FOR 2373 Spoken Morphology

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# The effect of morphological boundaries on stem vowel duration in English

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## Background

- Morphological structure affects phonetic duration (Plag et al. 2017; Seyfarth et al. 2017):

| | | |
|---|---|---|
| **monomorphemic word-final S** e.g. *freeze* | longer than | **suffix S** e.g. *free#s* |

- Segments preceding word-final segment are also shorter (Zimmermann 2016, 2018).
- What happens to vowel preceding final segment?

## Research Questions

- Is there an effect of a morpheme boundary on the duration of the vowel preceding final /z/ and final /d/ in American English?
- If so, how do these durational differences arise?
  - Vowel lengthening effect that is sensitive to morphology, similar to Scottish Vowel Lengthening Rule, Canadian Raising? (Giegerich 1992; Bermúdez-Otero 2017)
  - Paradigm uniformity effect? (Seyfarth et al. 2017)

## Methodology

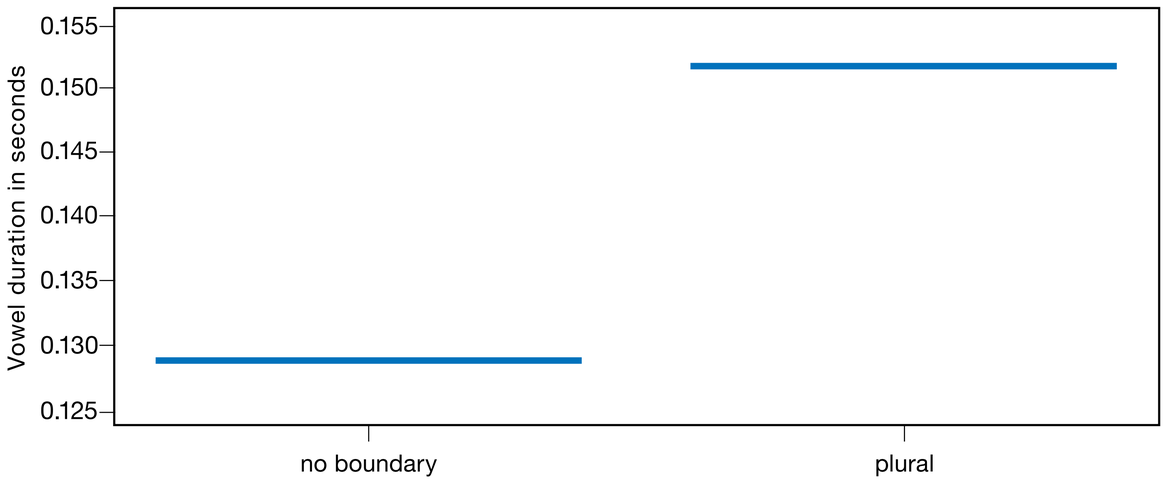
- Buckeye Corpus (Pitt et al. 2007)
- Monosyllabic words ending in /z/ and /d/ in phonological representation
- Mixed effects regression modelling in R and lme4 (Bates et al. 2017; R Core Team 2015)
- Dependent variable: vowel duration
- Variable of interest: boundary type
- Covariates: num. of phonemes, word form frequency, speech rate, foll. pause, vowel

## Monomorphemic word-final /z/ vs. plural /z/

N = 548; 50 types, for example:

| | | |
|---|---|---|
| **simplex** | *use (66), close (45), news (43)* | *haze (1), rose (1), squeeze (1)* |
| **complex** | *guys (84), days (64), ways (52)* | *clues (1), lies (1), rows (1)* |

### Result




- There is an effect of a morphological boundary on the phonetic realisation of the vowel preceding the boundary.
- Vowels before plural boundaries are about 20 milliseconds longer than vowels in monomorphemic words ($t$ = 3.868; $p$ < 0.001).
- Results in line with Seyfarth et al. (2017), who found that stems in complex words were 18 milliseconds longer.
- Covariates behave as expected from the literature.

### Discussion

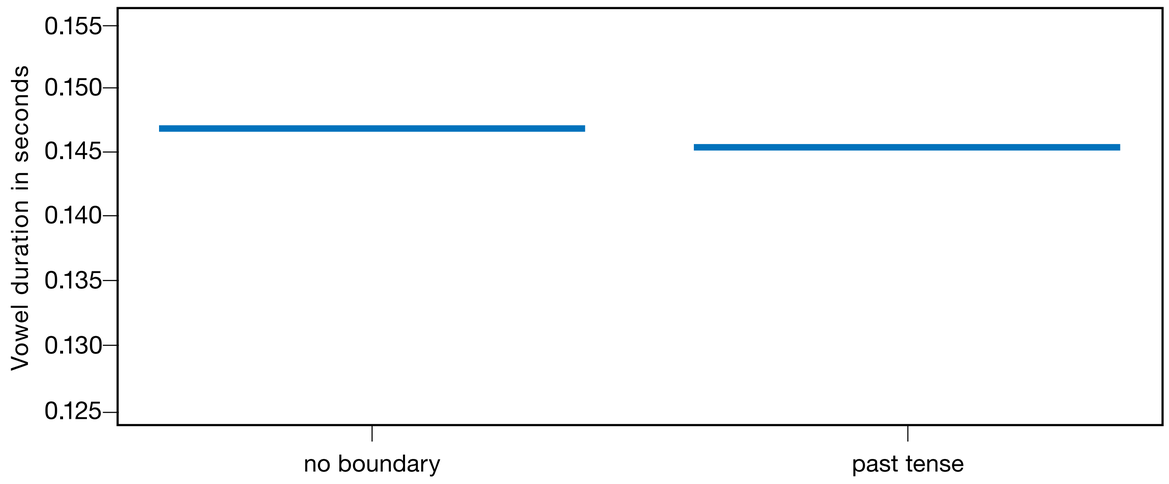
- English vowel lengthening effect that is sensitive to the presence of a morphological boundary? → The presence of the plural boundary causes the vowel to be extra long.
- Paradigm uniformity effect? → Inflected words (e.g. *keys)* may be influenced in duration by morphological relatives (e.g. *key),* causing the vowel in the complex word to be extra long.

## Monomorphemic word-final /d/ vs. past tense /d/

N = 369; 28 types, for example:

| | | |
|---|---|---|
| **simplex** | *grade (84), side (42), food (27)* | *pride (3), dude (2), guide (1)* |
| **complex** | *paid (34), tried (30), stayed (25)* | *sued (2), cried (1), tied (1)* |

### Result




- There is no effect of boundary type on vowel duration ($t$ = -0.223; $p$ = 0.824); vowels before past tense /d/ have about the same duration as vowels before word-final /d/ in monomorphemic words.
- Results for /d/ are in line with Seyfarth et al. (2017), as they also didn‘t find a effect.
- Most covariates behave as expected, with the exception of word form frequency, which behaves counter-intuitively: the more frequent a word, the longer the vowel.

### Discussion

- Dataset may be too small and too skewed for a meaningful analysis (due to type/token ratio of words; due to more simplex than complex words in dataset).
- Unclear how to interpret results, esp. effect of word form frequency.
- Why is /d/ generally inert? (See also Zimmermann 2018).

## Outlook

- Extension to look at other segments preceding word-final morphemic boundaries and how they differ in duration.
- Replication using other corpora such as the Quakebox Corpus (New Zealand English), to investigate whether this effect is limited to American English or a phenomenon of other varieties of English as well.
- Replication in a controlled experiment in order to deal with the numerous problems that occur when working with corpus data.

References

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