Word Level Rhythm in Non-Native English
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Introduction
Word durations vary due to lexical features, both in the lexicon (e.g. frequency and part of speech), and the discourse (e.g. discourse status). The effects of these features on word duration have been thoroughly examined for native English speakers, but little is known about how these features affect duration in the speech of language learners. Exploring the effects of lexical features on word durations in non-native speech can provide insights into prosodic transfer from L1 to L2, and properties of the L2 lexicon.

In this study we address the following questions:
1. Are there differences between native and non-native English speakers in terms of word-level duration? If so, can these differences be explained by lexical features of English?
2. Are non-native-like word-level durational features associated with the perception of a stronger non-native accent?

Methods and Materials
Participants:
- 12 native American English speakers (6 males, 6 females)
- 20 Chinese learners of English (10 males, 10 females)
- 20 Korean learners of English (11 males, 9 females)

Materials:
- All participants read two paragraphs:
  - Stella Paragraph [11] Includes many difficult words for non-native English speakers
  - Second Mention Reduction Paragraph [2] Contains repeated words

Measurements and Analysis:
- Stella Paragraph: Measured all word durations
- Second Mention Reduction Paragraph: Measured repeated word durations
- Calculated ‘relative word durations’ by dividing word durations by total speech time
- Collected accent ratings from native English speakers on spontaneous speech produced by the non-native speakers

Background

<table>
<thead>
<tr>
<th>Lexical Class</th>
<th>Frequency</th>
<th>Discourse Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native English</td>
<td>Content longer than Function</td>
<td>Low frequency longer than High frequency</td>
</tr>
<tr>
<td>Other Languages</td>
<td>Content longer than Function</td>
<td>Non-Native English</td>
</tr>
<tr>
<td>Mandarin</td>
<td>Frequency longer than Turkish</td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td>Tone space expanded for low frequency words in Cantonese</td>
<td></td>
</tr>
<tr>
<td>Korean</td>
<td>Longer mention than Korean</td>
<td></td>
</tr>
<tr>
<td>Non-Native English</td>
<td>Less function word reduction for Japanese learners of English than native English speakers</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>1st mention longer than 2nd mention</td>
<td></td>
</tr>
<tr>
<td>Japanese</td>
<td>1st mention longer than 2nd mention</td>
<td></td>
</tr>
<tr>
<td>Indian English</td>
<td>1st mention longer than 2nd mention</td>
<td></td>
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<tr>
<td></td>
<td>Native</td>
<td>Non-Native</td>
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<tr>
<td></td>
<td>Native</td>
<td>Non-Native</td>
</tr>
</tbody>
</table>

Differences between natives and non-natives:
- For all words: Native speakers had significantly greater relative word duration variance than non-natives (p<.001)
- For content words alone: Native speakers had significantly greater relative word duration variance than non-native speakers (p<.05)

Differences between natives and non-natives:
- For all words: Native speakers had more variance in their relative word durations than non-natives (p<.001)
- For content words alone: Native speakers had more variance than non-native speakers (p<.01)

Differences between natives and non-natives:
- For all words: Native speakers reduced function words significantly more than non-native speakers (p<.001)

Lexical Class Results

<table>
<thead>
<tr>
<th>Native</th>
<th>Non-Native</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>2.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Analysis: Calculated variance of relative word durations for each participant

Within-Speaker Variance Results

- Non-native speakers with greater variance in their word durations received lower (more native-like) accent ratings
- Relative duration of function words correlated with accent rating (r = 0.44, p<.01)
- Non-native speakers with shorter function words received lower (more native-like) accent ratings - this may partially explain the within-subjects variance effect above

Summary/Discussion

1. Are there differences between native and non-native English speakers in terms of word-level duration? If so, can these differences be explained by lexical features of English?
- Variance: Individual native English speakers generally produced shorter short words and longer long words than non-native English speakers
- Native speakers reduced function words more than non-natives
- Native speakers had more variance in their relative content word durations than non-natives

2. Are non-native-like word-level durational features associated with the perception of a stronger non-native accent?
- Non-native speakers who have less variance in their relative word durations and less function word reduction were judged by native speakers to be more accented → Word-level durational features are associated with accentness

References


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