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

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Sabine Arndt-Lappe & Quentin Dabouis

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# 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

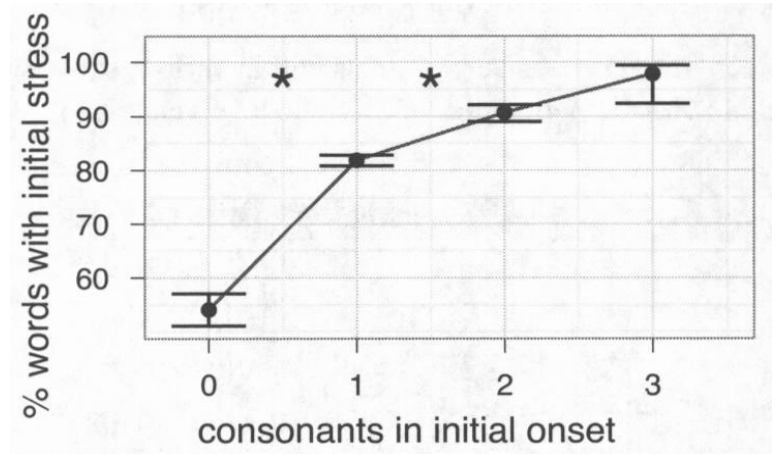
- Stressed on the penultimate if heavy (e.g. *agéndá*, *horízon*)
- Otherwise stressed on the antepenultimate (e.g. *América*, *díscipline*)

# 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						Effect found	
Rastle & Coltheart (2000)	Elicitation	2							
Guion et al. (2003)	Elicitation, Judgement	2					Analogy	Mixed results	
Kelly (2004)	Corpus	2							
Ryan (2014)	Elicitation	2						Coda place of articulation	
	Corpus	2							
Turcsan & Herment (2015)	Elicitation	2						Orthographic weight	No effect
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	Not tested
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+							
Dabouis & Fournier (2023)	Corpus (verbs)	2+							

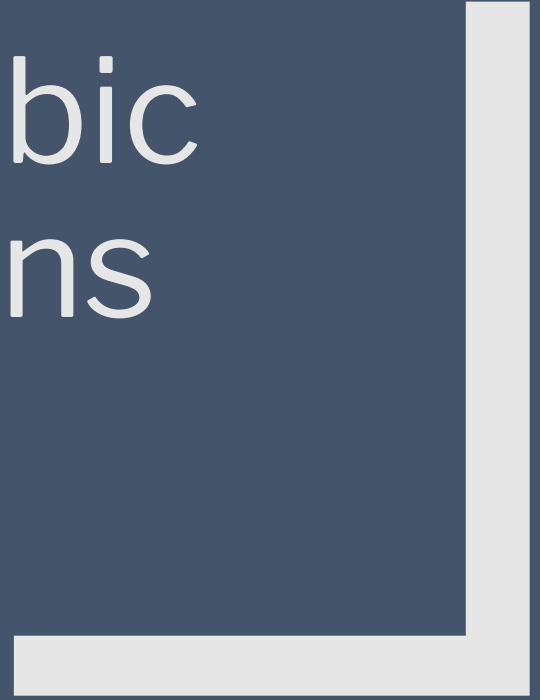


# Motivation for our experiments

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

# Procedure

Presented visually within carrier sentences<sup>1</sup> 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/

<sup>1</sup> 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](#))

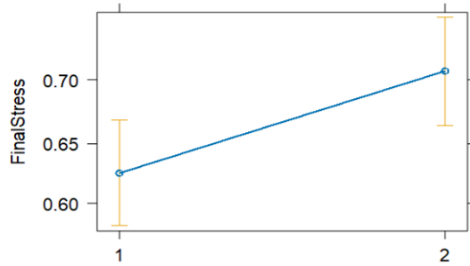
Results analysed using a binary logistic regression with participant as a random factor

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



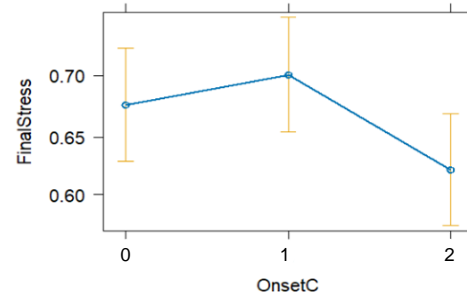
# Results: Main effects plot

CodaC effect plot



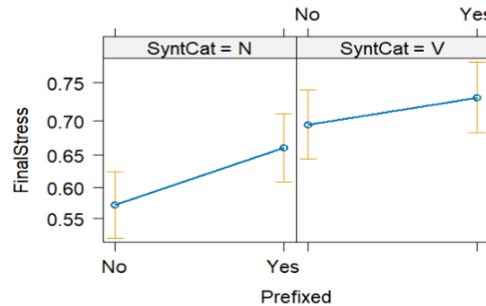
e.g. *idet*                      *irend*

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

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		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

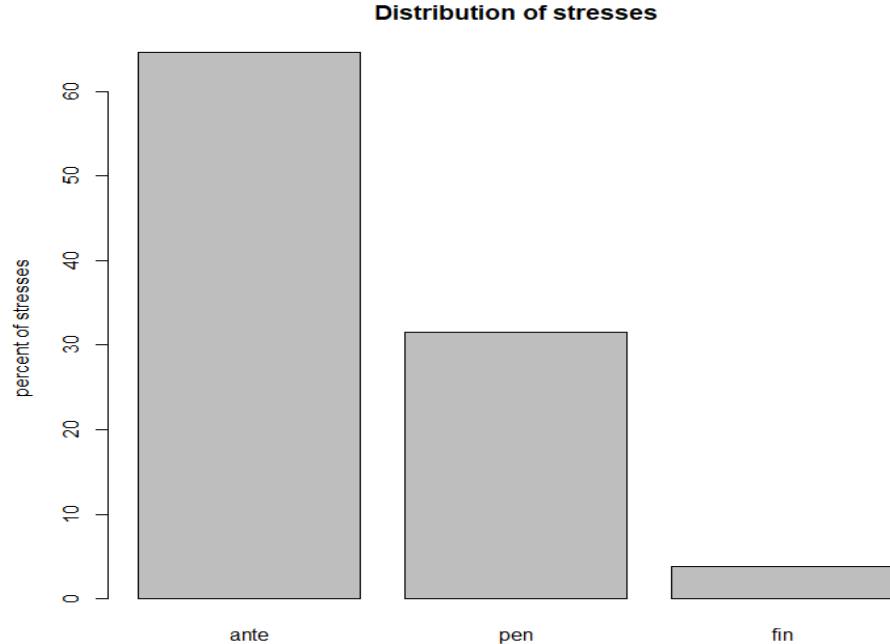
Auditory coding

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

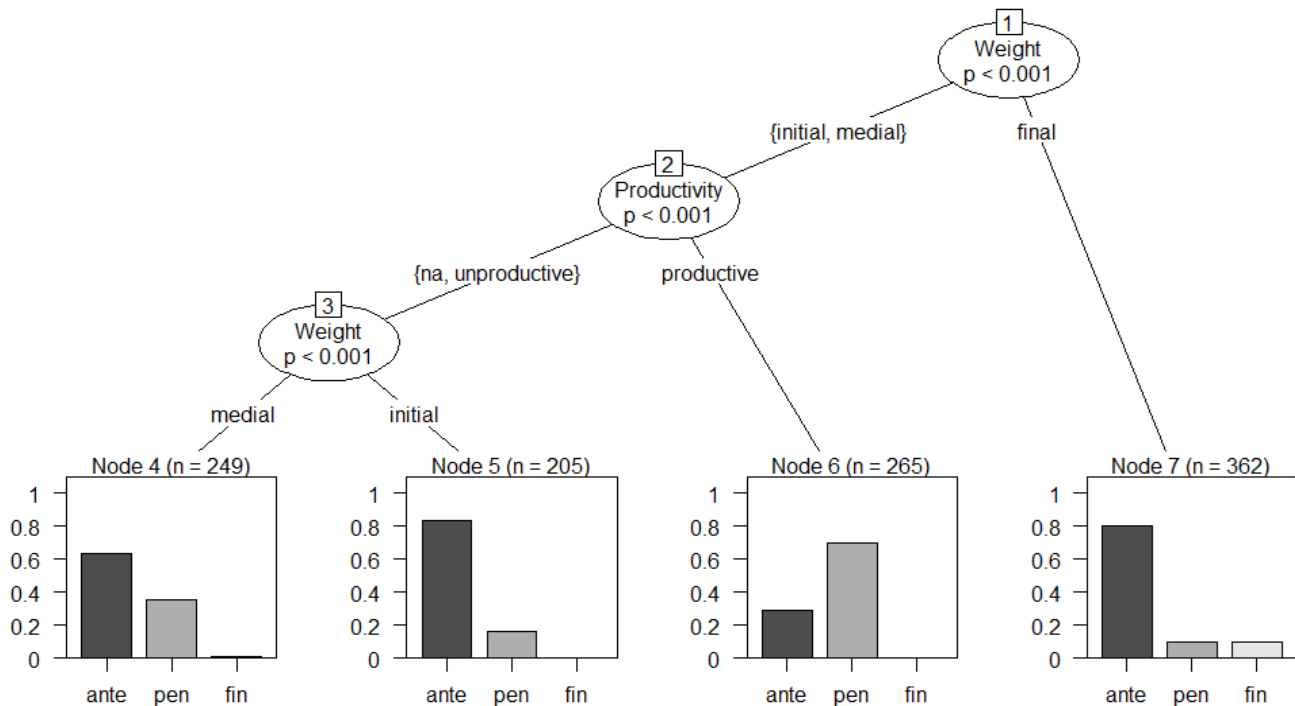


Overwhelming preference  
for ante stress (*CAborasp*)

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

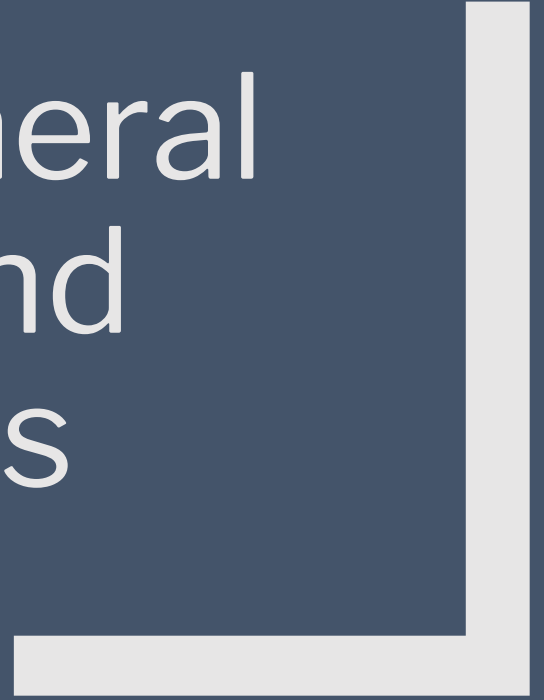
## Productive prefixes

- *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

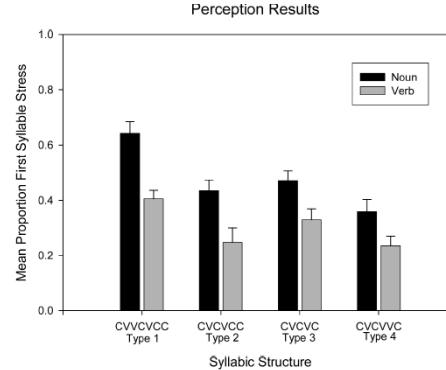
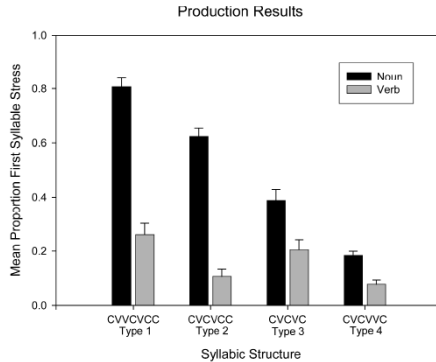
Questions, general  
discussion and  
perspectives



# 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>	<b>Final Stress</b>		
	<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	<b>0.002</b>
OnsetC	0.88	0.79 – 0.98	<b>0.025</b>
CodaC	1.44	1.21 – 1.71	<b>&lt;0.001</b>
SyntCat [V]	1.54	1.29 – 1.84	<b>&lt;0.001</b>
<b>Random Effects</b>			
$\sigma^2$	3.29		
$\tau_{00}$ ParticipantID	0.27		
ICC	0.08		
N <sub>ParticipantID</sub>	50		
Observations	2400		
Marginal R <sup>2</sup> / Conditional R <sup>2</sup>	0.030 / 0.104		

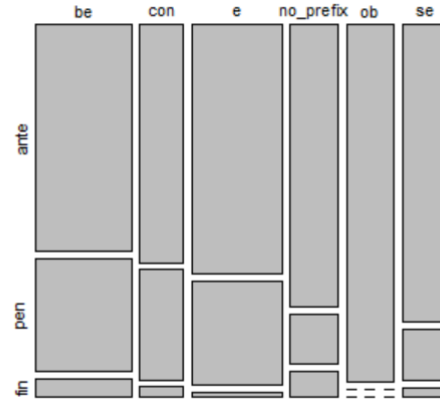
# Appendix

## Study 2

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



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



# Appendix

## Study 2

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

