Phonological variation in auditory word recognition

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Overview

Sesquisyllabic words: Trimoraic words consisting of a diphthong followed by /l/ or /ɹ/, e.g. *owl*, *dire*, *foil*.

Syllable count judgments and pronunciation of sesquisyllables co-vary (e.g. [1, 4]).

- One syllable (1σ) judgment ↔ shorter rime duration
- $> 1\sigma$ judgment ↔ longer rime duration

Variation in syllable counts and their correlation with production suggests that individuals have (at least) two phonological representations for sesquisyllabic words [4].

Spoken word recognition: mapping acoustic signal to phonological representation.

Research questions:

1. Does having multiple representations of the phonological structure of a word influence word recognition?

   Does it depend on the familiarity/typicality of the pronunciation of the word being recognized (cf [3])?

2. Does this influence depend on participants' own phonological judgments?

Method

Materials

Lexical decision task: 90 monomorphemic real words & 90 phonotactically legal non-words (1/3 monosyllabic words, 1/3 disyllabic words, 1/3 sesquisyllabic words).

Syllable judgment: The 90 real words from the lexical decision task. Followed the lexical decision experiment to avoid priming effects.

	aɪ		aʊ		ɔɪ	
/l/	*tile*	ˈtaɪl	*growl*	ˈgɹaʊl	*soil*	ˈsɔɪl
/ɹ/	*dire*	ˈdaɪɹ	*sour*	ˈsaʊɹ	—	—

Table (1): The nucleus-coda combinations in the experiment.

Materials were recorded by two speakers:

1. **Non-standard English speaker** (Pittsburgh English): monophthongizes diphthongs, judges and produces sesquisyllabic words as monosyllables.
2. **(Relatively) standard English speaker**: judges and produces sesquisyllables as disyllables.

Method continued...

Procedure

Lexical decision task: Two experimental lists were constructed with Speaker counterbalanced in a Latin Square design such that every participant heard every syllable type produced by both speakers, but responded to each word only once.

Syllable judgment: Participants viewed a written word, subvocalized it, and judged whether it had one syllable or more than one syllable.

Participants

35 native monolingual or early bilingual American English speakers participated. 28 identified as female, 1 as non-binary, and 6 as male; 32 identified as right-handed, 2 as left-handed, and 1 as ambidextrous. Their average age was 21.3 (standard devision = 2.39).

None were from the Pittsburgh area.

Results & analysis

Syllable judgment

A **structure preference score** was calculated for each subject as the proportion of sesquisyllabic words they judged as $> 1\sigma$.

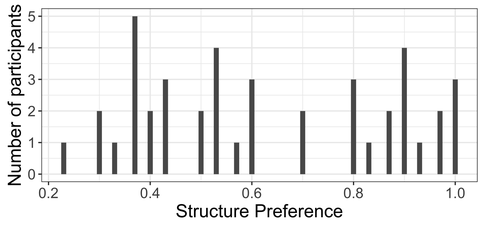

Figure (1): Histogram of structure preference scores.

Lexical decision

Negative reciprocal RTs on accurate responses to real words were analyzed by fitting a Linear Mixed Effects model in R using the `lme4` package and using the `lmerTest` package to simulate Satterthwaite approximations for degrees of freedom.

Random effects: Random intercepts by subjects and items.

Controls: Duration, frequency, phonological neighborhood density, & experimental list.

Fixed effects of interest:

- Syllable Type (σ, $\mu\mu\mu$, $\sigma\sigma$, ref level σ).
- Speaker (standard, non-standard, ref level standard)
- Structure Preference
  (0.0 = parses all $\mu\mu\mu$ as σ, 1.0 = parses all $\mu\mu\mu$ as $> 1\sigma$)
- The 3-way interaction

Main Results:

- Standard pronunciations of sesquisyllables are NOT harder to judge in a lexical decision task than unambiguous monosyllables.
- Everyone struggles to judge the non-standard, monophthongized pronunciations of sesquisyllables, BUT...
- Participants who judge sesquisyllables as 1σ struggle more with the non-standard pronunciations than participants those who judge sesquisyllables as $> 1\sigma$.
- People who tend to judge sesquisyllables as 1σ are faster overall (except on non-standard tokens of sesquisyllables).
- People who tend to judge sesquisyllables as $> 1\sigma$ are slower overall.

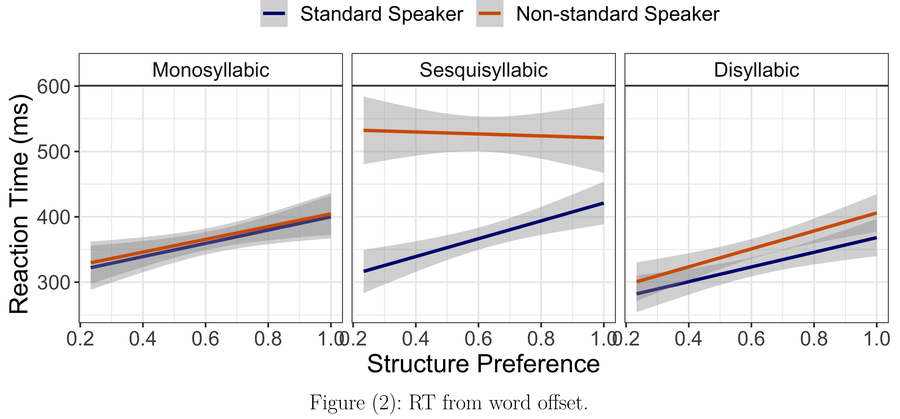

Figure (2): RT from word offset.

Summary & discussion

1. Does having multiple representations of the phonological structure of a word influence word recognition?

   Does it depend on the familiarity/typicality of the pronunciation of the word being recognized (cf [3])?

   - When the pronunciation is non-standard, RTs to sesquisyllables are slow.
   - When the pronunciation is fairly standard, RTs to sesquisyllables are not different from RTs to unambiguously monosyllabic words.

   Discussion: Suggests that having multiple structural representations does not pose any special problem for lexical access. Consistent with exemplar-based models, in which all words have multiple representations (cf [2]).

2. Does this influence depend on participants' own phonological judgments?

   - There is an effect of participants' phonological judgments on RT, but it is not specific to sesquisyllabic targets:
   - Judge sesquisyllables as $> 1\sigma$ ↔ slower RTs overall

   Discussion: Mysterious. Possibly both RT and syllable count judgments of sesquisyllables are related to a third factor, though it is not clear what that factor would be.

References

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Acknowledgements & contact info

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