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Stress assignment in English pseudo-words: On the role of weight, prefixation and syntactic category

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21st OCP – Leipzig – 14-16 Feb. 2024

Outline

1. The literature on stress assignment in English simplex verbs and nouns
2. Study 1: Disyllabic verbs and nouns (judgement)
3. Study 2: Long verbs (production)
4. Discussion and perspectives

Literature

Since **Chomsky & Halle (1968)**: assumption that English stress is quantity-sensitive

Heavy syllable = VV(C) or VC(C)

Light syllable = V

Observation that verbs and nouns don't behave the same

Literature

Verbs

- Stressed on their final syllable if it is heavy (e.g. *cajóle*, *eráse*, *collápsse*)
- Otherwise stressed on the penultimate (e.g. *bóther*, *devélop*, *édit*, *vómit*)

Nouns

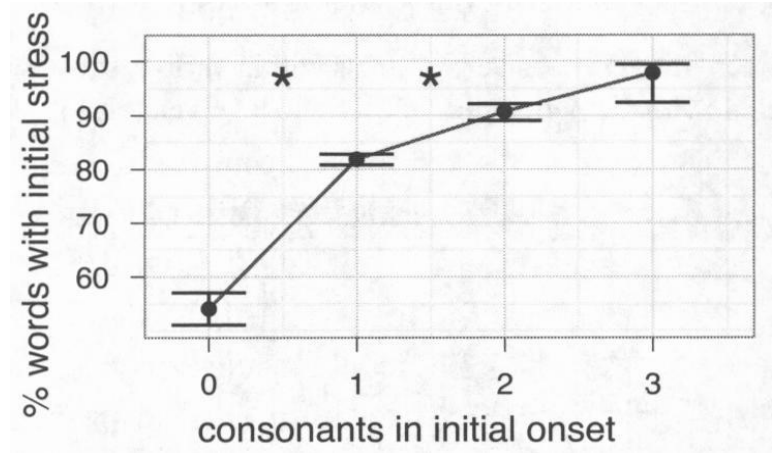
- Stressed on the penultimate if heavy (e.g. *agéndá*, *horízon*)
- Otherwise stressed on the antepenultimate (e.g. *Amériá*, *díscipline*)

Literature

The role of onsets

Usual assumption: only the rime contributes to syllabic weight

A few studies report effects of onset weight on stress (Kelly 2004; Ryan 2014)



Stress in English disyllables according to the number of onset consonants (Ryan 2014)

Literature

Historical prefixes

Many frequent words in English with opaque or obscure prefixes, mainly borrowed from Romance languages

e.g. *accept, believe, contain, develop, eject, entertain, expel, implicit, reflex, submit...*

Often treated as simplex, but have been shown not to pattern with truly simplex words on a number of phonological characteristics (Dabouis & Fournier submitted)

Previous studies

Study	Type	Nb syllables	Effects found				Others
			Rime weight	Onset weight	Prefixation	Syntactic category	
Kelly & Bock (1988)	Elicitation	2					Analogy
Rastle & Coltheart (2000)	Elicitation	2					
Guion et al. (2003)	Elicitation, Judgement	2					
Kelly (2004)	Corpus	2					Coda place of articulation
Ryan (2014)	Elicitation	2					
Turcsan & Herment (2015)	Corpus	2					Orthographic weight
Ktori et al. (2016)	Elicitation	2					
Ktori et al. (2018)	Elicitation	2					Final nucleus
Treiman et al. (2020)	Elicitation, Judgement, Corpus	2					
Baker & Smith (1976)	Elicitation	2+					Length
Guierre (1979)	Corpus	2+					
Ernestus & Leijt (2008)	Judgement, Corpus	3-4					Final nucleus
Domahs et al. (2014)	Elicitation, Corpus	3					
Moore-Cantwell (2020)	Corpus, Elicitation	3+					Final nucleus
Dabouis & Fournier (2023)	Corpus (verbs)	2+					

Effect found



Mixed results



No effect



Not tested

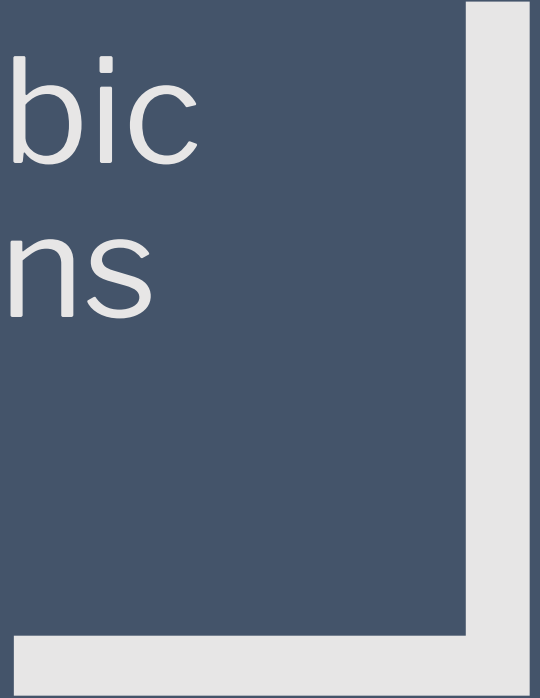


Motivation for our experiments

- The evidence is inconclusive, and the interactions between the factors isn't explained
- Only one of the studies tested for all the variables at the same time
- Most of those studies focused on disyllabic words

Study 1: Disyllabic verbs and nouns

Judgement task



Design

Aim: testing the effects of several variables impacting stress assignment in disyllabic words:

- Syllable weight (onset and coda)
- Presence/absence of an opaque prefix
- Syntactic category (noun vs. verb)

Stimuli

48 pseudo-words

Initial string may or may not be a prefix

Between 0 and 2 onset consonants

Between 1 and 2 coda consonants

Nominal or verbal syntactic context

Syllabic structure	Prefixed		Non-prefixed	
	NOUNS	VERBS	NOUNS	VERBS
VCVC	<i>adet elut</i>	<i>abul elop</i>	<i>idet ilut</i>	<i>ibul ilop</i>
VCVCC	<i>arend elont</i>	<i>anunt ebint</i>	<i>irend ilont</i>	<i>inunt ibint</i>
CVCVC	<i>detep relom</i>	<i>denen retud</i>	<i>dotep rolom</i>	<i>donen rotud</i>
CVCVCC	<i>denont rebint</i>	<i>denund redond</i>	<i>donont robint</i>	<i>donund rodond</i>
CCVCVC	<i>probal prelel</i>	<i>pronip prepem</i>	<i>prabal pralel</i>	<i>pranip prapem</i>
CCVCVCC	<i>pronast prebund</i>	<i>provand predont</i>	<i>pranast prabund</i>	<i>pravand pradont</i>

Procedure

Presented visually within carrier sentences¹ and auditorily

e.g. *She's got a chance to **elop***

Each pseudo-word recorded by a native Canadian speaker with two possible stress patterns

e.g. *adet* /ə'dɛt/ or /'ædɛt/

¹ Sentences were extracted from COCAE : <https://www.english-corpora.org/coca/>

Methodology

Participants: 50 native speakers of British English, recruited via Prolific

Distractors: 40 existing words.

Rhythmic context: pseudo-words always positioned at the end of carrier sentences, with a constant rhythmic context (Kelly & Bock 1988; Ktori et al. 2018)

Methodology

Choose the pronunciation that you would prefer for the underlined word in the following sentence:

You know, you've got an elut.



Please select one answer

▶ 0:00 / 0:01 - 🔊

▶ 0:00 / 0:01 - 🔊

Results

Higher proportion of final syllable stress than expected:

- 61% final stress in nouns (out of 1200 nouns);
- 70% final stress in verbs (1200).

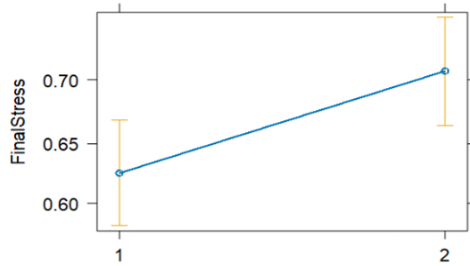
This is much higher than what has been found in the literature (e.g. 20% nouns, 50% verbs – [Hammond 1999](#))

Results analysed using a binary logistic regression with participant as a random factor

Formula of best model: `glmer (FinalStress ~ Prefixed * SyntCat + CodaC + OnsetC + (1 | ParticipantID), data = data, family = binomial)`

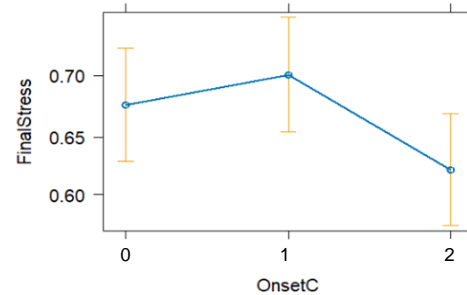
Results: Main effects plot

CodaC effect plot



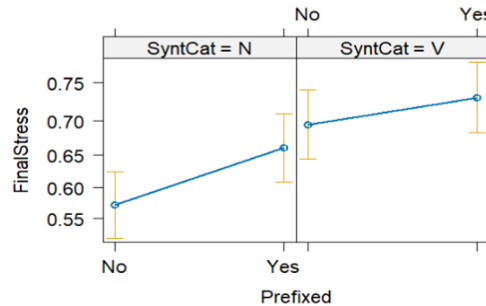
e.g. *idet* *irend*

OnsetC effect plot



e.g. *adet* *detep* *probal*

Prefixed*SyntCat effect plot



e.g. *dotep* *detep*

Study 2: Long verbs

Production task



Study 2: Long verbs

This study is concerned with primary stress assignment in English trisyllabic pseudo-verbs.

Factors to be investigated:

- Syllable weight
- Prefixation
- (Synchronic) productivity of the prefix.

Research questions

Q1) Does syllable weight influence primary stress assignment in English trisyllabic pseudo-verbs and how?

Q2) Do the (pseudo-)prefixes in our experiment repel stress?

Q3) If so, is there a difference between productive and unproductive prefixes?

Methodology

Participants: 50 native speakers of British English, recruited via Prolific (online experiment, distributed via Labvanced)

1081 observations

Participants were asked to read the verbs in carrier sentences:

If you **caborasp** something, you build something without anyone's help.

He managed to caborasp a small cabin.

Design - stimuli examples

		Prefixed	
	Non-prefixed	Non-productive	Productive
LLH	<i>caborasp</i>	<i>becarost</i>	<i>precomult</i>
LHL	<i>tufontap</i>	<i>secolpam</i>	<i>rebaltin</i>
HLL	<i>pendatip</i>	<i>contasit</i>	<i>unpavin</i>

27 different stimuli (+ 27 distractors)

Each prefix appears in one or two different stimuli

Data coding

Responses coded independently by three trained raters

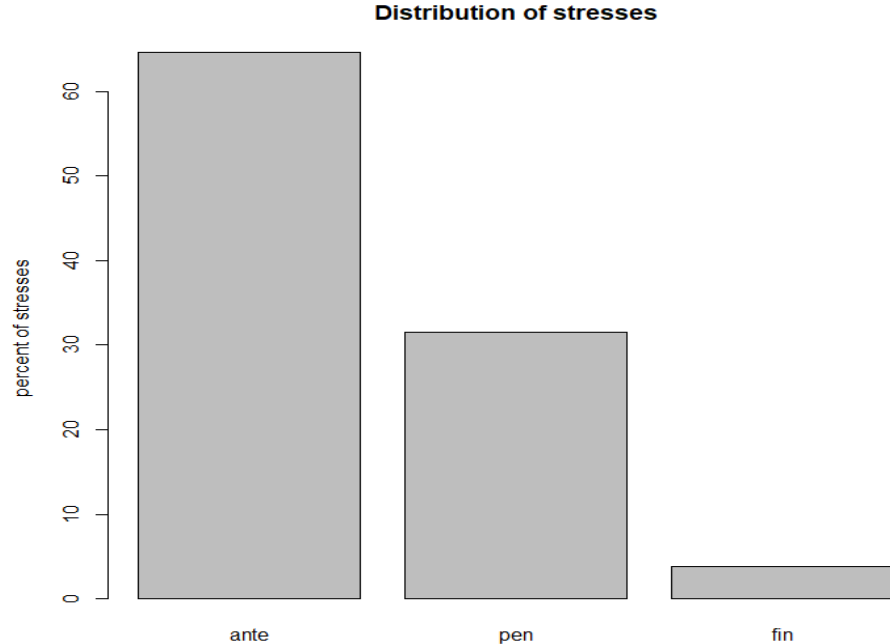
Auditory coding

Exclusion criteria:

- Inter-rater disagreement (stress was coded according to majority choice, item was included if at least 2 out of 3 agreed)
- Stress pattern could not be identified
- Item was not produced in its carrier sentence
- Change in segmental structure
- One of the vowels was realized as a long vowel or diphthong

→ Overall, **9.6%** of responses excluded

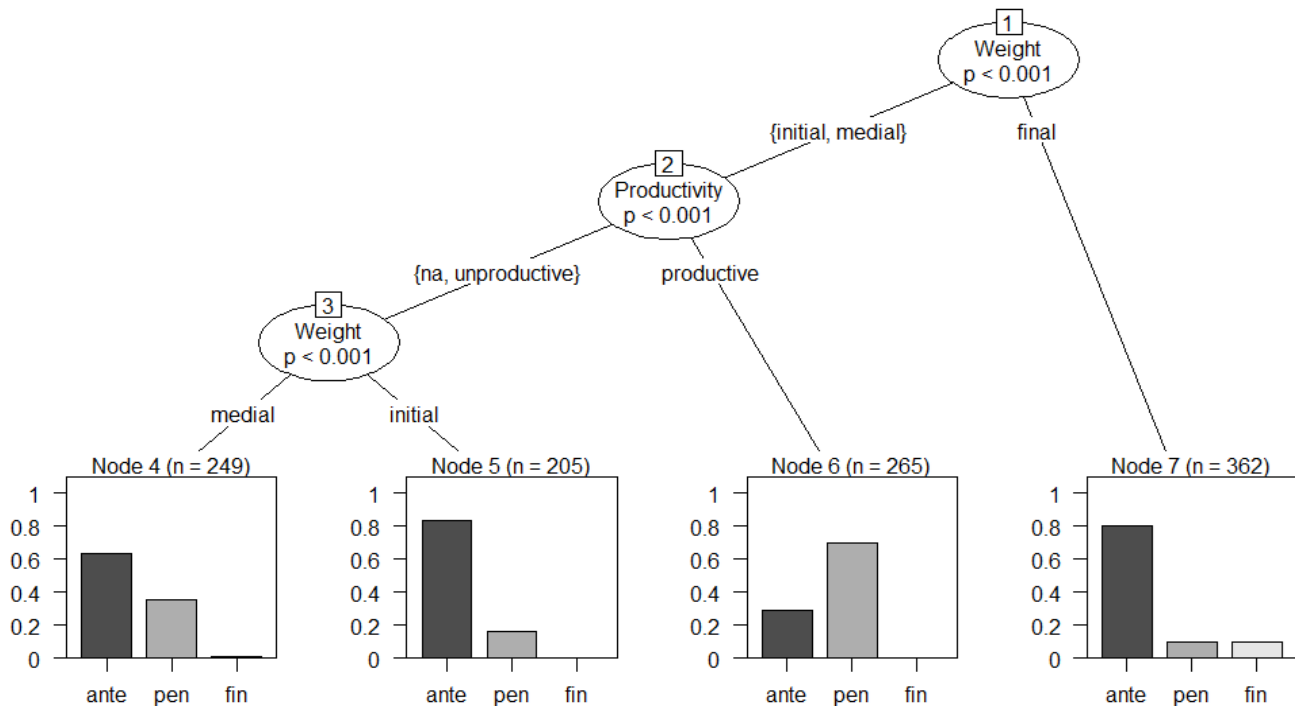
Results - General trends



Overwhelming preference
for ante stress (*CAborasp*)

Final stress is strongly
dispreferred (*caboRASP*)

Results - Classification tree



TUfontap,
SEcolpam

PENdatip,
CONTasit

reBALtin,
unPAvin

CAborasp,
PREcomult

Results

Productive/unproductive prefix classes do not behave as homogenous groups

- There are clear differences between individual prefixes and words

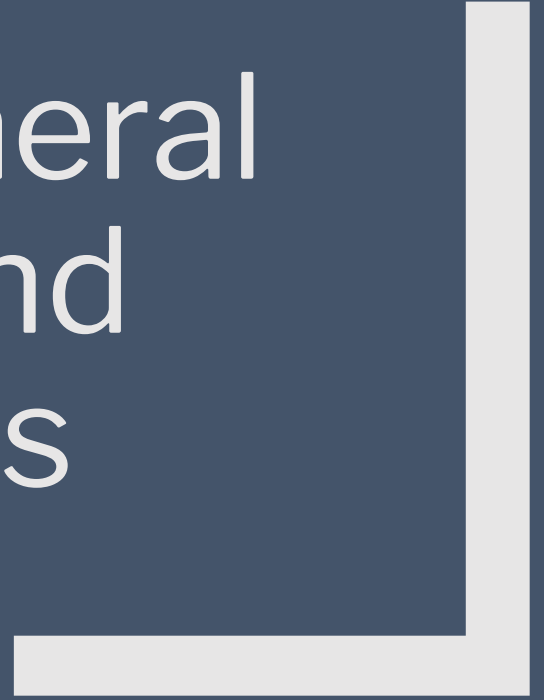
Productive prefixes

- *dis-*, *un-* strongly associated with pen stress (*unPAvin*, *disRUpit*)
- *re-*, *pre-*, *de-* much more evenly distributed between ante and pen stress

Unproductive prefixes

- words starting in *ob-* categorically stressed on the antepenultimate (*OBserat*)
- *be-*, *con-* show sizeable proportions of pen stress

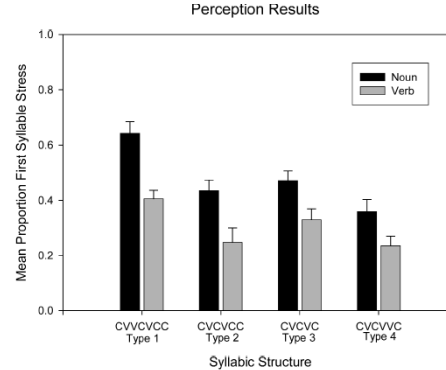
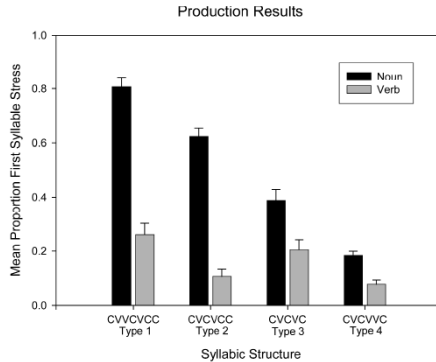
Questions, general
discussion and
perspectives



Discussion

High proportions of final stress in Study 1, a task effect?

- [Guion *et al.* \(2003\)](#) report similar results in their judgement study (more final stress for nouns, less for verbs than in production study)



- The binary choice could bias participants to equalize the number of responses per option

Discussion

Why is there so much antepenult stress in Study 2?

- Distributional patterns in the lexicon: long verbs in English tend to be morphologically complex (prefixed, suffixed (*-ify*, *-ate*, *-ize*), or both)
- It is possible that morphologically simplex verbs in this experiment have been modelled on complex trisyllabic verbs with word-initial stress
- General preference for word-initial stress in English (Cutler & Carter 1987)

Discussion

Confirmation that there is more final stress in disyllabic verbs than in disyllabic nouns

Effects of syllabic weight (both studies)

- Onsets play a role (as reported by [Ryan 2014](#), [Kelly 2004](#))
- Nouns are affected by the weight of the final syllable (as in [Domahs *et al.* 2014](#))
- Syllable weight influences the results in long verbs in **all positions**, not just the final syllable (as in [Domahs *et al.* 2014](#))

Discussion

Effects of prefixation in pseudo-words (both studies)

- Inconsistent effects
- Results suggest differences between individual prefixes that should be investigated further

The effects are not categorical: need for a gradient model



Thank you !

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Study 1

Regression model with participants as a random factor.

Dependent variable: Final Stress (Yes)

Predictors: Prefixed (Yes, No)

Onset Consonant (0, 1, 2)

Coda Consonant (1, 2)

Syntactic Category (Noun, Verb)

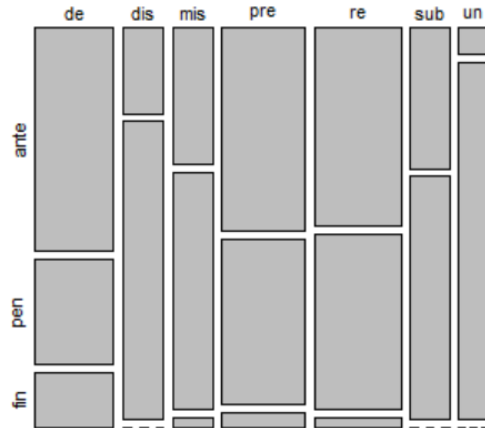
Random Effect: Participant ID

<i>Predictors</i>	Final Stress		
	<i>Odds Ratios</i>	<i>CI</i>	<i>p</i>
(Intercept)	1.04	0.70 – 1.54	0.850
Prefixed [Yes]	1.33	1.11 – 1.58	0.002
OnsetC	0.88	0.79 – 0.98	0.025
CodaC	1.44	1.21 – 1.71	<0.001
SyntCat [V]	1.54	1.29 – 1.84	<0.001
Random Effects			
σ^2	3.29		
τ_{00} ParticipantID	0.27		
ICC	0.08		
N _{ParticipantID}	50		
Observations	2400		
Marginal R ² / Conditional R ²	0.030 / 0.104		

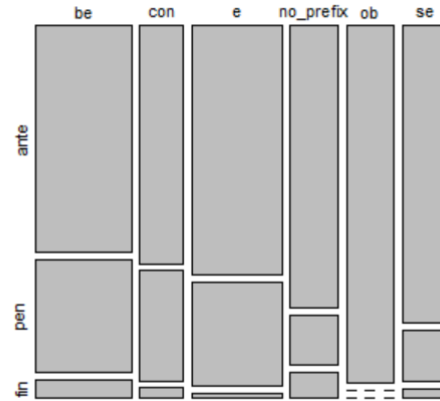
Appendix

Study 2

`table(prod$Prefix, prod$MajorityChoice)`



`table(unprod$Prefix, unprod$MajorityChoice)`



Appendix

Study 2

```
table(nopref$Prefix, nopref$MajorityChoic
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