sa ‘professor-INE’ variation

Sonority & **clash avoidance** play a role in variation (Anttila 2010)

☞ Lexical ⇔ post-lexical planes (Dresher and van der Hulst 1998)

Portuguese

Primary stress in non-verbs

Trisyllabic domain: $\sigma\sigma\sigma]$

Primary stress affected by weight (Wetzels 2007; Garcia 2017)

Regular stress:

XXH $\rightarrow$ XX$\acute{\text{H}}$	*jornal, papel* ‘newspaper’, ‘paper’
XXL $\rightarrow$ X$\acute{\text{X}}$L	*borboleta, cavalo* ‘butterfly’, ‘horse’

Irregular stress

XX$\acute{\text{L}}$	*abacaxí* ‘pineapple’
X$\acute{\text{X}}$H	*nível* ‘level’
$\acute{\text{X}}$XX	*patético* ‘pathetic’

Portuguese

Secondary stress in non-verbs

Secondary stress weight-**in**sensitive (Collischonn 1994, p. 45)

Stress every other pre-tonic syllable R-L

a.	ìnternàcionál	‘international’
	bòrboléta	‘butterfly’
	pàralèlepípedo	‘block paving’

Portuguese

Secondary stress in non-verbs

Variation: odd number of pre-tonic syllables

b. càcofonía ∼ cacòfonía ‘cacophony’

mèlhoraménto ∼ melhòraménto ‘improvement’

☞ Either **initial** or **peninitial** secondary stress

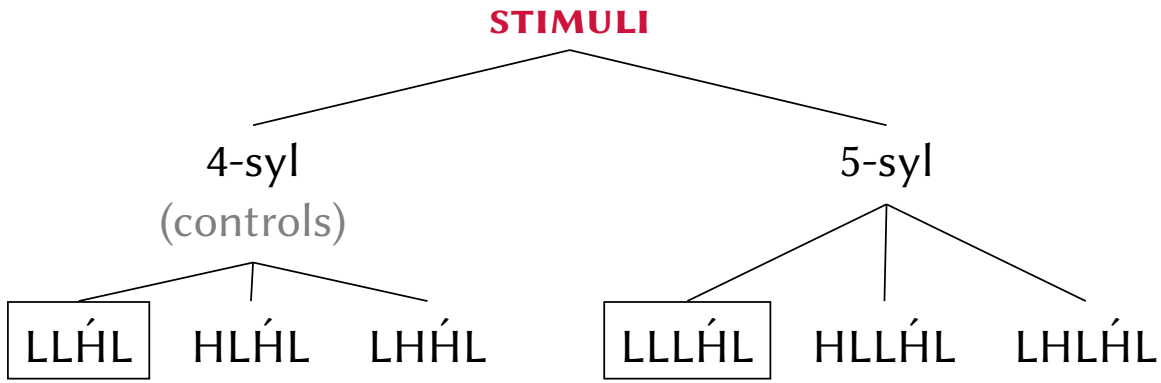
Could weight affect variation in secondary stress?

Methods

Auditory judgment task in Praat (Boersma and Weenink 2020)

Nonce words in Portuguese ($n = 120$)

Native speakers of Brazilian Portuguese ($n = 20$)



Minimal pairs: initial *vs*. peninitial secondary stress

àrgadoríste ∼ argàdoríste
mòrilánte ∼ morìlánte (control)

Methods

Stimuli

☞ Correlate for stress in Portuguese: **duration** (Major 1985; Moraes 2003)

Secondary stress → harder to capture:

Some (most?) studies point to duration (e.g., Moraes 2003)

Some to intensity (Fernandes-Svartman et al. 2008)

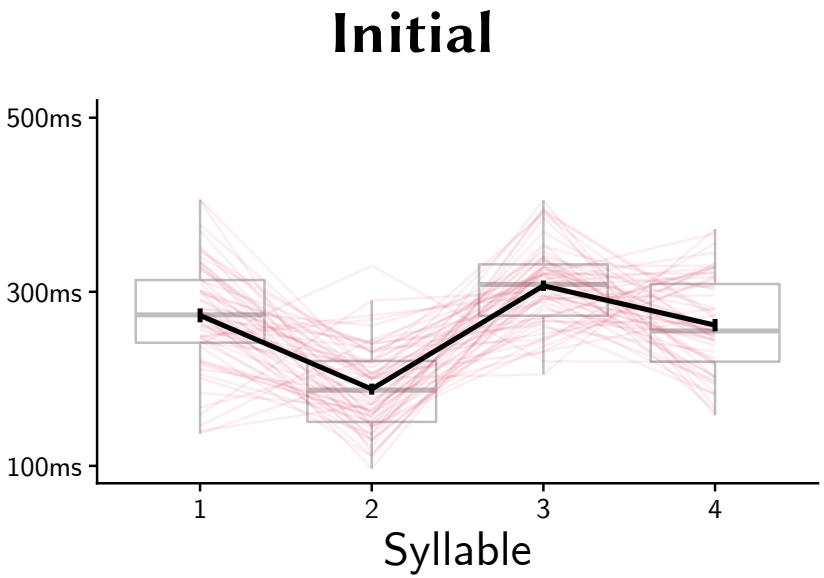
Similar situation for Spanish (Hualde and Nadeau 2014)

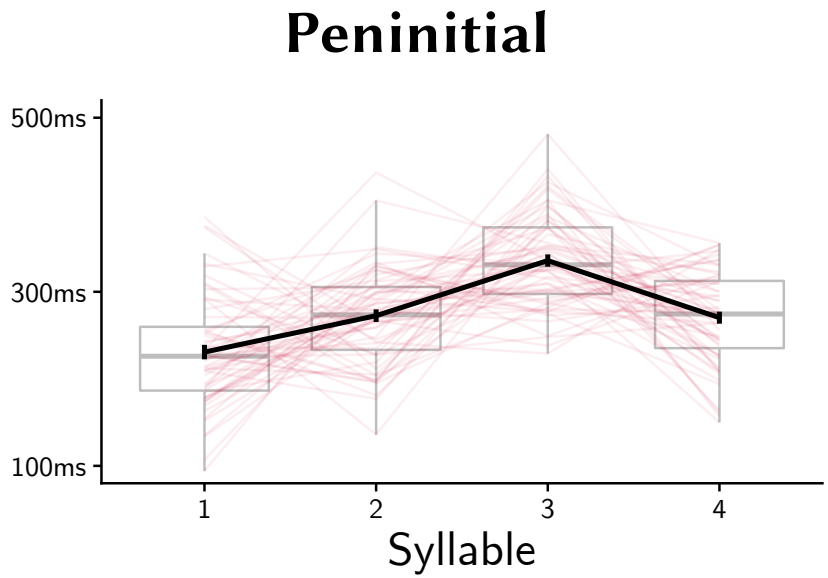
Methods

Duration in stimuli: 4σ (controls)

☞ **Durational** pattern for secondary stress in stimuli

Recorded by native speaker with phonetic training



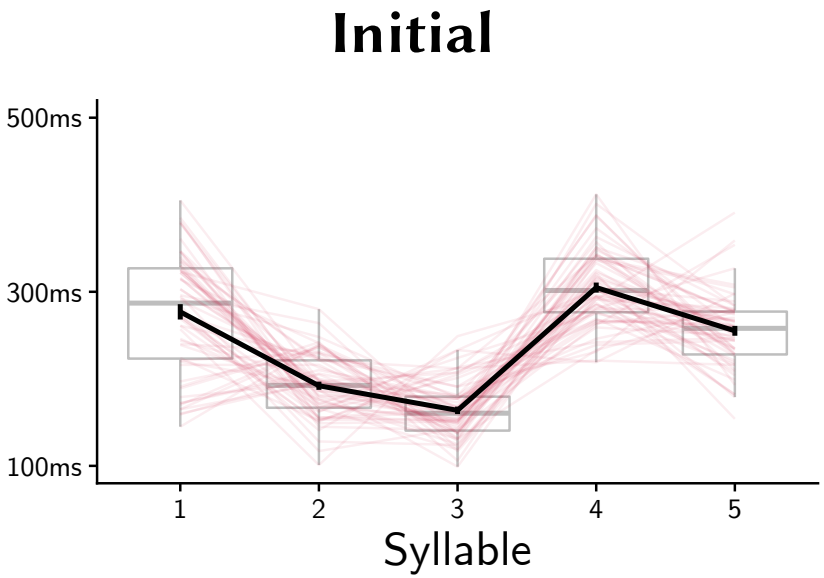


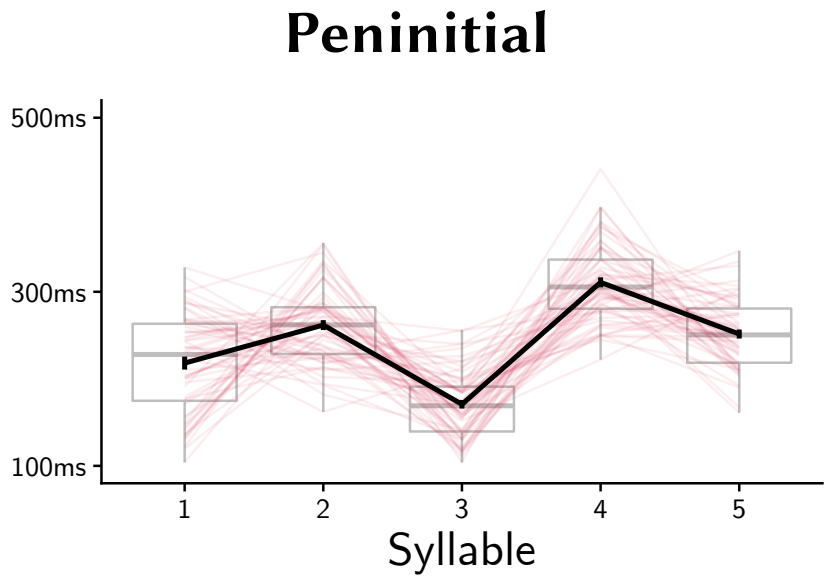
Methods

Duration in stimuli: 5σ

☞ **Durational** pattern for secondary stress in stimuli

Recorded by native speaker with phonetic training

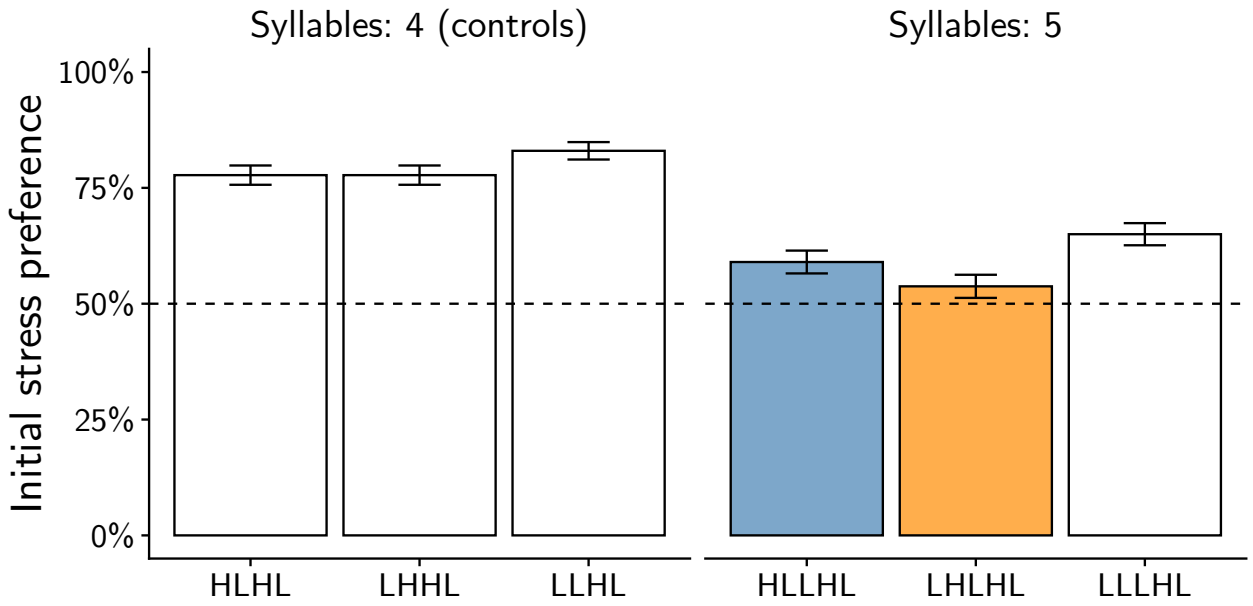




Main results

Initial stress overall favored over peninitial stress

4- and 5-syllable words: expected difference

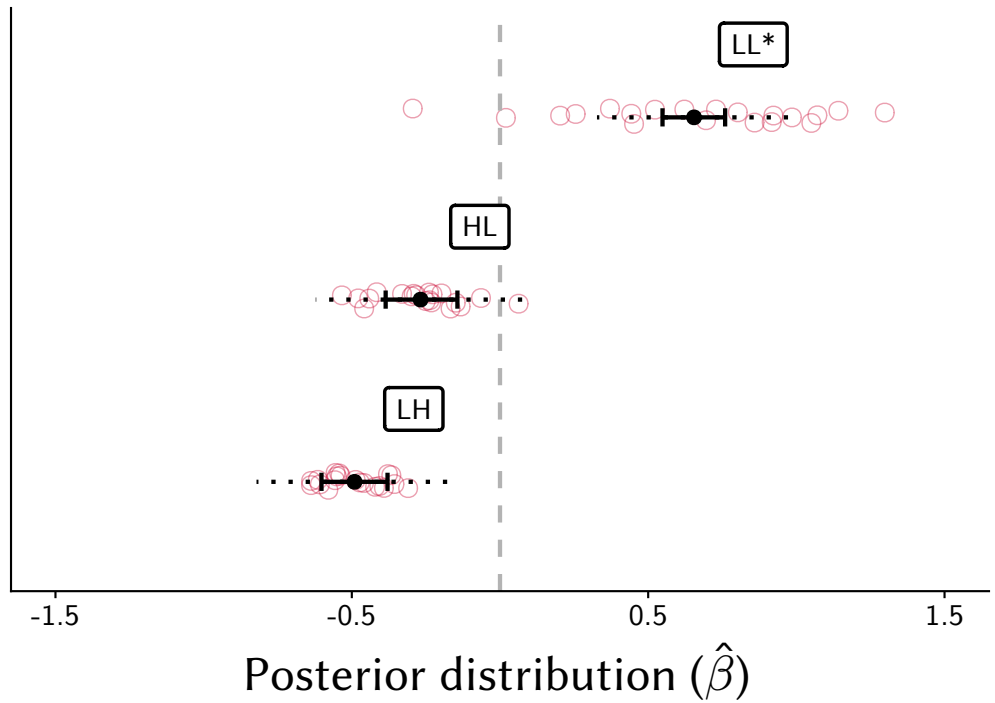


ÌLLĹL ≻ ÌHLĹL ≻ ÌLHLĹL

Main results

Hierarchical logistic regression (50% and 95% CIs)

$$\texttt{initial} \sim \texttt{weight} + (1 + \texttt{weight} \mid \texttt{ID})$$



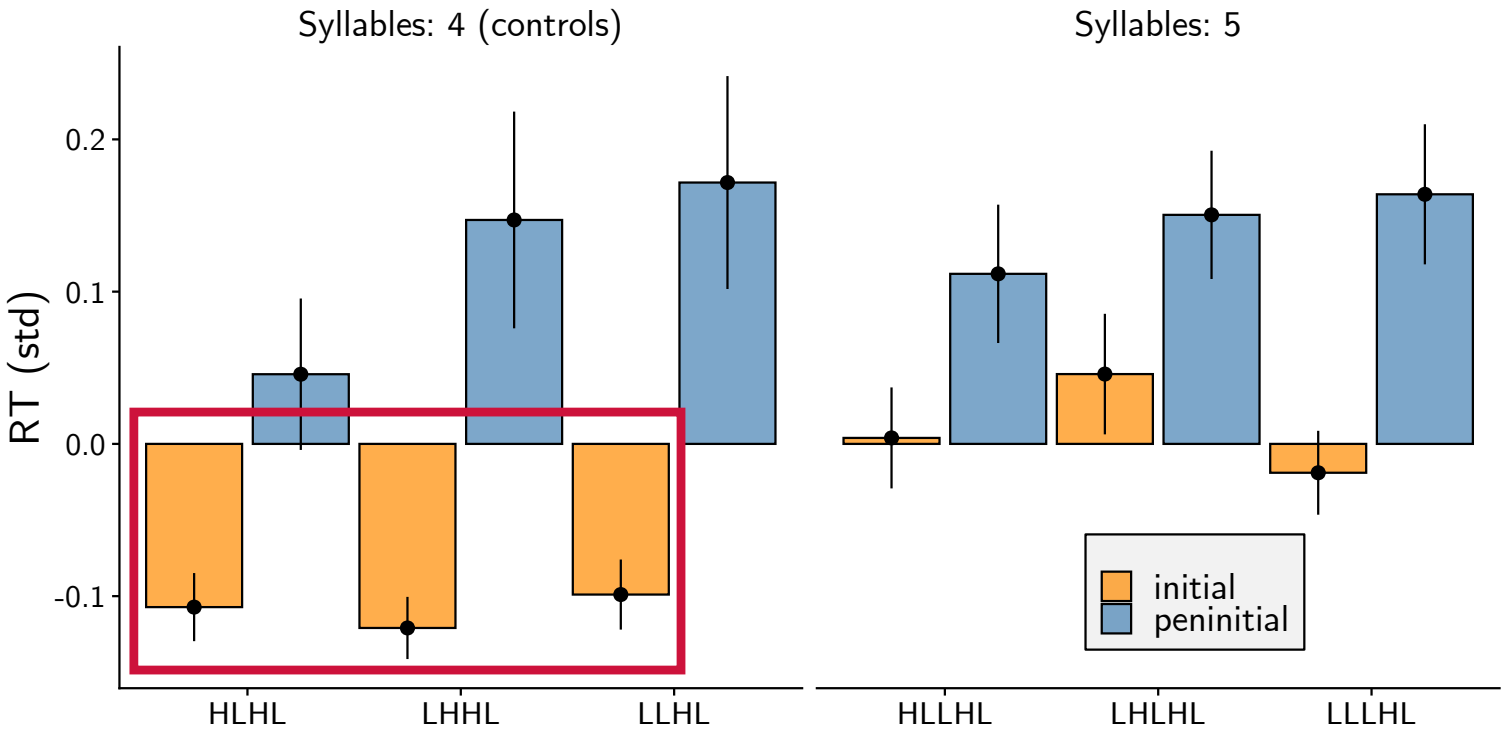
- Positive $\hat{\beta} \rightarrow$ **initial** secondary stress

  Results interpreted relative to intercept (LL)*

Reaction time

Trends

Overall: faster RTs when choosing **initial secondary stress**



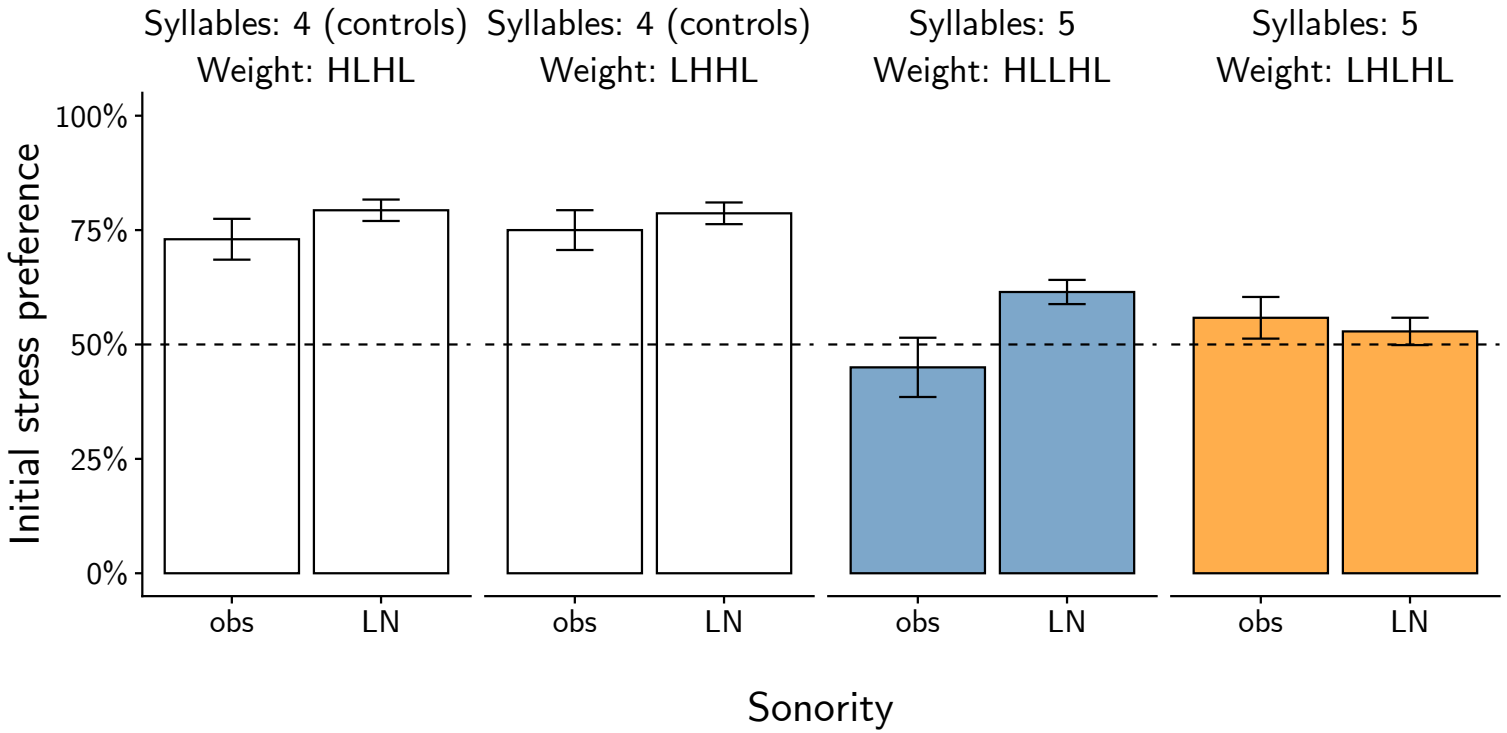
☞ **but** even faster for 4-syl words

Speakers also more certain when choosing initial stress

Coda sonority

Trends

- ☞ Initial stress preferred when coda contains liquid or nasal
- ▶ No clear trend in control items (4-syllable words)



Summary and discussion

- Overall: bias towards **initial** secondary stress

  Stronger bias for 4σ words (clash avoidance)

- Location of Hσ seems to affect speakers' judgements:

  ȊLLĹL ≻ ĹHLĹL

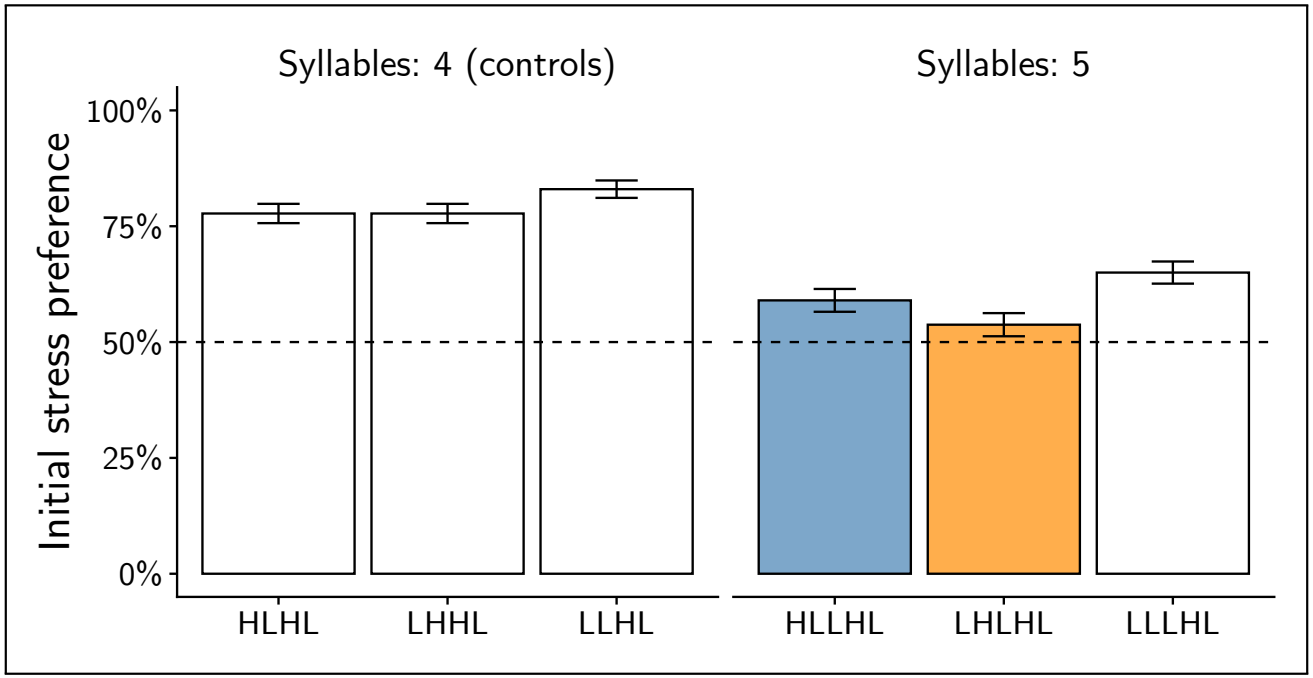
☞ Lexical ⇔ post-lexical planes (Dresher and van der Hulst 1998)

Why ĹLLĹL ≻ ȊLLĹL?

Summary and discussion

50% ambiguity:

Speakers consistently find both options **good**
Speakers consistently find both options **not so good**



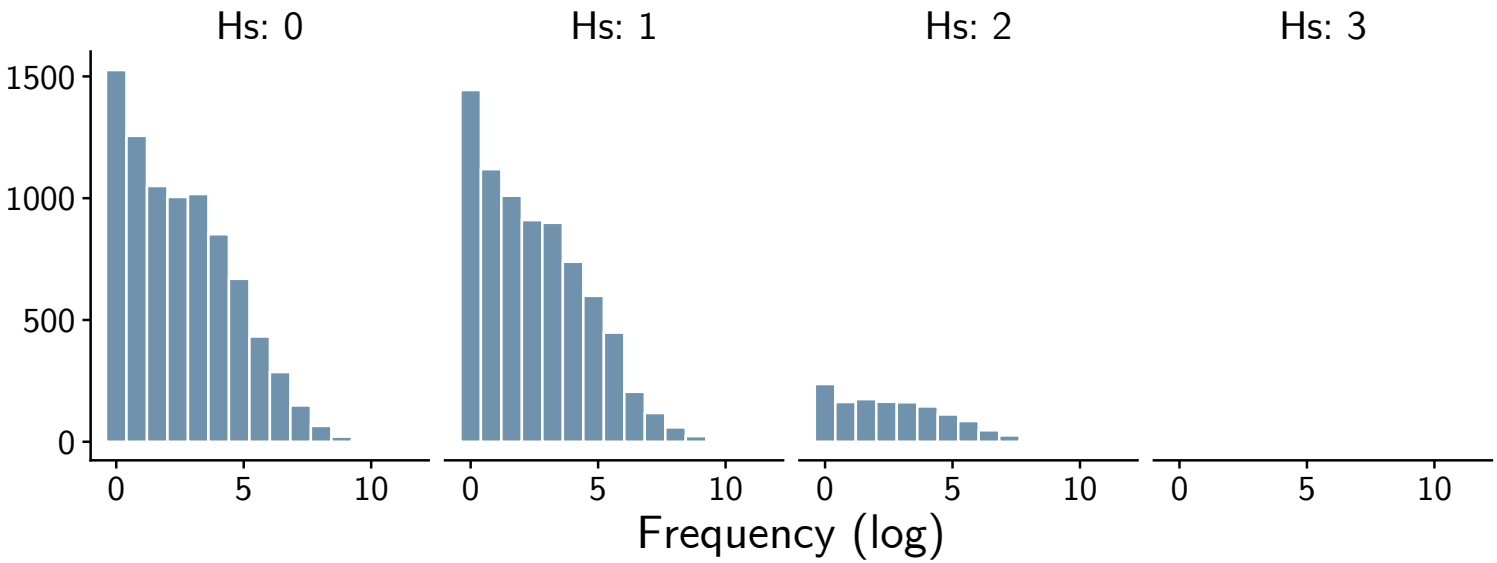
Hypothesis: presence of 2 Hσ seen as less natural

☞ Confound in stimuli given lexical distribution of weight

Summary and discussion

≈90% of all words in Portuguese have 0/1 Hσ (Garcia 2014)

☞ Same distribution when we control for frequency: (Tang 2012)



(Whether or not we examine 4-5σ words *vs.* all words)

Summary and discussion

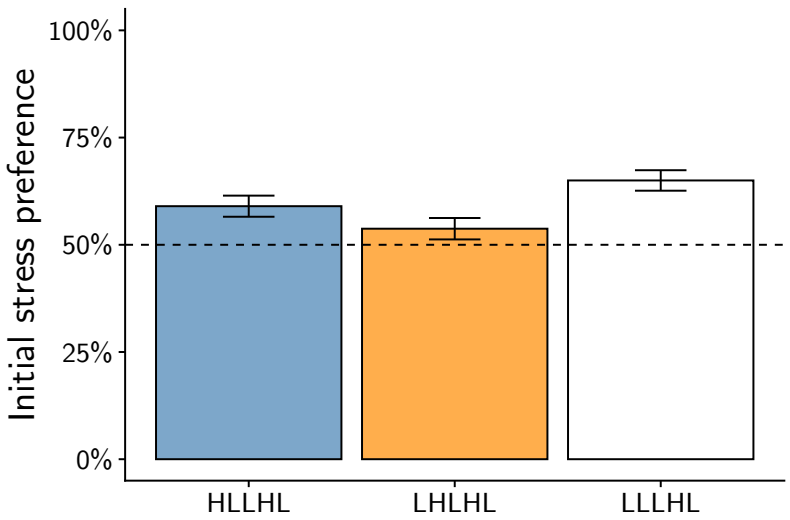
Could duration in the stimuli explain speakers' preferences?

A Initial:Peninitial ratio in i^{th} item with **initial** stress

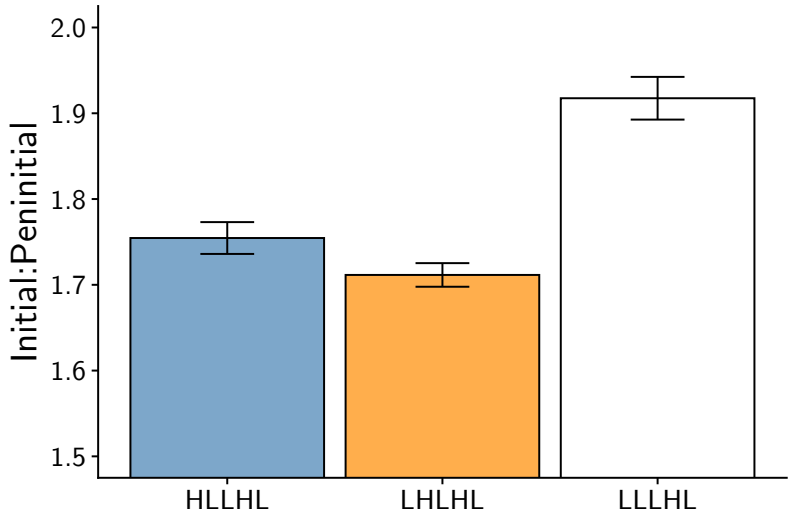
B Initial:Peninitial ratio in i^{th} item with **peninitial** stress

☞ Overall ratio **A:B** shows longer duration for initial σ

Main results (again)



Ratios



Final remarks and future directions

Next steps:

A. Do we observe the same patterns with L$\acute{\text{L}}$L]$_\omega$ stimuli?

B. Can durational ratios alone explain **L̀LLH́L** > **H̀LLH́L**?

C. Does production mirror judgements?

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Thank you!

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Durational differences

Iniial vs. peninitial